GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Sem 1 :Automobile Engineering / Fabrication Technology

Sem 2: Plastics Engineering

Course / Subject Code: DI01000201

Course / Subject Name: Computer Applications and Graphics

w. e. f. Academic Year:	2024-25
Semester:	1 or 2
Category of the Course:	ESC / BSC

Prerequisite:	NIL
Rationale:	The aim of this course is to help students understand and utilize office application software and basic engineering drafting software. It will provide hands-on experience with various software used for office automation, enhancing problem-solving skills through online resources for creating business documents, data analysis, graphical representations, and technical drawings. Additionally, it will teach students how to use Internet services for communication. Developing sketching abilities will strengthen effective engineering communication and presentation. This course will also develop students' skills in generating various digital production drawings required in the industry using different CAD software.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Utilize various computer hardware, peripheral devices and software tools.	**U**
02	Create professional documents, spreadsheets, and presentations using office application software.	**A**
03	Interpret cyber security while utilizing of internet services for various applications.	**A**
04	Draw simple 2D geometry drawings using CAD software.	**A**
05	Draw technical drawings using advance features in CAD software.	**A**

**Revised Bloom's Taxonomy (RBT)*

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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
0	0	6	3	0	0	20	30	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Basics of computer systems & internet and applications:** Computer system block diagram, concept of hardware and software. CPU, control unit, Arithmetic Logic Unit (ALU), memory unit, power unit and interfacing ports. Input Output unit: monitor, keyboard, external hard disk, mouse, printers, plotters, scanner, projectors, webcam, Mic, etc. Introduction to the internet and basic internet terminologies: browser, webpage, website, URL. Search engine introduction and search query. Applications of Internet Digital Platforms. (BHIM, Digi-Locker, m-Parivahan, NSDL, Digital Gujarat, Passport seva, UIDAI.)	10	12
2.	**Documentation, Spreadsheet & Presentation using Software:** **Using Text Processing** Basics of font type, size, color, effects and other text formatting features. Page settings and margins including header and footer in word document. Spelling and grammatical checks. Table and its options, inserting rows or columns, merging and splitting cells, arithmetic calculations in a table. Working with pictures, drawings and word-art, Mail merge. **Using Spreadsheet** Introduction to data, cell address, data types, formatting, number, text and date concept of hyperlink in spreadsheet. Understanding formulas, operators and common spreadsheet functions. Types of graphics: art, auto shapes, Images, charts. Concept of print area, margins, header, footer and other page setup options. **Using Professional Presentation**	18	22

	Creating new slides, working with text boxes, fonts, tables, Layouts, themes, effects, background and colors. Selecting, deleting, moving, copying, resizing and arranging objects. Working with drawing tools, applying shape or picture styles, applying object borders, object fill, object effects, clip art collection and modifying clip art. Embed a video, link to a video, size a video, video playback options, configuring a sound playback, assigning sound to an object, adding a digital music soundtrack, transition effects and timings. **Using Gujarati/Hindi IME** Installation of Guajarati/Hindi IME software. How to change language English to Gujarati/Hindi.		
3.	**Information Security:** Need for Information Security. Definition of various terms of Information Security. Cryptography, Vulnerability, Threat, Attack, Encryption, Decryption. Security services. Cyber-attacks: Introduction of common types of attacks. Preventing Tools: Antivirus, Firewall. Cyber Law: IT Amendment Act 2008 (Section 66 & 67).	4	5
4.	**Creating digital drawings using a Computer Aided Drafting (CAD) Software:** System requirements & understanding the interface. Explain Drawing standards. (IS-696 /SP 46) (Drawing/ printing/ storage). Components of a CAD software window: Such as Quick Access Toolbar, Ribbon, Command Bar, Orientation tools, Status bar, Different Menu / Tools / commands, etc. File features: new file, saving the file, opening an existing drawing file, Creating Templates, Quit. Setting up new drawing: Units, Limits, Grid, Snap. Methods of Specifying points: Absolute coordinates and Relative Cartesian & Polar coordinates. Use of object Snap. Concept of model space and paper space. Standard sizes of sheet: Selecting various plotting parameters such as Paper size, paper units, drawing orientation, plot scale, plot offset, plot area, print preview. Creating viewports in model space and creating floating view port in paper space. Shifting from model space to papers pace and vice versa.	24	28

	Take printouts from CAD software. Introduction to basic Edit, Inquiry and display commands: Copy, Rotate, Move, Erase, Mirror, Array, Trim, Break, Extend, Chamfer, Fillet. Zoom window, Zoom in-out, PAN. List, Delist, Area, Mass prop		
5.	**Advance editing of a drawing using a CAD software:** Properties, Line type, color, line weight Concept of Layers. Concept of Blocks. Concept of Hatch. Dimensioning: Types of dimensioning: Linear, Horizontal, Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions. Dim scale variable. Editing dimensions. Text styles: Selecting font, size, alignment etc.	28	33
	Total	**84**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
-	-	-	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Fundamentals of Computers, Sixth Edition, Raja Raman VAdabala N, Prentice Hall India Learning Private Limited. ISBN: 8120350677
2. Computer Course, R Taxali, Tata McGraw Hills. New Delhi. ISBN: 9780070700376
3. Information Technology, Dennis P. Curtin, Kim Foley, Kunal Sen and Cathy Morin, Tata McGraw Hills Publication. ISBN: 978- 0074635582
4. Computer Fundamentals R.S. Salaria Khanna Book Publishing Company ISBN: 978-9381068533
5. Machine Drawing including AutoCAD, Ajeet Singh, McGraw Hill
6. Engineering Graphics with AutoCAD, Sarkar.A.K, PHIindia
7. Essentials of Engineering Drawing and Graphics using AutoCAD, Jeyapoovan, Vikaspublication
8. AutoCAD User Guide, Autodesk, Autodesk Press.

(b) Open-source software and website:

- www.nptel.ac.in

- www.autodesk.com

Suggested Course Practical List (90 Hours)

1. Identify and prepare report document including sample specifications that contains brief information regarding various components of computer systems and peripheral devices available in the institute's computer labs.
2. Demonstrate the installation procedure of computer peripheral devices/software in Desktop/Laptop from the following list: - Computer Mouse & Keyboard (Wired/Wireless) - Webcam - Microphone - Scanner - Printer - Projector - Data Storage Devices (USB/Portable Hard Disk drive) - Operating systems/software tools
3. Install preferable web browser in the computer system and perform various use of web browser for accessing the internet facility.
4. Demonstrate participation in any three Digital India Platforms from the following list. Digital India Platforms: BHIM, Dig-Locker, m-Parivahan, the Unique Identification Authority of India (UIDAI), Digital Gujarat.
5. Create a text document incorporating various page setup feature, font, language and character feature, pictures-shape-icons-smart- art feature, header-footer with page number feature, using an equation and symbols, plot data table and chart/graph with referring published technical paper or any technical survey/Project report. Submit the completed report in PDF format.
6. Create spreadsheet document with use of sort & filter features, conditional formatting features, font & alignment setting, cell property and formatting features, analyze data using formulas and functions and present it through charts with referring student's results data sheet. Submit the completed spreadsheet in PDF format.
7. Create slide presentation of relevant topic using basic formatting features, insert and design slide, drawing tools, shape and picture style, object fill and effects, data table or 2D-3D charts, animation and transition effects, short media clip and hyperlink. Submit the completed presentation in PDF format.
8. Study of the features of firewall in providing network/cyber security and to set Firewall Security in computer operating system and visit site https://cert-in.org.in/
9. Draw and edit simple problems of different geometrical shapes in AutoCAD software using Drawing Tools, Modifying tools, Dimensioning tools, etc. Submit the completed drawings in PDF format. Write steps to prepare each drawing, Steps must include followings.
   A. Sketch of components at each step with dimensions.
   B. Sequence of commands with name, options and values.
10. Prepare orthographic production drawings of mechanical components with all necessary views, dimensions, tolerances, notes, title block, etc. using CAD software (Real industrial component may be selected by student as student activity and approved / assigned by teacher.) Submit the completed drawings in PDF format. Write steps to prepare each drawing/component. Steps must include followings.

A. Sketch of components at each step with dimensions.
B. Sequence of commands with name, options and values.

11. Prepare 2D drawings of mechanical assembly and its components with all necessary views, dimensions, tolerances, notes, title block, etc. using CAD software. (Following are some samples for reference; teacher may assign any other branch specific assembly). Take print out of the same using printer/plotter. 1. Drawing of cotter joint assembly 2. Drawing of knuckle joint assembly 3. Drawing of Flanged coupling assembly 4. Drawing of Machine vice assembly. Write steps to prepare each drawing/component/assembly. Steps must include the following.
    A. Sketch of components at each step with dimensions.
    B. Sequence of commands with name, options and values.

List of Laboratory/Learning Resources Required:

1. Computer system with latest configuration.
2. Laser printer-scanner, plotter.
3. Related software. (OS, open office, CAD software, MS office, Auto CAD, Anti-Virus software, Gujarati-Hindi language input tool software etc.)

Suggested Project List:

1. Word documents: Prepare Subject teacher assigned document/Reports covering all the major features of word processing software.
2. Slide Presentations: Prepare slides show with all Presentation features such as: classroom presentation, presentation about department, presentation about institute, presentation of report. (Subject teacher shall assign a presentation to be prepared by each student).
3. Spreadsheets: Prepare Pay bills/salary statements, tax statement, student's assessment record, and Students fees system, earning and expenditure statement of a company to ascertain profit-loss etc. using spreadsheet. (Teacher shall assign a spreadsheet to be prepared by each student).
4. Bring an industrial production drawing/component from workshop. Learn to interpret and list the commands to be used to draw it.

Suggested Activities for Students:

1. Encourage Students to create and design forms related to Departmental work.
2. Prepare a portfolio for the Digital India platform and identify digital services for Indian citizens.
3. Students are encouraged to register themselves in various MOOCs such as: Swayam, edx, Coursera, Udemy etc. to further enhance their learning.
4. Select simple mechanical components each made up of a minimum of 5-6 manufacturing operations. Get them approved by the teacher. Measure and sketch them in report pages with dimensions.

5. Select at least one simple mechanical assembly in a group of 5-6 students, each made up of a minimum of 5-6 components. Get them approved by the teacher. Measure and sketch them in report pages with dimensions.
6. Bring Actual assembly from workshop/industry, measure dimensions, sketch it and make 2D production drawing for the same.