

**GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)****Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)**

II – Semester

**Course Title: Computer Applications and Graphics**

(Course Code: 4300019)

<b>Diploma programmer in which this course is offered</b>	<b>Semester in which offered</b>
Mechanical Engineering, Automobile Engineering, Fabrication Technology.	Second

**1. RATIONALE**

The objective of this subject is to make the students understand and apply the functioning of office application software, basic engineering drafting software. It will provide the student hands-on experience on different application software used for office automation and improve day-today problem-solving skills using online resources for creating business documents, data analysis, graphical representations and creating, editing and printing technical drawings. It will also enable the student to use Internet services for different communication. Development of sketching ability strengthens effective engineering communication & presentation. This course helps to develop the skills in student to generate various digital production drawings as required in industry using various CAD software.

**2. COMPETENCY**

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Develop basic skills using various IT software tools for creating professional documents, analyzing data, preparing multimedia presentation and use internet services.**
- **Prepare production drawings using computer and relevant software following standards codes and norms.**

**3. COURSE OUTCOMES (COs)**

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

- a) Utilize various computer hardware, peripheral devices and software tools.
- b) Create professional documents, analyzing data and presentation using various IT software tools.
- c) Interpret cyber security in use of internet services for various applications.
- d) Draw simple Mechanical components/assembly in 2D using CAD software.

#### 4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	CA	ESE	CA	ESE	
0	0	4	2	00	00	25*	25	50

(\*): For this practical only course, 25 marks under the practical CA have two components i.e. the assessment of micro-project, which will be done out of 10 marks and the remaining 15 marks are for the assessment of practical. This is designed to facilitate attainment of COs holistically, as there is no theory ESE.

**Legends:** **L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **CA** - Continuous Assessment; **ESE** -End Semester Examination.

#### 5. SUGGESTED PRACTICAL EXERCISES

Following practical outcomes (PrOs) are the sub-components of the Course Outcomes (Cos). All PrOs are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
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.	I	02
2	Demonstrate the installation procedure of computer peripheral devices/software in Desktop/Laptop from the following list: <ul style="list-style-type: none"> <li>- Computer Mouse &amp; Keyboard (Wired/Wireless)</li> <li>- Webcam</li> <li>- Microphone</li> <li>- Scanner</li> <li>- Printer</li> <li>- Projector</li> <li>- Data Storage Devices (USB/Portable Hard Disk drive)</li> <li>- Operating systems/software tools</li> </ul>	I	02
3	Install preferable web browser in the computer system and perform various use of web browser for accessing the internet facility.	I	02
4	Demonstrate participation in any three Digital India Platforms from the following list. Digital India Platforms: BHIM, Dig-Locker, mParivahan, The Unique Identification Authority of India (UIDAI), Digital Gujarat.	I	02
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	II	06

Sr. No.	Practical Outcomes (PROs)	Unit No.	Approx. Hrs. Required
	referring published technical paper or any technical survey/Project report. <b>Submit the completed report in PDF format.</b>		
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. <b>Submit the completed spreadsheet in PDF format.</b>	II	06
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. <b>Submit the completed presentation in PDF format.</b>	II	06
8	Study of the features of firewall in providing network/cyber security and to set Firewall Security in computer operating system and visit site <a href="https://cert-in.org.in/">https://cert-in.org.in/</a>	III	02
9	Draw and edit 4 simple problems of different geometrical shapes in AutoCAD software using Drawing Tools, Modifying tools, Dimensioning tools, etc. <b>Submit the completed drawings in PDF format.</b> 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.	IV	4
10	Prepare orthographic production drawings of minimum four 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.) <b>Submit the completed drawings in PDF format.</b> 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.	IV	12
11	Prepare 2D drawings of minimum one 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	V,VI	12

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	Write steps to prepare each drawing/component/assembly. Steps must include followings. A. Sketch of components at each step with dimensions. B. Sequence of commands with name, options and values.		
			56

### **Note**

*i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*

The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency.

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
1.	Lab Records and regularity	20
2.	Question answer / Writing steps of exercise	20
3.	Execution of exercise	20
4.	Printout/Result	10
5.	Viva voice	30
<b>Total</b>		<b>100</b>

## **6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED**

These major equipments with broad specifications for the PrOs is a guide to procure them by the administrators to user in uniformity of practical's in all institutions across the state.

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1.	Computer system with latest configuration.	All
2.	Laser printer-scanner, plotter.	All
3.	Related software. (OS, open office, CAD software, MS office, Auto CAD, Anti-Virus software, Gujrati-Hindi language input tool software etc.).	All

## **7. AFFECTIVE DOMAIN OUTCOMES**

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfill the development of this course competency.

- a) Work as a leader/a team member.
- b) Follow safety practices while using electrical and electronics equipment.
- c) Maintain tools and equipment.
- d) Realize importance of E-waste management. (Environment related).

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1<sup>st</sup> year
- ii. 'Organization Level' in 2<sup>nd</sup> year.
- iii. 'Characterization Level' in 3<sup>rd</sup> year.

## 8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
<b>Unit-I</b>  <b>Basics of Computer Systems &amp; Internet and applications</b>	1a Describe computer system and its components. 2a Explain functions of CPU, ALU and memory unit of a computer system. 3a Describe basic terminologies of Internet. 4a Utilize the internet for various applications.	1.1 Computer system block diagram, concept of hardware and software. 1.2 CPU, control unit, Arithmetic Logic Unit (ALU), memory unit, power unit and interfacing ports. 1.3 Input Output unit: monitor, keyboard, external hard disk, mouse, printers, plotters, scanner, projectors, webcam, Mic, etc. 1.4 Introduction to internet and basic internet terminologies: browser, webpage, website, URL. 1.5 Google search engine introduction and search query. 1.6 Applications of Internet Digital Platforms. (BHIM, Digi-Locker, mParivahan, NSDL, Digital Gujarat, Passport seva, UIDAI.)

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
<b>Unit-II Documenta- tions, Spreadsheet &amp; Presentation using Software.</b>	2a. Write steps for text formatting, page Setup features, checking spelling and grammar, with header and footer for a text document. 2b. Write steps for inserting graphics/clipart, shapes and table in a text document. 2c. Write steps to mail merge documents for inviting students. 2d. Write steps for creating spreadsheet and representing in the form of chart. 2e. Write steps to setup page as per given layout and print a spreadsheet sheet. 2f. Write steps for creating presentation and apply basic formatting features using spreadsheet. 2g. Write steps to insert objects, clips, video, audio, with special effects and hyperlink in a multimedia presentation. 2h. Write steps for installing Indic IME Gujarati for creating a document.	<b>Using Text Processing</b> 2.1. Basics of font type, size, color, effects and other text formatting features. 2.2. Page settings and margins including header and footer in word document. 2.3. Spelling and grammatical checks. 2.4. Table and its options, inserting rows or columns, merging and splitting cells, arithmetic calculations in a table. 2.5. Working with pictures, drawings and word-art, Mail merge. <b>Using Spreadsheet</b> 2.6. Introduction to data, cell address, data types, formatting, number, text and date concept of hyperlink in spreadsheet. 2.7. Understanding formulas, operators and common spreadsheet functions. 2.8. Types of graphics: art, auto shapes, Images, charts. 2.9. Concept of print area, margins, header, footer and other page setup options. <b>Using Professional Presentation</b> 2.10. Creating new slides, working with text boxes, fonts, tables, Layouts, themes, effects, background and colors. 2.11. Selecting, deleting, moving, copying, resizing and arranging objects. 2.12. Working with drawing tools, applying shape or picture styles, applying object borders, object fill, object effects, clip art collection and modifying clip art.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
		2.13. Embed a video, link to a video, size a video, video playback options. 2.14. Configuring a sound playback, assigning sound to an object, adding a digital music sound track, transition effects and timings. <b>Using Gujarati/Hindi IME</b> 2.15. Installation of Gujarati/Hindi IME software. 2.16. How to change language English to Gujarati/Hindi. 2.17. Introduction about the Gujarati/Hindi keyboards. 2.18. Introduction about the Gujarati IME and create Documents in Gujarati/Hindi.
<b>Unit-III Information Security.</b>	3.a. Explain concepts of Information Security for Data Protection. 3.b. Write various methods to secure your personal computer Describe cyber laws for data protection and IPR.	3.1. Need for Information Security. 3.2. Definition of various terms of Information Security. - Cryptography - Vulnerability - Threat - Attack - Encryption - Decryption 3.3. Security services. 3.4. Cyberattacks: Introduction of common types of attacks. 3.5. Preventing Tools: Antivirus, Firewall. 3.6. Cyber Law: IT Amendment Act 2008 (Section 66 & 67).
<b>Unit– IV Creating digital drawings using a Computer Aided Drafting (CAD) Software.</b>	4.a. Start Computer aided drafting software (AutoCAD). 4.b. Invoke commands in AutoCAD. 4.c. Set limits & Coordinate systems. 4.d. Use object selection.	Introduction to Basic Draw Commands in any Computer Aided Drafting software like AutoCAD Power draft, Micro station:  4.1. System requirements & Understanding the interface. 4.2. Explain Drawing standards. (IS-696 /SP 46) (Drawing/

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
	4.e. Create basic & advance 2D entities Close & save work	<p>printing/ storage).</p> <p>4.3. Components of a CAD software window: Such as Quick Access Toolbar, Ribbon, Command Bar, Orientation tools, Status bar, Different Menu / Tools / commands, etc.</p> <p>4.4. File features: New file, saving the file, Opening an existing drawing file, Creating Templates, Quit.</p> <p>4.5. Setting up new drawing: Units, Limits, Grid, Snap,</p> <p>4.6. Methods of Specifying points- Absolute coordinates and Relative Cartesian &amp; Polar coordinates.</p> <p>4.7. Use of object Snap</p> <p>4.8. Concept of model space and paper space.</p> <p>4.9. Standard sizes of sheet. Selecting various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.</p> <p>4.10. Creating view ports in model space and creating floating viewport in paper space. Shifting from model space to paper space and vice versa.</p> <p>4.11. Take print outs from a CAD Software.</p>
<b>Unit – V Editing Drawing using a CAD software.</b>	<p>5 a. Modify existing 2D entities.</p> <p>5b. Use different arrays in existing 2D drawing.</p> <p>5c. View given drawing entities properly.</p> <p>5d. Enquire about various attributes of existing 2D entities.</p>	<p>Introduction to Basic Edit, Inquiry and display Commands.</p> <p>5.1. Copy, Rotate, Move, Erase, Mirror, Array, Trim, Break, Extend, Chamfer, Fillet.</p> <p>5.2. Zoom window, Zoom in-out, PAN.</p> <p>5.3. List, Dblist, Area, Massprop.</p>



Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
<b>Unit – VI Advance editing of a drawing using a CAD Software.</b>	6 a. Use layers for proper management of drawings. 6b. Set properties of existing drawing entities as per requirement. 6c. Able to dimension given 2D entities with perfection. 6d. Use Blocks effectively to create perfect drawings.	Introduction to Advanced Modify & other utility Commands in any Computer Aided Drafting software like Auto CAD Power draft, Micro station:  6.1. Properties, Line type, color, line weight 6.2. Concept of Layers. 6.3. Concept of Blocks. 6.4. Concept of Hatch. 6.5. Dimensioning: Types of dimensioning: Linear- Horizontal, Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions. 6.6. Dim scale variable. 6.7. Editing dimensions. 6.8. Text Styles: Selecting font, size, alignment etc.

### 9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
<b>Not applicable</b>						

**Legends:** R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

### 10. SUGGESTED STUDENT ACTIVITIES

Other than the laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- Undertake micro-projects in team/individually.
- Encourage Students for creating and designing forms related to Departmental work.
- Prepare a portfolio for the Digital India platform and identify digital services for Indian citizens.
- Students are encouraged to register themselves in various MOOCs such as: Swayam, edX, Coursera, Udemy etc. to further enhance their learning.

- e) Select at least four simple mechanical components each made up of minimum 5-6 manufacturing operations. Get them approved by teacher. Measure and sketch them in report pages with dimensions. (For Ex.No.10).
- f) Select at least one simple mechanical assembly in group of 5-6 students, each made up of minimum 5-6 components. Get them approved by teacher. Measure and sketch them in report pages with dimensions. (For Ex.No.11).
- g) Bring Actual assembly from workshop/industry, measure dimensions, sketch it and make 2D production drawing for the same.(For Ex.No.11)
- h) Prepare the Charts that classify recycling process for electronic waste and plastics.

### 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b) Guide student(s) in undertaking micro-projects.  
About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature may be given to the students for **self-learning**, but to be assessed using different assessment methods.  
Guide students on addressing the issues on environment and sustainability using the knowledge of this course.
- c) Introduce IS Codes of drawing for self-study.
- d) Guide students for keeping the drawings in digital form and reduce use of paper.

### 12. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-projects are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

- a) Word documents: Prepare Subject teacher shall assign document/Reports to be prepared by each student covering all the major features of word processing software.
- b) 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).

- c) Spreadsheets: Prepare Pay bills/salary statements, tax statement, student's assessment record, 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).
- d) Bring an industrial production drawing/component from workshop. Learn to interpret and List the commands to be used to draw it.

e) **Sorting of e-waste: Compile a report for sorting different types of electronic and plastic waste.**

### 13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1.	Fundamentals of Computers, Sixth Edition	Rajaraman V, Adabala 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, Cathy Morin	Tata McGraw Hills Publication. ISBN: 978-0074635582
4.	MS-Office for Dummies	Wallace Wang	Wiley India, New Delhi. ISBN: 9788126578559
5.	Sams Teach Yourself Internet and Web Basics All in One	Ned Snell, Bob Temple, Michael Clark	Sams Publishing, Indiana, USA, ISBN:0672-32533-0
6.	Computer Fundamentals	R.S. Salaria	Khanna Book Publishing Company ISBN: 978-9381068533
7.	Machine Drawing including AutoCAD	Ajeet Singh	McGraw hill
8.	Production Drawing	K L Narayan	New Age Publication
9.	Fundamental of Geometric Tolerance and dimensioning	Alex Krulikowski	Cengage Learning
10.	Engineering Graphics with AutoCAD	Sarkar .A.K	PHI india
11.	Essentials of Engineering Drawing and Graphics using AutoCAD	Jeyapoovan	Vikas publication
12.	AutoCAD User Guide	Autodesk	Autodesk Press.

**14. SOFTWARE/LEARNING WEBSITES**

- a. <https://www.tutorialspoint.com>
- b. [https://edu.google.com/intl/ALL\\_in/teacher-enter/products/forms/?modal\\_active=none](https://edu.google.com/intl/ALL_in/teacher-enter/products/forms/?modal_active=none)
- c. [www.w3schools.com](http://www.w3schools.com)
- d. <https://support.microsoft.com/en-us/training>
- e. <https://edu.gcfglobal.org/en/topics/googleapps/>
- f. <https://www.udemy.com>
- g. <https://www.coursera.org/>
- h. <https://www.digitalindiaportal.co.in/>
- i. <https://getintopc.com/>
- j. <https://nptel.ac.in/>
- k. <https://magazine.opensourceforu.com/>
- l. <https://www.electronicsforu.com/>
- m. <https://www.redhat.com/en>
- n. <https://www.netacad.com/>
- o. <https://www.cert-in.org.in/>
- p. [https://www.youtube.com/results?search\\_query=engineering+drawing](https://www.youtube.com/results?search_query=engineering+drawing)
- q. <https://www.youtube.com/c/MechanicalEnggSubjectsGTU/playlists>
- r. <https://youtu.be/MT1T31GtGpg>
- s. <https://youtu.be/WEwkepkv6mg>
- t. <https://youtu.be/trJQIvatlpl>
- u. <https://nptel.ac.in/courses/112/103/112103019>
- v. <https://nptel.ac.in/courses/112/105/112105294>
- w. [https://en.wikipedia.org/wiki/Engineering\\_drawing](https://en.wikipedia.org/wiki/Engineering_drawing)
- x. <https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing>
- y. [https://www.scribd.com/search?content\\_type=tops&page=1&query=engineering%20drawing&content\\_types=tops,books,audiobooks,summaries,articles,documents,shet\\_music,podcasts](https://www.scribd.com/search?content_type=tops&page=1&query=engineering%20drawing&content_types=tops,books,audiobooks,summaries,articles,documents,shet_music,podcasts)
- z. <http://www.cognifront.com/tools.php>
- aa. <https://www.youtube.com/watch?v=bmAlJAMndwM>
- bb. [https://www.youtube.com/watch?v=904\\_RPjGJg4](https://www.youtube.com/watch?v=904_RPjGJg4)
- cc. <https://www.youtube.com/watch?v=jzIDouas0Wc>
- dd. <https://www.youtube.com/watch?v=VuHdV38fyjc>
- ee. [https://www.youtube.com/watch?v=iOzIIJge\\_G0](https://www.youtube.com/watch?v=iOzIIJge_G0)
- ff. <https://www.youtube.com/watch?v=-l0iRdH3MbA>
- gg. <https://www.youtube.com/watch?v=vI5xhCD5mXQ>
- hh. <https://www.youtube.com/watch?v=GDrD9nEZ9LY>

## 15. PO-COMPETENCY-CO MAPPING

Semester II	Computer Applications and Graphics (Course Code: 4300019)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning
<b>Competency</b> 1. Develop basic skills using various IT software tools for creating professional documents, analyzing data, preparing multimedia presentation and use internet services.	3		2	2	2		2
2. Prepare production drawings using computer and relevant software following standards codes and norms.	3		2	2	2	1	2
CO 1) Utilize various computer hardware, peripheral devices and software tools.	3			2			2
CO 2) Create professional documents, analyzing data and presentation using various IT software tools	3	1	2	2	2		2
CO 3) Use internet services for various applications.	2			2	2		2
CO 4) Draw simple Mechanical assembly in 2D using CAD software.	3		2	2	2	1	2

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO.

**16. COURSE CURRICULUM DEVELOPMENT COMMITTEE****GTU Resource Persons**

<b>Sr. No.</b>	<b>Name and Designation</b>	<b>Institute</b>	<b>Contact No.</b>	<b>Email</b>
1.	Dr.J.B.Patel, Lecturer in Mechanical Engineering	SIR Bhavsinhji Polytechnic Institute, Bhavnagar	9998816294	jaybpti241120@gmail.com
2.	Prof. N.G.Parmar, Lecturer in Mechanical Engineering	R.C.Technical Institute,Ahmedabad	9426333054	ng_parmar@yahoo.co.in
3.	Prof. H.V.Patel, Lecturer in Automobile Engineering.	SIR Bhavsinhji Polytechnic Institute, Bhavnagar	9978872090	hvpautodept@gmail.com
4.	Prof. R.B.Zapadiya, Lecturer in Fabrication Techmology	SIR Bhavsinhji Polytechnic Institute, Bhavnagar	9033219351	rohan.zapadiya@gmail.com

**BOS Resource Persons**

<b>Sr. No.</b>	<b>Name and Designation</b>	<b>Institute</b>	<b>Contact No.</b>	<b>Email</b>
1.	Dr.S.H.Sundarani BOS Chairman HOD Mechanical Engg.	Government Polytechnic Ahmedabad	9227200147	gpasiraj@gmail.com
2.	Dr.Rakesh.D.Patel BOS Member HOD Mechanical Engg.	B&B Institute of Technology V V Nagar	9825523982	rakeshgtu@gmail.com
3.	Dr.Atul.S. Shah BOS Member Principal	B.V.Patel Institute of Technology Bardoli	7567421337	Assshah97@yahoo.in