Jharkhand University of Technology, Ranchi

Diploma First Year

Session: 2023-2024

Branch: Automobile Engineering/ Civil Engineering/ Computer Engineering/ Computer Science Engineering/ Computer Science & Information Technology/ Computer Engineering Application Computer Science & Engineering/ Electrical Engineering/ Electrical & Electronics Engineering/ Food Technology/ Mechanical Engineering/ Mechanical Engineering (Automobile)/ Computer Engineering / Metallurgical Engineering / Mining Engineering.

Jharkhand University of Technology, Ranchi

Diploma- First Semester

Branch: Automobile Engg. / Electrical Engg. / Electrical & EC Engg / Food Technology / Mechanical Engg. / Computer Engg. / ECE / Computer Sc. & Engg / Civil Engineering / Information Tech./ Metallurgical Engg. / Computer Engg. Applications / MEA/ CS & IT / AA

S. No.	Course Code	Course Title	L	T	P	J	Cr	FM	Overall Pass Marks	Internal	External		Categorisation
			Hours Per Week							FM	FM	PM	
01	AEC01	Engineering Mathematics	3	1	-		4	100	40	30	70	-	AEC
02	DSC01	Engineering Physics	2	0	-		2	100	40	30	70	-	DSC
03	DSC02	Engineering Chemistry	2	0	-		2	100	40	30	70	-	DSC
04	AEC02	Communication Skills	1	0	-		1	100	40	30	70	-	AEC
05	SEC02	Fundamentals of ICT	1	0	-		1	100	40	30	70	-	SEC
Total			09	1		6	10	500	-	-	-	-	-
Practical			**L**	**T**	**P**		**Cr**	**FM**		**Internal**	**External**	**PM**	**Categorisation**
07	DSC01P	Engineering Physics	-	-	2		1	50	25	30	20	10	DSC
08	DSC02P	Engineering Chemistry	-	-	2		1	50	25	30	20	10	DSC
09	AEC02P	Communication Skills	-	-	2		1	50	25	30	20	10	AEC
10	DSC03P	Engineering Graphics	2	-	4		4	50	25	30	20	10	DSC
11	SEC01P	Engineering Workshop	-	-	4		2	50	25	30	20	10	SEC
12	SEC02P	ICT Skills	-	-	2		1	50	25	30	20	10	SEC
Audit Course													
13	AU01P	NSS/NCC/Yoga and Meditation/Sports/Creative Arts/Classical Music & Dance	-	-	4		1	50*	25	30	20	10	AU
Total			-	-	20		11	300		-	-	-	-
Grand Total			11	01	20	6	21	800		-	-		-

Note: -

Course Category: Ability Enhancement Course (AEC): 02, Discipline Specific Course Core (DSC): 02, Discipline Specific Elective (DSE): 0, Audit Course (AU): 01, Internship /Apprentice /Project/Community (INP): 0, Skill Enhancement Course (SEC): 02, Generic Elective (GE): 0

Audit Course*:

1. One has to secure minimum pass mark prescribed for the course.
2. Passing the audit course shall be compulsory.

Self-learning (J): Self learning hours shall not be reflected in the Timetable. Self-learning includes micro project / assignment / other activities.

1. The objective of self-learning is to develop an appreciation of rural culture amongst the students.
2. To learn about the status of various agricultural and development program.
3. To understand the cause of distress and poverty faced by the rural people (vulnerable household) and explore solution for them.
4. To apply classroom knowledge of courses to feel realities and thereby improve quality of learning.

Students are supposed to do at least five of the following field based practical activities under the supervision of one teacher in a group of Twenty students: -

I. Visit MANREGA national rural project site and interact with beneficiaries and interview functionaries at the work site.
II. Field visit to Swatch Bharat project sites, conduct analysis and initiate problem-solving measures.
III. Visit rural schools/ mid-day meal centers, study academic and infrastructural resources, digital device gap sources.
IV. Interaction with the SHG's of women members/ Gram-Sabha and study their functions challenges, planning for their skill building and livelihood building.
V. Visit local Anganwadi centers and observe the services being provided.
VI. Attend parent's teachers meeting at school level and interview reason for the dropouts.
VII. Organize awareness program, health camps (disability camp and cleanliness camp)
VIII. Conduct soil health test drinking water analysis, energy use and fuel efficiency survey and building solar power village.

For the activity like group discussion/ Seminar / PI etc.

1. One faculty from concerned department and other faculty either from HSS or training placement cell will be assigned to make the students ready for industry.
2. Institutions should also conduct some interactive session with domain experts from the industry/ academia/ HR head of different organization.

Subject: Engineering Mathematics
Subject Code: - AEC01 (L-3, T-1)

RATIONALE:

Mathematics provides foundation for all engineering subjects. Deep thought is given while selecting topics of this subject known as "Engineering Mathematics-1" which intends to teach students basic facts, concepts and principles of mathematics as a tool to analyze engineering problems. It lays down the foundation for understanding core engineering and technological subjects.

OBJECTIVE:

This subject helps the students to develop logical thinking, which is useful in comprehending the principles of all professional subjects. Analytical and systematic approach towards any problem is developed through learning of this subject. Mathematics being a versatile subject can be used as a tool at every stage of human life.

Course Outcomes:

Students will be able to achieve & demonstrate the following:

1. Apply the concepts of algebra to solve engineering (discipline) related problems.
2. Utilize trigonometry to solve branch specific engineering problems.
3. Solve engineering problems with different parameters of straight line.
4. Apply differential calculus to solve discipline specific problems.

Unit No.		Topic	Hours
1.		**ALGEBRA**	**16**
	1.1	Prerequisites: Revision of Arithmetic, Geometric and Harmonic Progressions, Formula of n^{th} term and sum to n-terms of Arithmetic and Geometric Progressions. Expression of $\sum n$, $\sum n^2$, $\sum n^3$.	02
	1.2	Logarithm: Concept and laws of logarithm with simple problems.	02
	1.3	Matrices: Matrices, Algebra of matrices, Transpose, Value of Determinant of matrix of order 3x3, Ad joint and Inverse of matrices. Determinants of order 3x3, its properties.	04
		Solution of simultaneous equations by Matrix inversion method.	02
	1.4	Partial Fractions: Types of partial fraction based on Nature of factors and related Problems.	02

	1.5	BINOMIAL THEOREM Definition of Factorial notation, Definition of Permutation and Combinations with formula (without proof). Derivation of simple identities. Binomial theorem for positive index. General term, Middle term, independent term and coefficient of x^n. Simple Problems.	03
	1.6	Algebra in Indian Knowledge System: Solution of Simultaneous equations (Indian Mathematics).	01
2.		**Trigonometry**	**08**
	2.1	REVISION: Measurement of an angle (degree and radian). Relation between degree and radian. Trigonometrical ratios of 0^o, 30^0, 45^0, 60^0, 90^0, $90^0 \pm \theta$, $180^0 \pm \theta$, $360^0 \pm \theta$. Fundamental identities.	01
	2.2	Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), submultiples angles, Factorization and De factorization formulae (Without Proof).	04
	2.3	Inverse Trigonometric Ratios and related problems: Principle values and relation between trigonometric and inverse trigonometric ratios.	02
	2.4	Trigonometry in Indian Knowledge System.	01
3.		**COORDINATE GEOMETRY**	**08**
	3.1	Revision: Concept of Cartesian and Polar coordinate System. Distance formula, Section formula, midpoint, centroid of triangle. Area of triangle and condition of collinearity.	02
	3.2	Straight Line: Straight line and slope of straight line. Angle between two lines, Condition of parallel and perpendicular lines. Various forms of straight lines: Slope point form, two-point form, Double intercept form, General form. Perpendicular distance from a point on the line. Perpendicular distance between two parallel lines.	05
	3.3	Geometry Indian Knowledge System.	01
4.		**Differential Calculus**	**10**
	4.1	Functions and Limits: Concept of function and simple Examples. Concept of limits with examples.	03
	4.2	Derivatives: Rules of derivatives such as Sum, Product, Quotient of functions.	01

	4.3	Derivatives: Derivative of Composite functions (Chain Rule), Implicit and Parametric functions.	03
	4.4	Derivatives of Inverse, Logarithmic and Exponential Functions.	02
	4.5	Calculus in Indian Knowledge System: The discovery of Calculus by Indian Astronomers.	01

Suggested Books / Learning Materials.

Sr.No.	Title	Authors	Publications
1	Mathematics: A Textbook for ClassXI Part I &II	National Council of Educational Research and Training	
2	Mathematics: A Textbook for ClassXII Part I &II	National Council of Educational Research and Training	
3	Mathematics for Class XI	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
4	Mathematics for Class XII	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
5	Higher Sr. Secondary School Mathematics for XI & XII	R.S. Agrawal	Bharti Bhawan, Patna
6	Higher Engineering Mathematics	B. S. Grewal	Khanna publication, New Delhi
7	Advance Engineering Mathematics	H. K. Das	S Chand publication, New Delhi
8.	A First Step to Differential Calculus	Dr Manoj Kumar	KDP, e-book https://amzn.eu/d/aqxvcip
9.	maths for the beginner	Dr Manoj Kumar	https://youtube.com/@kumara-mq9xz?si=gZ3Ic9c9frKP0n6S
10.	Web portal: https://www.ndl.gov.in/homestudy/science https://ncertbooks.ncert.gov.in/login https://epathshala.nic.in// https://webscte.co.in/ https://en.wikipedia.org/wiki/ https://openlibrary.org/ https://www.youtube.com/ http://content.inflibnet.ac.in/ https://doabooks.org/ https://www.oapen.org/home http://www.gutenberg.org/		
10.	Apps in Google Play Store:National Digital Library		
11.	e-Granthalaya NSDC eBook Reader: Kaushal ePustakalaya ePathshala		
12.	IGNOU e-content		

Subject: **Engineering Physics**

Subject Code: - DSC01 **(L-2)**

RATIONALE:

Physics forms the foundation of Engineering and Technology. It provides fundamental facts, principles, laws and proper sequence of events to streamline Engineering knowledge. This course will help the Diploma Engineering students to apply the basic concepts and principles for solving various engineering problems.

OBJECTIVE OF LEARNING:

Study of Engineering Physics gives an understanding of physical world by observations and predictions. This course will help the diploma students to develop proper understanding of physical phenomenon, scientific approach and engineering aptitude.

COURSE OUTCOMES:

Student will be able to:

- Measure dimensions of given objects by using appropriate instruments accurately and estimate the errors in measurements of physical quantities with precision.
- Solve the problems based on kinetics and apply the concept of Hooke's Law to solve various problems in the field of engineering and technology.
- Identify good and bad conductors of heat and apply the concept of waves in various engineering applications of wave dynamics

CONTENTS: THEORY

UNIT	CONTENT	HOURS
1	**UNITS AND MEASUREMENTS** 1.1 Need of measurement and unit in Engineering and science, Definition of Unit, Fundamental and Derived physical Quantities and their units, systems of units-CGS, MKS and S.I. 1.2 Scalar and vector physical quantities ,definition of dimensions with examples, dimensional formula, Applications of dimensional analysis – principle of homogeneity of dimensions, to check the correctness of a physical relation, Conversion of one system of units to another. 1.3 Definition of error, types of errors – instrumental, systematic and random error, estimation of errors – absolute error, relative error and percentage error, significant figures Ancient astronomical instruments : Chakra, Dhanuyantra, Yasti and Phalaka yantra. Applications of Vernier callipers, Screw gauge. (Simple problems)	6
2	**2.1 LINEAR MOTION AND FORCE**	4
	Equations of motion with uniform acceleration- (i) $v = u + at$ (ii) $s = ut + \frac{1}{2} at^2$ (iii) $v^2 = u^2 + 2as$ (iv) $s_n = u + \frac{1}{2} a(2n-1)$ Newton's laws of motion, force, inertia, momentum, impulse With practical examples, law of conservation of linear Momentum. (Simple problems)	

	2.2 GRAVITATION	4
	Newton's laws of gravitation, universal gravitational constant(G) and its S.I. unit, acceleration due to gravity(g) and its relation with 'G' , variation of g with altitude, depth and latitude. (Simple problems)	
	2.3 ELASTICITY	4
	Deforming force, restoring force, elastic and plastic body, stress & strain with their types, elastic limit, Hooke's law, Young's modulus, Bulk modulus, modulus of rigidity and relation Between them. (No derivation). (Simple problems)	
	2.4 PRESSURE	2
	Definition of pressure, units, atmospheric pressure, gauge Pressure, absolute pressure.	
3	**3.1 HEAT**	4
	Three modes of transmission of heat- conduction, convection and radiation with daily life examples, laws of thermal conductivity, coefficient of thermal conductivity and its S.I Unit. Definition of coefficient of linear, superficial and cubical Expansion and relation between them. (No derivation). (Simple problems)	
	3.2 SOUND	4
	Definition of wave motion, amplitude, time period, frequency, and wavelength, derivation of relation $v=n\lambda$,longitudinal and transverse wave, definition of stationary wave, node and Antinode. (Simple problems)	
	Total	28

Subject: **Engineering Physics Lab**
Subject Code: - DSC01P **(P-2)**

LIST OF EXPERIMENTS:

1. To use Vernier calipers for the measurement of dimensions of given object.
2. To use micrometer screw gauge for the measurement of dimensions (thickness / diameter) of given object.
3. To use spherometer for the measurement of thickness of a given glass piece.
4. To calculate Young's modulus of elasticity of given wire by Vernier method / Searle's method.
5. Determination of acceleration due to gravity using simple pendulum.
6. To determine the velocity of sound using resonance tube.
7. To determine the refractive index of a glass using glass slab by pin method ($\sin i / \sin r = \mu$).
8. To calculate the coefficient of linear expansion for copper using Pullinger's apparatus.

SUGGESTED BOOKS/ LEARNING MATERIALS:

Sl. No.	Title	Authors	Publications
1	Engineering Physics	R K Gaur & S L Gupta	Dhanpat Rai Publications
2	Concept of Physics – I	H.C. Verma	Bharti Bhawan Publications
3	Core Physics - I	A. Kumar	Bharti Bhawan Publications
4	Pradeep's Fundamental Physics – XI	K.L. Gomber & K.L. Gogia	Pradeep Publication
5	S. Chand's Principles of Physics- XI	V. K. Mehta & Rohit Mehta	S. Chand & Co.
6	Dinesh New Millennium Physics- XI	S.K. Sharma	Dinesh Publication
7	Fundamentals of Physics	Resnick, Hlliday & Walker	Wiley India Pvt. Ltd.
8	Foundation of Physics (Theory & Experiments)	Devraj Singh & Dharmendra K. Singh	Dhanpat Rai & Co.
9	Modern abc of Physics, Part- I	Satish K. Gupta	Modern Publishers
10	Practical Physics	C.L. Arora	S. Chand Publications

Subject: **Engineering Chemistry**

Subject Code: - DSC02 **(L-2)**

Unit 1: Atomic Structure **6 hours**

Indian Chemistry: - Philosophy of atom by Acharya Kanad. Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Mass no., Isotopes & Isobars & their distinction with suitable examples, Bohr's Theory, Definition & Shape of the orbitals & distinction between Orbits & Orbitals, Hund's Rule, Aufbau's Principle, Pauli's exclusion principle, Electronic Configuration, (till Atomic no. 30), Quantum Number, Definition & types of Compounds. Distinction between electrovalent & covalent compounds, electronic theory of valency: Assumptions, Chemical bonds: Types and characteristics of electrovalent bond, covalent bond, coordinate bond, hydrogen bond, and metallic bond, VSEPR Theory.

Unit 2: Electrochemistry, Metal Corrosion & Its Prevention **7 hours**

Electrolytic dissociation, Arrhenius Theory of Ionization, Degree of Ionization & factors affectingdegree of ionization, Electrolyte - Types of electrolytes, ionization and dissociation, Cathode, Anode, Electrode potential: oxidation and reduction, Electrolysis, Electrochemical series for cations and anions. Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaCl solution & fused NaCl by using carbon electrode, Faraday's laws of electrolysis: Faraday's first and second law and its Numerical. Applications of electrolysis: Electro-refining of copper and electroplating, Difference between Primary and Secondary cell.

Corrosion: Definition and Types of corrosion Dry corrosion: Mechanism, Types of oxide film, Wet corrosion: Mechanism hydrogen evolution in acidic medium, Factors affecting the rate of corrosion. Corrosion control: Modification of environment, Use of protective coatings, coating of less active metal like Tin (Tinning), coating of more active metal like Zinc (Galvanizing), Anodic and Cathodic protection, Choice of material- using pure metal and using metal Alloy.

Unit 3: Engineering Materials **7 hours**

Paints: Definition, Purposes of applying paint, Characteristics of paints, Ingredients of paints, Function and examples of each ingredient. Varnish: Types, Difference between paint and varnishes. Insulators: Characteristics, Classification, Properties and Application of Glass wool Thermocol, Asbestos. Polymer and monomer: Classification on the basis of Molecular structure, on the basis of monomers (homo polymer and copolymer), on the basis of Thermal behavior (Thermoplastics and Thermosetting). Types of Polymerization Reaction, Addition Polymerization, Condensation Polymerization, Synthesis, properties and application of Polyethylene, Polyvinyl chloride, Teflon, Polystyrene, Phenol formaldehyde, Epoxy Resin.

Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanization of Rubber with Chemical Reaction. Synthetic Rubber: Definition, Distinction between Natural & Synthetic rubber. Properties & applications of Vulcanized & Synthetic Rubber. Adhesives: Definition, Characteristics, Classification and their uses.

Unit 4: Environmental Effects (Awareness level) **8 hours**

Definition of Pollution & Pollutant, Causes of Pollution, Types of Pollution - Air & WaterPollution. Types of Air pollutants their Sources & Effects, such as Gases, Particulates, Radio, Active Gases, Control of Air Pollution, Air Pollution due to Internal Combustion Engine & Its Control Methods, ESP, Catalytic converter, Bag house filter Deforestation their effects & control measures. Cause, Effects & control measures of Ozone Depletion & Green House Effect. Causes & Methods of Preventing WaterPollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical &Biological Characteristics, Concept & significance of BOD, COD, Biomedical Waste & E –Waste, their Origin, Effects & Control Measures, Preventive Environmental Management(PEM) Activities.

Subject: **Engineering Chemistry Lab**

Subject Code: - DSC02P **(P-2)**

1. Identification of any Four Cations in given ionic salt solutions.
    i. Basic Radicals: Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K^{+}, NH_4^{+}.
2. Identification of any Four Anions in given ionic salt solutions.
    i. Acidic radicals: Cl^{-}, Br^{-}, I^{-}, CO_3^{-2}, SO_4^{-2}, NO_3^{-}.
3. To standardize $KMnO_4$ using Sodium Oxalate.
4. To determine pH of given solution by Universal Indicator & pH meter.
5. To determine the strength of given HCl solution by NaOH solution using pH meter titration.
6. To prepare Phenol-Formaldehyde Resin (Bakelite).
7. To determine Neutralization, point of Fatty Acid & NH_4OH & calculate strength & Normality of Fatty Acid.
8. To determine percentage of Fe in the given Mohr's salt solution.
9. Determination of thinner content in oil paint.
10. To determine the Equivalent Conductivity of preparation of $BaCl_2$ with H_2SO_4 by Titration Method using Conductivity Meter & also find the Normality & Strength of $BaCl_2$ solution.

Suggested Learning Materials / Books

1. Jain and Jain, Engineering Chemistry, National Council of Education Research and Training, New Delhi, 2010, ISBN: 8174505083
2. Dara S.S., Engineering Chemistry, National Council of Education Research and Training, New Delhi, 2015, ISBN: 8174505660
3. Aryabhatta, The Surya Siddhanta, Baptist Mission press, Calcutta
4. Steeramula Rajeswara Sarma, The Archaic And The Exotic: Studies In The History Of Indian Astronomical Instruments, Manohar Book Service, 2008 ISBN 10: 8173045712 / ISBN 13 : 9788173045714
5. Anju Rawlley,Devdatta V. Saraf, Applied Chemistry with Lab Manual, Khanna Book Publishing Co. (P) Ltd. New Delhi, 2021, ISBN- 978-93-91505-44-8

Subject: **Communication Skills**

Subject Code: - AEC02 **(L-1)**

Course Outcomes:

Students will be able to achieve & demonstrate the following:

1. Construct grammatically correct sentences in English.
2. Compose paragraphs and dialogues on given situations.
3. Comprehend passages correctly.
4. Use contextual words in English appropriately.
5. Deliver effective presentations in English using appropriate body language.

Unit 1: Vocabulary **6 hours**

Phonetics: Vowels (12), Consonants (24), Diphthongs (8). Prefix & Suffix: Definition & Examples, List of common prefixes and suffixes. Synonyms & Antonyms: Vocabulary expansion, Context & Usage. Homophones: Identifying Homophones, Meaning & Context, Vocabulary Expansion. Collocations: Definition & identification, Types of collocations.

Unit 2: Paragraph and Dialogue Writing **2 hours**

Types of paragraphs: Technical, Descriptive, Narrative. Dialogue Writing: i Greetings ii. Development iii. Closing Sentence Phonetic

Unit 3: Comprehension (Seen and Unseen Passages) **3 hours**

Say No to Plastic bags, Interview of Dr. APJ Abdul Kalam, Maximum Achievements, Be Remarkable, Arunima Sinha: A Biography, Roses of Gratitude. Importance of Comprehension. Unseen Passages. Interpretation of passages in written and spoken form.

- Let not confined to specific text.
- Literature available on related topic on electronic media or print media.
- Q/A on this topic.
- Unseen Passage for comprehension.

Unit 4: Communicative Language **1 hours**

Technical objects: i. Heading ii. Description of technical objects. Picture Description: i. Situational picture ii. Describe in your own words. Diary Entry: i. Date ii. Content iii. Name of the writer. Translation of paragraph from English to Marathi/Hindi-Vice versa (Question not to be asked on Translation in Theory Examination).

Unit 5: Presentation Skills **2 hours**

Dressing & Grooming: i. Dressing for the occasion ii. Proper grooming. Speech Writing: i. Situation ii. Salutations iii. Introduction of the topic iv. Description/Body v. Conclusion. Power Point Presentation: i. Layout ii. Font size iii. Color combination. Kinesics: i. Facial expressions ii. Eye contact iii. Postures iv. Gestures.

Subject: Communication Skills
Subject Code: - AEC02P (P-2)

Any 12 out of 16 practical are compulsory.

1. Write 20 words using phonetic transcription.
2. Practice pronunciation as per IPA using language lab.
3. Formulate 20 words using Prefix and Suffix.
4. Construct sentences using 20 collocations.
5. Write two paragraphs of 75 words each.
6. Compose situational dialogues (Any Two).
7. Enact Role Plays as per situation and context.
8. Describe any three technical objects using correct grammar.
9. Narrate anecdotes of various situations in English.
10. Describe a given picture (Any Two).
11. Introduce oneself and others.
12. Prepare a Power point presentation on a given topic.
13. Translate paragraph --English to Hindi (vice -Versa) (Any4).
14. Write your experience in 50 words on (Four) given situations (Diary Entry).
15. Respond to the questions based on the given passages.
16. Deliver oral presentations using correct grammar and appropriate body language.

Suggested Learning Materials / Books

1. Kumar, E. Suresh, Sreehari, P Savitri, Effective English with CD, Pearson Education.
2. Gnanamurli, English Grammar at a Glance, S. Chand.
3. CBSE, English Communicative (class X), Golden.
4. Dr. Anjana Tiwari, Communication Skills in English, Khanna Publishers, New Delhi.

Subject: **Fundamentals of ICT**
Subject Code: - SEC02 **(L-1)**

Course Outcomes:

Students will be able to achieve & demonstrate the following.

1. Use computer system and its peripherals for given purpose.
2. Prepare Business document using Word Processing Tool.
3. Analyze Data and represent it graphically using Spreadsheet.
4. Prepare professional Slide Show presentations.
5. Use different types of Web Browsers and Apps.
6. Explain concept and applications of Emerging Technologies.

Unit 1: Introduction to Computer System **4 hours**

Basics of Computer System: Overview of Hardware and Software: block diagram of Computer System, Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit Internal components: processor, motherboards, random access memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives). External Devices: Types of input/output devices, types of monitors, keyboards, mouse, printers: Dot matrix, Inkjet and LaserJet, plotter and scanner, external storage devices CD/DVD, Hard disk and pen drive. Application Software: word processing, spreadsheet, database management systems, control software, measuring software, photo-editing software, video-editing software, graphics manipulation software System Software compilers, linkers, device drivers.

Network environments: network interface cards, hubs, switches, routers and modems, concept of LAN, MAN, WAN, WLAN, Wi-Fi and Bluetooth. Working with Operating Systems: Create and manage file and folders, Copy a file, renaming and deleting of files and folders, Searching files and folders, application installation, creating shortcut of application on the desktop.

Unit 2: Word Processing **2 hours**

Word Processing: Overview of Word processor Basics of Font type, size, colour, Effects like Bold, italic, underline, Subscript and superscript, Case changing options, Previewing a document, Saving a document, Closing a document and exiting application. Editing a Document: Navigate through a document, Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting. Changing the Layout of a Document: Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs. Inserting Elements to Word Documents: Insert and delete a page break, Insert page numbers, Insert the date and time, Insert special characters (symbols), Insert a picture from a file, Resize and reposition a picture

Working with Tables: Insert a table, convert a table to text, Navigate and select text in a table, Resize table cells, Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent page. Working with Columned Layouts and Section Breaks: a Columns,

Section breaks, Creating columns, Newsletter style columns, changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Column widths, Adjust.

Unit 3: Spreadsheets **4 hours**

Working with Spreadsheets: Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, Close and open Workbook. Editing Worksheet: Insert and select data, adjust row height and column width, delete, move data, insert rows and columns, Copy and Paste, Find and Replace, Spell Check, Zoom In-Out, Special Symbols, Insert Comments, Add Text Box, Undo Changes, - Freeze. Formatting Cells and sheet: Setting Cell Type, Setting Fonts, Text options, Rotate Cells, Setting Colors, Text Alignments, Merge and Wrap, apply Borders and Shades, Sheet Options, Adjust Margins, Page Orientation, Header and Footer, Insert Page Breaks.

Working with Formula: Creating Formulas, Copying Formulas, Common spreadsheet Functions such as sum, average, min, max, date, In, And, or, mathematical functions such as sqrt, power, applying conditions using IF. Working with Charts: Introduction to charts, overview of different types of charts, Bar, Pie, Line charts, creating and editing charts. Using chart options: chart title, axis title, legend, data labels, Axes, grid lines, moving chart in a separate sheet. Advanced Operations: Conditional Formatting, Data Filtering, Data Sorting, Using Ranges, Data Validation, Adding Graphics, Printing Worksheets, print area, margins, header, footer and other page setup options.

Unit 4: Presentation Tool **2 hours**

Creating a Presentation: Outline of an effective presentation, identify the elements of the User Interface, Starting a New Presentation Files, Creating a Basic Presentation, Working with textboxes, Apply Character Formats, Format Paragraphs. Inserting Media elements: Adding and Modifying Graphical Objects to a Presentation - Insert Images into a Presentation, insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format

Working with Tables: Insert a Table in a Slide, Format Tables, and Import Tables from Other Office Applications. Working with Charts: Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications.

Unit 5: Basics of Internet and Emerging Technologies **2 hours**

Creating World Wide Web: Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers- history, extension, default page, default search engine, creating and retrieving bookmarks, use search engines. Web Services: e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e-Reservation, e-Groups, Social Networking. Emerging Technologies: IOT, AI and ML, Drone Technologies, 3D Printing. Tools: Docs, Drive, forms, quiz, Translate and other Apps.

Subject: **ICT Skills**
Subject Code: - SEC02P **(P-2)**

1. Work with Computer System, Input/output devices, and peripherals. b) Work with files and folders.
2. Work with document files: a) Create, edit and save document in Word Processing. b) Text, lines and paragraph level formatting.
3. Work with Images and Shapes in Word Processing.
4. Work with tables in Word Processing.
5. Working with layout and printing a) Document page layout, Themes, and printing. b) Use of mail merge with options.
6. Create, open and edit Worksheet.
7. Formulas and functions in Worksheet.
8. Sort, Filter and validate data in Spreadsheet.
9. Charts for Visual Presentation in Spreadsheet.
10. Worksheet Printing.
11. Make Slide Show Presentation.
12. Use Tables and Charts in Slide.
13. a) Insert Animation effects to Text and Slides. b) Insert Audio and Video files in presentation.
14. a) Internet connection configuration b) Use Internet and Web Services.
15. Working with Browsers.
16. Prepare Forms for Survey.
17. Prepare Forms for Quiz.

Suggested Learning Materials / Books

1. Goel, Anita, Computer Fundamentals, Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097.
2. Schwartz, Steve, Microsoft Office 2010 for Windows: Visual Quick Start, Pearson Education, New Delhi India, 2012, ISBN : 9788131766613.
3. Leete, Gurdy, Finkelstein Ellen, Mary Leete, OpenOffice.org for Dummies, Wiley Publishing, New Delhi, 2003 ISBN : 978-0764542220.
4. Miller, Michael, Computer Basics Absolute Beginner's Guide, Windows 10, QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516.

Subject: **Engineering Graphics Lab**

Subject Code: - DSC03P **(L-2, P-4)**

Rationale:

Normally Graphical representation is used for expressing intents and contents. Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and conveying the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects.

Course Outcomes:

Students will be able to achieve & demonstrate the following:

1. Draw geometrical figures and engineering curves.
2. Apply principles of orthographic projections for drawing given pictorial views.
3. Draw isometric views of given component or from orthographic projections.
4. Use various drawing codes, conventions and symbols as per IS SP-46 in engineering drawing.
5. Use computer aided drafting packages.

Unit	Name of Topic		No. of Sheet	No. of Hr.	
				Theory	Practical
01.	1.1- 1.2- 1.3-	Drawing Instruments and supporting material: Method to use them with applications standard size of sheets and I.S. codes for planning and layout Letters and Numbers as per BIS: SP46-2003 Scale (Plane and diagonal scale) reduced, enlarged and full-size scale.	02	04	08
02	2.1- 2.2- 2.3-	Curves and Conic Section:Concept and Understanding of focus, directrix, vertex and eccentricity. To draw ellipse by directrix and arc of circle method To draw parabola by directrix and rectangle method To draw hyperbola by rectangle and directrix method.	03	06	12
03	3.1- 3.2-	Introduction to orthographic projection of first angle and third angle method and their symbols. Projection of point on principal, auxiliary and profile planes. Idea of shortest distance.	02	04	08
04	4.1- 4.2- 4.3- 4.4-	Projection of straight line on principal plane in the following cases. Parallel to both H.P and V.P Inclined to one plane and parallel to other plane. Inclined to both planes. Projection of simple plane.	01	02	04
05	5.1-	Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, cylindrical surfaces.	01	02	04

06	6.1-	Projection of simple solid. Projection of Prism, Pyramid, Cone, Cylinder, and Cube with their axis Inclined to one reference plane and parallel to other.	02	04	08
07	7.1-	Isometric Scale and their use in drawing isometric views of single and compound solids. (Simple case only)	01	02	04
08	8.1-	AutoCAD Introduction to basic, lawyer, Multi-lawyer Image, Graphic Interfaces, Sketch & Different views in AutoCAD.	02	04	08
		Total-	**14**	**28**	**56**

Suggested Learning Materials / Books

1. Bureau of Indian Standards, Engineering Drawing Practice for Schools and Colleges IS: SP-46, Third Reprint, October 1998 ISBN No. 81-7061-091-2.
2. Bhatt, N.D., Engineering Drawing, Charotar Publishing House, 2010 ISBN No. 978-93-80358-17-8.
3. Bhatt, N.D.; Panchal, V. M, Machine Drawing, Charotar Publishing House, 2010 ISBN No. 978-93-80358-11-6.
4. Dhawan, R.K., Engineering Drawing, S. Chand and Company New Delhi, ISBN No. 81-219-1431-0.
5. Mohan, K.R., Engineering Graphics, Dhanpat Rai & Publication Co.
6. Mastering AutoCAD, BPB Publication.

1. Identify fire extinguisher according to their specification.
2. Perform mock drill session in group of minimum 10 students for extinguishing fire.
3. Identify different tools used in workshop.
4. Prepare job using following operations: part 1 a. Marking operation as per drawing b. punching operation as per drawing c. Filing operation as per drawing d. sawing operation as per drawing e. drilling operation as per drawing f. tapping operation as per drawing.
5. Prepare T joint pipe fitting job as per given drawing (individually).
6. Prepare elbow joint pipe fitting job as per given drawing (individually).
7. Prepare bill of material for given pipeline layout (individually).
8. Practice different safety rules in welding shop as per given instruction.
9. Prepare lap joint using gas welding as per given drawing (individually).
10. Prepare butt joint using gas welding as per given drawing (individually).
11. Prepare utility job (like stool, benches, tables or similar jobs) involving arc welding and artificial wood as per given drawing (in group of 4 to 5 students) Fabrication operation involve measuring, marking, cutting, edge preparation, welding.
12. Prepare sheet metal utility job using following operations a. Cutting and Bending b. Edging c. End curling d. Lancing e. Soldering f. Riveting.
13. Draw sketches of various ancient tools.

Suggested Learning Materials / Books

1. Gupta, J.K.; Khurmi, R.S., A Textbook of Manufacturing Process (Workshop Tech.), S.Chand and Co. New Delhi ISBN:81-219-3092-8.
2. Hajra; Choudhary, Elements of Workshop Technology, Media Promoters and Publishers Mumbai, 2009, ISBN: 10-8185099146.
3. Sarathe, A.K., Engineering Workshop Practice, Khanna Book Publishing CO(P) LTD, New Delhi, ISBN No. 978-93-91505-51-6.
4. Raghuwansi, B.S; Workshop Technology, Dhanpat Rai & Co.