

1ST SEM

TECHING SCHEME

Subject code	Subject	Teaching Scheme				Examination Scheme				
		L	T	P	C	Theory		Practical		TOTAL
						ESE	PA	ESE	PA	
3300001	BASIC MATHEMATICS	2	2	0	4	70	30	0	0	100
3300002	ENGLISH	3	2	0	5	70	30	20	30	150
3300003	ENVIRONMENT CONSERVATION & HAZARD	4	0	0	4	70	30	0	0	100
3300006	ENGINEERING CHEMISTRY (GROUP-2)	3	0	2	5	70	30	20	30	150
3300013	BASIC OF COMPUTER & INFORMATION TECHNOLOGY	0	0	4	4	0	0	40	60	100
3300015	FUNDAMENTAL OF MECHANICAL ENGINEERING	3	0	2	5	70	30	20	30	150
	TOTAL	15	4	8	27	350	150	100	150	750

DE EE SEM-1 Detail Syllabus (3300001) BASIC MATHEMATICS

Teaching Scheme			Total credit	Examination scheme				Total Marks
				Theory Marks		Practical Marks		
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
2	2	0	4	70	30	0	0	100

Unit – 1 Logarithm: Concept, Rules and related Examples

Unit- II Determinants and Matrices: Idea of Determinant and Matrix, Addition/Subtraction, Product, Inverse up to 3X3 matrix, Solution of Simultaneous Equations (up to three variables)

Unit- III Trigonometry: Units of Angles (degree and radian), Allied & Compound Angles, Multiple –Submultiples angles, Graph of Sine and Cosine, Periodic function, sum and factor formulae, Inverse trigonometric function

Unit– IV Vectors: Basic concept of Vector and Scalar, addition & subtraction, Product of Vectors, Geometric meaning of Scalar and Vector Product. Angle between two vectors, Applications of Dot (scalar) and Cross (vector) Product, Work Done and Moment of Force.

Unit-V Menstruation: Area of Triangle, Square, Rectangle, Trapezium, Parallelogram, Rhombus and Circle Surface & Volume of Cuboids, Cone, Cylinder and Sphere.

Reference Books: Polytechnic Mathematics by S P Deshpande.

Syllabus of (3300002)ENGLISH

Teaching Scheme			Total credit	Examination scheme				Total Marks
				Theory Marks		Practical Marks		
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
3	2	0	5	70	30	20	30	150

Unit – I Grammar:

Tenses : Present Tense (Simple, Continuous, Perfect, Perfect Continuous), Past Tense (Simple, Continuous, Perfect), Future Tense (Simple).

Determiners: Articles (A, An, The) Some, Any, Much, Many, All, Both, Few, A few, The few,

Little, A little, The little, Each, Every.

Modal Auxiliaries: Can, Could, May, Might, Shall, Should, Will, Would, Must, Have to, Need, Ought to

Subject- Verb Agreement

The Passive Voice: Simple Tenses, Perfect Tenses And Modal, Auxiliary Verbs

Prepositions: Time, Place and Direction

Connectors: And, But, Or, Nor, Though, Although, If, Unless, Otherwise, Because, as, Therefore, So, Who, Whom, Whose, Which, Where, When, Why.

Unit – II Comprehension Passages:

Comprehension Passages: Lincoln's Letter to His Son's Teacher (Abraham Lincoln), What we must Learn from the West (Narayana Murthy), Dabbawallas : Mumbai's Best Managed Business (Amberish K. Diwanji), Internet (Jagdish Joshi)

Vocabulary Items: Matching items (word and its Meaning), One word Substitution, Phrases and idioms, Synonyms and Antonyms from given MCQs.

Unit – III Short Stories:

My Lost Dollar by Stephen Leacock, The Snake in the Grass by R K Narayan, A Day's Wait by Earnest Hemingway.

Unit – IV Writing Skills:

Dialogue Writing

Samples for Practice: Meeting and Parting, Introducing and Influencing, Requests, Agreeing and Disagreeing, Inquiries and Information

Letter: Placing an order, Letter to Inquiry, Letter of Complaint, Letter of Adjustment, Letter seeking permission

Unit – V Speaking Skills:

For 28 hours of practical periods, digital language laboratory is recommended to be established in every polytechnic. But as polytechnics currently do not have digital language laboratories practical periods will be engaged encouraging the students to speak as per the text taught in the class

Reference Books: High School English Grammar by Wren & Martin

**Syllabus of (3300003) ENVIRONMENT CONSERVATION & HAZARD
MANAGEMENT**

Teaching Scheme			Total credit	Examination scheme				Total Marks
				Theory Marks		Practical Marks		
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
4	0	0	4	70	30	0	0	100

Unit – I Ecology and environment: Importance of environment and scope, Engineering and environment issues, The natural system, Biotic and a-Biotic components and processes of natural system, Eco system, food chain and webs and other biological Systems, Causes of environmental pollution, Pollution due to solid waste, water pollution, air pollution, the Noise as pollution, Pollution of land due to industrial and chemical waste, Radiation and its effects on vegetables and animals.

Unit– II Sustainable Development: Concept of sustainable development, Natural resources, a-biotic and biotic resources, Principles of conservation of energy and management, Need of Renewable energy, Growth of renewable energy in India and the World, Concept of waste management and recycling.

Unit –III Wind Power: Growth of wind power in India, Types of wind turbines – Vertical axis wind turbines (VAWT) and horizontal axis wind turbines (HAWT), Types of HAWTs – drag and lift types Working of large wind turbines, Aerodynamic control of large and small wind turbines, Types of electrical generators used in small and large wind turbines.

Unit – IV Solar Power: Features of solar thermal and PV systems, Types of solar cookers and solar water heaters, Solar PV systems and its components and their Working, Types of solar PV cells, Solar PV and solar water heaters, rating and costing.

Unit – V Biomass energy: Types of Biomass Energy Sources, Energy content in biomass of different types, Types of Biomass conversion processes, Biogas production.

Unit – VI Seismic Engineering and disaster management: Introduction of seismic engineering and its application civil engineering designs, Features of disasters such as Floods, Earthquakes , Fires, Epidemics, Gas/radioactive leaks etc., Management and mitigation of above disasters

Reference Books: Renewable Energy Technologies by Chetan Singh solanki.

Syllabus of (3300006)ENGINEERING CHEMISTRY (GROUP-2)

Teaching Scheme			Total credit	Examination scheme				
				Theory Marks		Practical Marks		Total Marks
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
3	0	2	5	70	30	20	30	150

Unit – I Chemical Bondings and Catalysis: Introduction, Theory Of Valence ,Types of chemical bonds, Electrovalent bond,& its characteristics , Covalent bond & its characteristics, Co-ordinate bond & its characteristics ,Hydrogen bond, its types and Significance , Metallic bond, Explanation of Metallic prop1.3 Intermolecular force of attraction, Molecular arrangement in solid, liquid and gase1.5 Structure of solids. Metallic solids- Unit cell- bcc, fcc and hcp pof metals –examples and properties reflected by tpacking of atoms , Catalysis, Types of catalysis, Theory of Catalysis ,Types of Catalyst, Positive Catalyst ,Negative Catalyst, Auto-catalyst Catalytic Promoter and Catalytic inhibitor, Industrial Application of Catalyst.

Unit– II Concepts of Electro Chemistry: Introduction, Arrhenius theory of ionization. Degree of ionization, Factors affecting the degree of Ionization, Definition of pH ,pH of acid, base and neutral solution, pH calculations of acid, base and salt solution at different concentration, Importance of pH in various fields. Definition of buffer solution. Buffer Action & Types of buffer solution. Application of buffer solutions. Electrolytes and Non-electrolytes, Types of electrolytes, Construction and working of electrochemical cell, Standard conditions, Standard

hydrogen electrodes, Nernst theory of single electrode potential & Nernst equation, Electrochemical series, galvanic series, Electrolysis, Faradays laws of electrolysis, Industrial application of Electrolysis, Conductance of solution (a) Conductivity (b) Specific Conductivity (c) Equivalent conductivity (d) Molar conductivity

Unit– III Corrosion of metals & its prevention : Definition of corrosion ,Types of corrosion, Dry corrosion: Oxidation corrosion mechanism ,corrosion-mechanism , Nature of oxide film, Wet corrosion-mechanism , Concentration cell corrosion, Pitting corrosion ,Waterline corrosion, Crevice corrosion, Factors affecting the rate of corrosion,- Nature of film, Nature of Environment, PH of Solution, Area of cathode anode and, Temperature, Moisture, Purity of metal ,. Methods of prevention of corrosion-Modification of environment, Modification of the properties of metal , Use of protective coatings. Anodic and cathodic protection, Modification in design and choice of material.

Unit– IV Fuels and Combustion: Definition of fuels classification of fuels ,Calorific value and its unit ,Determination of calorific value by Bomb calorimeter, Solid Fuels: Coal Classification of coal proximate and ultimate analysis of fuels ,Numerical based analysis of coal-Dulong formula, Liquid Fuels: Petroleum, Origin of petroleum& Composition of petroleum, Refining of petroleum Octane Number of petroleum, Cetane number of Petroleum , Power alcohol, Bio-diesel. Gaseous fuels: Composition, Properties and application of natural gas CNG,LPG and LNG- Properties and application Hydrogen gas as fuel ,Combustion-chemical reaction.

Unit– V Lubricants: Introduction and definition of lubricants, function of lubricants, Types of lubrication, Fluid film lubrication. Boundary lubrication, Classification of lubricants Solid lubricants, Semi-solid lubricants , Liquid lubricants, Synthetic oils , Physical Properties of lubricants and thlike, Viscosity and viscosity index, Flash point and fire point , Pour point and cloud point oiliness , Chemical Properties of lubricants like Saponification value, Neutralization number, Emulsification number Selection of lubricants for Gears, Cutting tools , Steam turbine.

Unit– VI Polymers, Elastomers & Insulating Material: Introduction and Definition of Polymer and Monomer , Classification of Polymer on basis of Molecular structure as Linear, Branch and Cross-linked polymers , Classification on basis of monomers (homo polymer and copolymer) , Classification of Polymers on basis of Thermal behavior (Thermoplastics& Thermosetting) ,Types polymerization Reaction , Addition Polymerization, Condensation Polymerization Synthesis, properties and application of Polyethylene Polypropylene, Polyvinyl chloride, Teflon, Polystyrene ,Phenol formaldehyde, Acrylonitrile , Epoxy Resin Elastomers, Natural rubber and its properties Vulcanization of rubber, Synthetic rubber, Synthesis, proand uses Buna-S Rubber, Buna-N Rubber ,Neoprene Rubber Insulators: Definition : Classification and properties oinsulating materials : Natural insulating materials(wood,cotton,mica,pa6.12.2 Insulating oils. Insulating wool, resines Synthetic insulating.

Unit– VII Electrochemical Energy Sources: Batteries: An electrochemical source of energy, Types of Batteries :-Primary, Secondary and fuel batteries. Dry cell- construction and working.

Lead acid storage cell- -construction and working. Nickel/Cadmium battery –construction and Working. Fuel cell- definition example H₂/O₂ fuel cell [green fuel cell] - solar cells

Reference Books: Engineering Chemistry by JAIN & JAIN.

Syllabus of (3300013) Basic of Computer & Information Technology

Teaching Scheme			Total credit	Examination scheme				
				Theory Marks		Practical Marks		Total Marks
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
0	0	0	4	0	0	40	60	100

Unit – I Basics of Computer System: Basics of Computer System: Concept of Hardware and Software, Computer block diagram, Input Output unit CPU, Control Unit, Arithmetic logic Unit(ALU), Memory Unit, Monitor, Printers: Dot matrix, Laser, Inkjet, Plotters, Scanner, System software and Application Software, Operating system concepts, purpose and functions, Operations of Windows OS. Creating and naming of file and folders Copying file, renaming and deleting of files and folders, Searching files and folders, installation application, creating shortcut of application on the desktop Overview of control Panel, Taskbar.

Unit– II Using MS – Word 2007: Using MS - Word 2007: Overview of Word processor Basics of Font type, size, colour, Effects like Bold, italic , underline, Subscript and superscript, Case changing options, Inserting, deleting, undo and redo, Copy and Moving (cutting) text within a document, Formatting Paragraphs and Lists Setting line spacing; single Page settings and margins including header and footer Spelling and Grammatical checks Table and its options, Inserting rows or columns, merging and splitting cells, Arithmetic Calculations in a Table. Working with pictures, Inserting Pictures from Files, Using Drawings and WordArt; Lines and Shapes, Modifying Drawn Objects, Formatting Drawn Objects, options for Creating and Modifying a WordArt Object.

Unit– III Using MS – Excel 2007: Using MS - Excel 2007:Introduction to Excel 2007, Introduction to data, Cell address, Excel Data Types, Concept of hyperlink ,Introduction to formatting, number, text and date formatting, Concept of worksheet and workbook, Understanding formulas, Operators in Excel2007, Operators Precedence, Understanding Functions, Common Excel Functions such as sum, average, min, max, date, transpose, In, And, or, sqrt, power, upper, lower. Types of graphics : Word art, auto shapes ,Images, Introduction to charts, overview of different types of charts available with Excel, Concept of print area, margins, header, footer and other page setup options.

Unit – IV Using MS -PowerPoint 2007: Using MS - PowerPoint 2007:Outline of an effective presentations, Starting a New Presentation Files, Saving work, Creating new Slides, Working with text boxes Changing a slides Layout, Applying a theme, Changing Colours, fonts and effects, Creating and managing custom Colour & font theme, Changing the background Managing slides master, Managing theme. Changing the font, font size, font colour, text fill, Adjusting character spacing and line spacing Formatting text boxes. Word arts, styles, Formatting bulleted lists and numbered list, Finding and replacing text, Correcting your spelling, Creating a new and editing a table's structure, Selecting, deleting, moving, copying, resizing and arranging objects, Working with drawing tools, Applying shape or picture styles, Applying object borders, object fill, object effects. Working with 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 sound track, Transition effects and timings, Creating hyperlinks, Using action buttons.

UNIT-V MS-OFFICE INDIC & TBIL: Introduction about MS Office Indic, Installation of ms-office indic, How to change language English to Gujarati, Introduction about the Gujarati keyboards Introduction about the Gujarati IME. Difference between Remington and Transliteration K/B, How to operate the K/B. What is Transliteration K/B? How to type different Characters and Words from transliteration K/B, How to use IME help? How to use spelling grammars check in Gujarati? What is Smart Tag? What is Thesaurus? How to change the Menu from English to Gujarati? Convert the ASCII font to Unicode from TBIL Converter.

UNIT-VI Introduction to Internet HTML: What is the Internet? Web pages, Home page, Use of web sites, Access providers, Types of access, The browser, Universal resource locato, Browsing or surfing the web, A search engine, Internet phone

Applications of the Internet: E-mail, Voice mail, Newsgroup, Mailing list, Internet relay chat Games, Video-conferencing, File transfer protocol.

Unit – VII Using HTML: Basic structure of HTMLStructure of HTML Page, Inserting formatting tags for Text: bold, italic, underline, line break, special character, predefine headings, paragraph, comments. Font color, size, Alignment, Margin with body tag, background and text colour, Ordered and unordered lists

Tables, Images and Links in HTML: Tables – basic structure, Using TD, TR, TH tags, use of basic elements in table : border, cell padding, cell spacing, width, caption, align, bg color, Images in web page: inserting and formatting of images using SRC, border, V space, H space, align, ALT, height, width and background in HTML page , Types of links: Linking two or more web pages, linking within a web page, linking to external page, linking to a specific point in another web page, linking image file, mailto.

Working with Multimedia Objects: Video and sound file. Add marquees ofscrolling text. Inserting and controlling video and audio in HTML page.

Reference Books: Computer Course by R Taxali.

Syllabus of (3300015) Fundamental of Mechanical Engineering

Teaching Scheme			Total credit	Examination scheme				
				Theory Marks		Practical Marks		Total Marks
Theory	Tutorial	Practical	c	ESE	PA	ESE	PA	
3	0	2	5	70	30	20	30	150

Unit –1 INTRODUCTION: Introduction of mechanical engineering. Use of mechanical engineering In day to day life. Interdisciplinary use. Items in general use- identification criteria, major types, specifications and uses : such as bolts, nuts, washers, bearings, bushes, belts, springs, levers, couplings, brakes, screws, rivets, keys, o’ rings, oil seals, gears, pulleys, shafts, axles, etc. Pipes and pipe fittings- Types , specifications and uses of pipes and pipe fittings. Hand and power tools. Types, specifications and uses of spanners (such as fix, ring, box, pipe, allen, adjustable, etc.).Types, specifications and uses of hand tools(such as pliers, screw drivers, saws, hammers, chisels, cutters, planes, etc.).Types, specifications and uses of power tools (drill, chipper, etc.)

Unit –2 POWER TRANSMISSION & SAFETY: Power transmission: Importance. Modes (belt drives, rope drives, chain drives and gear trains).Types of belts. Gear train-concept, transmission ratio. Applications. Types and applications of couplings in power transmission. Causes and remedies of general accidents in power transmission. Safety norms to be followed for preventing accidents and damage in power transmission. Safety norms to be followed in mechanical based industries / shop floors.

Unit – 3 PROCESSES ON MATERIAL: 3.1 Welding. Types. Working setup of arc and gas welding, accessories and consumables. Types of work carried out by welding. Precautions and safety during arc and gas welding. Brazing and Soldering. General set up. Applications. Gas cutting. Working setup, accessories and consumables. Types of work carried out .Precautions and safety during gas cutting. Foundry. Concept Process of getting cast material. Applications. Other metal forming and cutting operations- bending, shearing-concept and applications. Basic machine tools. Working principle of hacksaw, lathe, drill and milling machines. Types of operations / jobs which can be performed on machine tools listed above.

UNIT –4 STEAM GENERATION AND PRIME MOVERS: Steam. Generation process. roperties. Boilers. Classification. Working. Accessories and mountings-types and applications. Applications. Regulations and safety requirements. Common troubles and remedies. Prime

movers. Meaning. Classification. Working. Steam turbine-working. Gas turbine-types and applications. Common troubles and remedies.

Unit –5 INTERNAL COMBUSTION ENGINES: Internal combustion engines Working of petrol engine, diesel engine and gas engine. Performance parameters. Main parts and functions. Applications. Common troubles and remedies.

Unit– 6HYDRAULIC AND PNEUMATIC DEVICES: Concept of theory of fluid flow. General properties of fluids. Pump. Working principle. Types. Working of centrifugal and reciprocating pumps. Performance parameters. Main parts of pumps and their functions. Common troubles and remedies. Water turbines-working principle, types and applications. Common troubles and remedies of water turbine. Air compressor. Working principle. Types. Performance parameters. Applications. Other hydraulic/pneumatic/ hydro-pneumatic equipments.. Principle of working-hydraulic lift, hydraulic pump, hydraulic power pack, hydraulic jack. Applications of above.

Unit – 7 MATERIAL HANDLING: Need of material handling. Types , principle of working and applications of material handling equipments. Hoisting equipments. Conveying equipments. Surface & overhead equipments. Earth moving machineries. Construction machineries. Criteria for selection of material handling equipments. Factors affecting selection of material handling equipments. Selection of suitable material handling equipment for the given situation. Common troubles and remedies.

Reference Books: Theory of Machines by R.S.Khurmi and J.K.Gupta