

SEMESTER: I

Course Objective:- To provide every student with opportunities to acquire the knowledge, values, attitudes, skills needed to protect and improve the environment; to create new patterns of behavior of individuals, groups, and society as a whole towards the environment.

COURSE CONTENT:

Unit I

Introduction to Environment

The Biosphere (biotic and abiotic factors), an aquatic ecosystem, types of pollution, impact of human being on environment, impact of environment on human being, basic approach to improve environmental qualities and role of an environmental engineer.

Air Pollution Sources & Effects

Standard definition of air pollution, composition of natural air, names of air pollutants, classification of air pollutants, primary and secondary pollutants, classification of sources of air pollutants on different bases and definition of different types of aerosols. Effect of air pollution on human health, material properties and vegetation, major toxic metals and their effects. Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion. Air quality standards and brief description of air pollution laws.

Unit II

AIR POLLUTION CONTROL, METHODS & EQUIPMENTS

Natural purification processes of air, artificial purification methods of air. Brief description of following control equipments along with sketch e.g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator. Brief description of following processes for the control of gaseous pollutants e.g. absorption, adsorption, condensation, combustion etc

Water Pollution Sources And Classification

Water resources, uses of water and classification of water, origin, composition and characteristics of domestic waste water as well as industrial waste water. Biochemical oxygen demand, Water pollution laws and standards, uses of waste water, classification of waste water - Chemical oxygen demand. Waste water treatment method and basic processes of water treatment.

Unit III

Waste Water Treatment Methods

Meaning of primary, secondary and tertiary treatment, flow chart of a simple effluent treatment plant, theory of industrial waste treatment, volume reduction, neutralization and proportioning.

Solid Waste Management.

Sources and classification of solid waste, public health aspects, disposal methods, open dumping, sanitary, land fill, incineration, composting . Potential methods of disposal, recovery and recycling of paper, glass, metal and plastics.

Unit IV

Noise Pollution & Control

Sources of noise pollution, units of noise pollution, measurement, allowable limits for different areas, problems of noise pollution and measures to control it. Noise pollution control devices (brief discussion)

Unit V

Safety Practices

Responsibility of employees and employers regarding health and safety, fire hazards (prevention and precautions), industrial hazards (prevention and protection) and protection from air and noise pollution.

Out comes:-Students are expected to be able to:

1. Articulate the interdisciplinary context of environmental issues.
2. Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.
3. Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives

References

1. Environmental Pollution Control Engineering by C.S. Rao
 2. Air Pollution and Control by Seth
 3. Air Pollution by M.N. Rao
 4. Industrial Waste and its Treatment by Seth
 5. Paryavaran Yantriki Hindi Granth Akadami.
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SEMESTER: I

Objective- The objective of this course is to fulfill the needs of students to understand the Applications of mathematics in the field of Engineering. It covers Algebra, Permutation, Binomial theorem, Concept & Principles of Determinants, Types of Matrices, Trigonometry and Statistical Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems.

Algebra: Arithmetic Progression, its n^{th} term and sum of n terms with their applications to engineering problems. Geometrical Progression, its n^{th} term and sum of n terms and to infinity with application to engineering problems. Partial fractions. Complex numbers. Permutation: Meaning of factorial n . Permutation of ' n ' dissimilar thing taken ' r ' at a time Combination: Combination of n dissimilar things taken ' r ' at a time.

Binomial Theorem: Statement of the theorem for positive integer general term, middle term, constant term. Binomial theorem for any index (expansion without proof only). First and second binomial approximation with application to engineering problems.

Determinant: Concept & principles of determinants and simple examples of properties of determinant.

Matrix: Definition of Matrix and Types of Matrix. Row, column, square, unit, upper and lower triangular, symmetric & skew symmetric, singular and non singular matrices. Adjoint and Inverse of a Matrix.

Statistics: Measures of Central tendency (Mean, Mode, Median) Measures of Dispersion (Mean deviation, standard deviation)

Trigonometry: Allied angles. Trigonometrical ratios of sum and difference of angles, (only statement). Sum and difference of trigonometric ratios (CD formula). Multiple angles (only double angle and half angle). Properties of triangle (without proof)

References:

- (i)Engineering Mathematics (M.P. Hindi Granth Akadami) Dr. S.K. Chouksey & Manoj Singh.
- (ii)Mathematical Statistics, Ray and Sharma.
- (iii)Higher Engineering Mathematics, Dr. B.S. Grewal Khanna Publication.

Outcome: - The curriculum is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of mathematics in the field of Engineering.



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Syllabus of Examination w.e.f. (Session 2016-17)

Mechanical Engineering Diploma(03YDC)

Engineering Chemistry(CHE020)

SEMESTER: I

Course Objective: To Recognize and acquire attitudes that are characteristic of the successful worker regardless of the major field of study and develop an awareness of the value of industrial chemistry in our daily living.

Unit:-1

Petroleum: Introduction, Occurrence, Composition of petroleum, Origin, Classification of petroleum, refining of petroleum, purification of petroleum, Flash point, Knocking, Octane number.

Coal and Fuel : Types, composition, Structure, classification and properties of coal, calorific value of coal, analysis of coal. Types of fuel, advantages and disadvantages, combustion of fuels, calorific value, specification for oils,

Boilers : Types of boilers, and their functioning, Heat transfer, heat exchanges shell and tube, finned tube heat exchanges plate, heat exchanges refrigeration cycles.

Unit: - 2

Catalysis: Introduction,Types : Homogeneous and Heterogeneous catalysis, Basic Principles of catalysis, Mechanism of catalysis,Factor affecting the catalysis reaction, Industrial uses of catalysis reaction.

Surface chemistry: Sols, Gels, Emulsion.

Unit:- 3

Metals and Alloys: Physical and chemical properties of metals, copper, iron, aluminum, tin, nickel. General principal of metallurgy, minerals/ ores, ore dressing, roasting ,smelting, Explanation of alloying purposes, methods of alloying, composition and uses of alloy like brass, bronze, duralumin, German silver, gun metal, solder, stainless steel, casting and bearing alloy.

Inorganic materials of industrial importance : their availability, forms structure and modification, alumina, silica, silicates, clay, mica, carbon, zeolites.

Drying : Introduction, Equipments – tray dryer, rotary dryer, drum dryer, spray dryer.

Unit:4

Solid waste management: industrial safety, removal of solid contaminants from waste water by coagulation, fuel palatalization, soil conditioning and green house effect, ozone depletion, carbon credits, principle and equipments of aerobic, anaerobic treatment such as adsorption, filtration, sedimentation, bag filters.

Unit:- 5

Water Treatment: Introduction, Physical and chemical property of water, Hardness of water and their types, Disadvantages of hard water, Different methods used for removing hardness of water, Scale and sludge. Specification for Industrial use, various water treatments. **Steam :** Generation and use, **Air :** specification for industrial use, processing of air. **Fluid flow :** Fans, blower, compressors, vacuum pumps, gear pumps, centrifugal pumps.

Unit:- 6

High Polymers and Rubber: Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation Properties and uses of PVC, polythene, polystyrene, poly-amides, polyesters, Bakelite . Synthetic fibers, nylon, rayon, Dacron, and polyesters. Idea about rubber and vulcanization.

Lubricants: Meaning, type and theory of lubricants, properties of a good lubricants, Flash and fire point and cloud point, emulsification number, viscosity.

List of Experiments:-

1. To identify one Anion and Cation in a given sample.
2. Determination of flash point and fire point of a given sample of oil by Abel's apparatus.
3. Determination of viscosity by Red Wood Viscometer no. 1 and no.2.
4. Determination of hardness of water by EDTA Method.
5. Determination of solid content in the given sample of water.
6. Determination of percentage of moisture in the given sample of coal by proximate analysis.
7. To determine the percentage of iron in a given sample of alloy by redoximetry titration.
- 8 To determine strength of ferrous ammonium sulphate by redoximetry titration.

Reference Books:

Engineering ChemistryJain & Jain

Physical Chemistry.....Bahl and Tuli

Inorganic Chemistry..... Satyaprakash

Applied Chemistry..... Dr. G. C. Saxena, Deepak Prakashan, Gwalior

Course Outcomes: Students would be able to understand the applications of chemistry in field of industries and they would be more proficient to select more appropriate material for different purposes. They will be learn various techniques of water treatment.

SEMESTER: I

RATIONALE

Engineering Technician irrespective of his field of operation in an industry is expected to possess a reasonable understanding of drawing which includes clear spatial visualization of objects and the proficiency in reading and interpreting a wide variety of engineering drawings. An engineer is also expected to possess certain degree of drafting skill. This course of engineering drawing for diploma courses is aimed at developing basic knowledge and skills of engineering drawing.

INTRODUCTION TO DRAWING INSTRUMENTS:

Introduction of drawing instruments, materials and their uses. Planning, lay-out of drawing sheet, conventional representation of the common engineering materials, electrical installations and fittings, electronic components, sanitary fittings, mechanical components.

LINES, LETTERING AND DIMENSIONING:

Introduction to lines, types of lines and their applications, dimensioning and types of dimensioning.

GEOMETRICAL CONSTRUCTIONS AND ENGINEERING CURVES:

Divide a line into any number of equal parts by parallel line method, bisecting of a line and an angle, construction of pentagon and hexagon.

Introduction of conic section: Construction methods of ellipse, parabola, hyperbola.
construction of cycloid and involute curves.

SCALES:

Introduction of scales and their applications, types of scales, representative fraction, construction of plain and diagonal scales.

ORTHOGRAPHIC PROJECTION:

Definition of projection, planes of projection, quadrants, first & third angle projection method, projection of points in all the four quadrants, projection of lines, line parallel to HP and VP both, line perpendicular to one plane and parallel to other, line inclined to one plane and parallel to other, knowledge of projection of line inclined to both the planes.

PROJECTIONS OF PLANES:

Projection of planes, perpendicular to HP and VP both, perpendicular to one plane and parallel to other, inclined to one plane and perpendicular to other, knowledge of projection of plane inclined to both the planes .

PROJECTIONS OF SOLIDS:

Projection of cylinder, cone, prism and pyramid for conditions, axis parallel to HP and VP, axis perpendicular to HP and parallel to VP, axis perpendicular to VP and parallel to HP, axis inclined to HP and parallel to VP and axis inclined to VP and parallel to HP.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Section of cone, cylinder, prism and pyramid with different orientation.

Introduction to development of lateral surface of solids, cone, cylinder, prism and pyramids under the condition, solid resting on its base in the HP and axis perpendicular to HP and parallel to VP .

ISOMETRIC VIEWS:

Concept of isometric projection and isometric view, construction of isometric scale, construction of isometric view of polygon and circle.

References

1. Engineering Drawing by– N.D. Bhatt
2. Engineering Drawing by– R.K. Dhawan
3. Engineering Drawing by– P.S.Gill
4. First year Engineering Drawing by – A.C.Parkinson

Outcomes:- The learning which will be imparted to the students studying this subject.

1. Ability to Create Geometric Construction with manual drawing instruments..
2. Ability to Create Section Views.
3. Ability to Create Dimensions.
4. Ability to Solve Traditional Descriptive Geometry Problems.
5. Ability to Generate Engineering Drawings from Models
6. Understanding of concepts of 2D and 3D Projections and ability to draw Orthographic projections of Lines, Planes, and Solids and engineering applications of this technique .

SEMESTER:I

Professional activities are not a descriptive course, as per conventional norms; therefore specific content for this course cannot be prescribed. It is a group of open-ended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its assessment are given under the course content.

OBJECTIVES:

1. To allow for professional development of students as per the demand of engineering profession.
 2. To provide time for organization of student chapter activities of professional bodies i.e. Institute of engineers, ISTE or Computer Society of India etc.
 3. To allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
 4. To provide time for organization of guest lectures by expert engineers/eminent professionals of industry.
 5. To provide time for organization of technical quiz or group discussion or any other group activity.
 6. To provide time for visiting library or using Internet.
 7. To provide time for group discussion or solving case studies.
 8. To provide time for personality development of students.
 9. To provide time for working for social cause like awareness for environmental and ecology etc.
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SEMESTER: I

Course objective:

The main focus of the syllabus of subject is to impart basic knowledge of principles of Physics such as fundamentals of units and measurement which is need of modern industry. Properties of matter, Heat energy and its propagation are the part of the subject to make a technical student versatile and competent.

UNITS & MEASUREMENT:

Fundamental and Derived units: Scalar and vector, basic requirements to represent vector symbols, abbreviation, and percolation. Linear Measurement by Vernier Caliper, Screw Gauge and Spherometer. Angular Measurement by Angular Vernier.

MOTION

Motion and its types, Linear motion (laws and equation), Circular motion, Angular velocity and relation with linear velocity, Centripetal acceleration, Centripetal and Centrifugal forces, Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration, Kinetic energy of rotation

MOLECULAR PHENOMENON OF SOLIDS, LIQUIDS AND GASES

Postulates of Molecular Kinetic Theory of Structure of Matter, Brownian motion, kinetic and potential energy of molecules, kinetic theory of gases, calculation of pressure by kinetic theory, prove different laws of gases by kinetic theory.

PROPERTIES OF MATTER

Elasticity: Meaning & definition, stress, strain, Hook's law and elastic limit, surface tension, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method.

Viscosity: Meaning & definition, stream line and turbulent flow critical velocity, Stock's law

HEAT

Heat and temperature, concept of heat as molecular motion, transmission of heat, study state and variable state.

Concept of heat capacity, specific heat and latent heat. Calorimeter and its uses, Principles of calorimetry

Thermodynamics: Relation between heat and work, mechanical equivalent of heat, first law of thermodynamics and its application, second law of thermodynamics and its application, Carnot cycle.

EXPERIMENTS:

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1	Verification of Ohm's law
2	Study of series circuit.
3	Study of parallel circuit.
4	To find out internal radius of hollow tube by vernier calipers.
5	To find out volume of given cylinder by screw gauge.
6	To find out radius of curvature of a curved surface by spherometer.
7	Focal length of a convex lens by displacement method.

Textbooks/Reference books:

1. Applied physics vol. 1 & 2 by saxena and prabhakar
2. Physics - TTTI publication
3. Physics vol. 1 & 2 by Halliday and Resnick
4. Engineering physics by Gaur and Gupta
5. Principle of physics by Brij lal & Subramanyan
6. Physics for technical education by I s zednov
7. Bhautiki by Deepshri Gupta
8. Physics by Deepshri Gupta

Course outcomes: studying this subject will develop an understanding of units and measurement , heat energy transfer, various properties of matter and applications of the concepts in engineering.
