

## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>1<sup>st</sup> Sem /1<sup>st</sup> year</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Subject Name</b>	<b>Mathematics</b>				
<b>Subject Code</b>	<b>D20S101</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Apply the concept of matrices and determinants and their applications to solve the system of linear equations in different engineering field.</li> <li>2. Apply and evaluate trigonometric concept in vector engineering field.</li> <li>3. Apply the coordinate and vector algebra in solving the problems of statics and mechanics.</li> <li>4. Create the basic concept of calculus.</li> </ol>	
	<p><b>Course Outcomes:</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Understand concept of permutation, combination, binomial expansion, partial fraction, data and their classification. They will be able to calculate mean, median, mode, mean deviation and standard deviation.</p> <p><b>CO2:</b> Learn different identities of trigonometry and to apply them in different problems of trigonometry.</p> <p><b>CO3:</b> Know the concept &amp; properties of determinants and different types of matrices and their arithmetic operations. They will be able to find the inverse of a given matrix.</p> <p><b>CO4:</b> Locate different points in a coordinate plane. They will be able to find the equation of a line in different form and distinguish scalars and vectors. They will be able to know dot and cross product of vectors and their different applications.</p> <p><b>CO5:</b> Understand the concept of function, limit, derivative and integration.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	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, Partial Fractions - Define a proper - Break a fraction into partial fraction whose denominator contains Linear, Repeated linear and Non repeated quadratic factors. STATISTICS- Measures of Central tendency (Mean, Mode, Median), Measures of Dispersion (Mean deviation, standard deviation), Complex Number Algebra of Complex Numbers - Polar form.	<b>12</b>
<b>UNIT-II</b>	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).	<b>8</b>
<b>UNIT-III</b>	Determinant - Concept & principles of determinants - Properties of determinant - Simple examples. Definition of Matrix, Types of Matrix. - Row, Column, Square, Unit, Upper and lower triangular, Symmetric & Skew Symmetric, Singular and non-Singular Matrices, Adjoint of a Matrix, Inverse of a Matrix.	<b>10</b>
<b>UNIT-IV</b>	Co-ordinate System: Cartesian and Polar, Distance, Division, Area of a triangle, Locus of a point and its equation. Slope of St. Line - Angle between two St. lines. - Parallel and perpendicular St. lines. Standard and general equation of St. line. Point of intersection of two st lines. Concept of Vector and Scalar Quantities. Different types of vectors. Addition and subtraction of vectors. Components of a vector. Multiplication of two vectors - Scalar Product - Vector Product - Applications (Work done, power & reactive power.	<b>10</b>
<b>UNIT-V</b>	Define constant, variable, function. Value of the function. Concept of limit of a function. First Principle of Differentiation. Standard results. Derivatives of sum, difference, product, quotient of two functions. Diff. coefficient of -function of a function, implicit function, parametric function. Logarithmic Differentiation. Definition of Integration as a inverse process of differentiation. Standard Results (including inverse function). Methods of Integration - Substitution - Integration by parts - Breaking up into partial fraction. Concept of Definite Integral.	<b>12</b>
	<b>Text Books:</b> 1. Mathematics for Polytechnics Vol. I and II - Prepared by T.T.T.I. Bhopal. 2. Higher Engineering Mathematics - B.S. Grewal. 3. Engineering Mathematics (M.P. Hindi Granth Akadami) - Dr. S.K. Chouksey & Manoj Singh.	
	<b>Reference Books:</b> 1. Integral Calculus - Gorakh Prasad. 2. Co-ordinate Geometry - S.L. Loni. 3. Mathematical Statistics - Ray and Sharma. 4. Differential Calculus - Gorakh Prasad.	

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<b>Subject Name</b>	<b>Applied Physics</b>				
<b>Subject Code</b>	<b>D20S102</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Applied Physics includes the study of a large number of diverse topics related to materials/things that exist in the world around us.</li> <li>2. It aims to give an understanding of this world both by observation and by prediction of the way in which such objects behave.</li> <li>3. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.</li> <li>4. The course will help the diploma engineers to apply the basic concepts and principles to solve broad- based engineering problems and to understand different technology based applications.</li> </ol>	
	<p><b>Course Outcomes:</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Have an understanding of the fundamental concepts and techniques in the various topics related to engineering physics and students should be able to apply the knowledge analytically.</p> <p><b>CO2:</b> Apply practical skill on the basis of theoretical knowledge imparted, identify analyse, differentiate and interpret logical sequence of field problems with the study of physics.</p> <p><b>CO3:</b> Measure given dimensions by using appropriate instruments accurately and should be able to select proper measuring instrument on the basis of range, least count and precision.</p> <p><b>CO4:</b> Understand principles, laws, facts, concepts, using mathematical techniques and experimental determination of values of different physical properties of materials by studying physics.</p> <p><b>CO5:</b> Apply the principles of physics and its significance in engineering system and technological advances.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	Measurement - Need of Measurement in engineering and science, unit of a physical quantity, requirements of standard unit, and systems of units Accuracy - Accuracy, Precision of instruments, Errors in measurement, Estimation of errors. Instruments - Basic Measuring instruments- Vernier Caliper, Micrometer screw gauge, ammeter, voltmeter with their least count, range, accuracy and precision.	<b>8</b>
<b>UNIT-II</b>	Elasticity : Deforming force, Restoring force, Elastic and plastic body, Stress and strain with their types, Hooke's law, Stress strain diagram, Young's modulus, Bulk modulus, Modulus of rigidity and relation between them( no derivation), (simple problems). (Simple problems) Stress strain diagrams. Surface Tension: Forces—cohesive and adhesive, , angle of contact, shape of liquid surface in a capillary tube, capillary action with examples, relation between surface tension , capillary rise and radius of capillary ( no derivation)( simple problem),effect of impurity and temperature on surface tension. Viscosity : Velocity gradient, Newton's law of viscosity, coefficient of viscosity ,streamline and turbulent flow, critical velocity, Reynold's number,( simple problems), Stokes law and terminal velocity( no derivation) ,buoyant (up thrust) force, effect of temperature & adulteration on viscosity of liquid.	<b>12</b>
<b>UNIT-III</b>	Transmission of heat and expansion of solids - Transmission of heat-conduction, convection and radiation, law of thermal conductivity, coefficient of thermal conductivity (simple problems), Gas laws and specific heats of gases Boyle's law, Charle's law, absolute temperature, Kelvin scale of temperature, general gas equation( no derivation)(simple problems),molar or universal gas constant, universal gas equation, standard or normal temperature and pressure (N.T.P.), specific heat of gases, relation between two specific heat (simple problems), thermodynamic variables, first law of thermodynamics (statement & equation only), isothermal, isobaric, isochoric & adiabatic processes (difference among these processes and equations of state) (simple problems).Second law of thermodynamics - Kelvin & Plank (statement & example).	<b>12</b>
<b>UNIT-IV</b>	Properties of light Reflection and, refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction), Wave theory of light & Interference Newton's corpuscles theory of light, Huygen's wave theory, wave front, Types of wave front-spherical, cylindrical and plane Huygen's principle of propagation of wave front, Principle of superposition of waves, Interference of light, constructive and destructive interference, Young's experiment. Analytical treatment of interference, conditions for stationary interference pattern. Laser Light amplification by stimulated emission of radiation, properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, HeNe laser- construction, working and application.	<b>12</b>
<b>UNIT-V</b>	Photo electricity: Plank's hypothesis, properties of photons, photo electric effect, laws and characteristics of photoelectric effect, Einstein's photoelectric equation,(simple problems), construction and working of photoelectric cell, applications of photoelectric cell. X-rays Production of X-rays, types of X-ray spectra-continuous and characteristics, X-ray wavelength (simple problems), properties of X-rays, applications of X-rays.	<b>8</b>

	<b>Text Books:</b> <ol style="list-style-type: none"><li>1. Basic Physics, S. Chand.</li><li>2. Physics, Deepak Publication.</li><li>3. Applied Physics 1, Sarthak Publication.</li></ol>	
	<b>Reference Books:</b> <ol style="list-style-type: none"><li>1. University Physics, Sears and Zemansky's.</li><li>2. Concepts of Physics, H. C. Verma.</li></ol>	



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<b>Subject Name</b>		<b>Applied Chemistry</b>				
<b>Subject Code</b>		<b>D20S103</b>				
<b>Paper</b>	<b>English</b>					
	<b>Hindi</b>					
<b>Max. Marks</b>		<b>100</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life.</li> <li>2. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians.</li> <li>3. On successful completion of this course, content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.</li> <li>4. Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.</li> <li>5. Use relevant water treatment method to solve domestic and industrial problems.</li> <li>6. Solve the engineering problems using knowledge of engineering materials and properties.</li> </ol>	
	<p><b>Course Outcomes:</b> After completing this course, students will be able to:</p> <p><b>CO1:</b> Illustrate and summarize the structure and properties of matter and phenomenon involved in engineering.</p> <p><b>CO2:</b> Classify, compare and infer some essential engineering materials.</p> <p><b>CO3:</b> Describe and interpret industrial processes.</p> <p><b>CO4:</b> Analyse the contents of essential raw materials utilized in industrial procedures.</p> <p><b>CO5:</b> Provide the required prerequisite knowledge to understand technical subjects.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	Elementary idea of fundamental particles of atom –their mass, charge, location. Rutherford's and Bohr's model of an atom. Bohr-Bury scheme of filling the electrons in various orbits. Idea of s,p,d,f orbital. Hund's rule and filling of orbitals by Aufbau principle. (Atomic no upto 30) Pauli's exclusion principle. Alfa, Gamma and Beta rays, theory of radio activity, Group displacement law, half-life period, fission and fusion. Bonding: Nature of bonds- Electrovalent, Covalent, coordinate and hydrogen bond.	<b>10</b>
<b>UNIT-II</b>	Arrhenius theory of ionization, factors affecting ionization. pH meaning (numerical), Buffer solutions and Buffer actions, choice of indicators (acidimetry and alkalimetry). Electrolytes and non-electrolytes, Electrolysis, Electrolytic cell, Electrodes. Mechanism of electrolysis, Electro-chemical series. General idea of fuel cells and its application. Solar cells and panels. Faraday's laws of electrolysis, Numerical problems on Faraday's Law, Applications of electrolysis-electroplating, Electro refining. Sources of water, types of water, hardness of water, its causes, types and removal, Boiler feed water, harmful – effects of hard water in boiler. Determination of hardness of water by O. Hehner's method, EDTA and soap solution method.	<b>12</b>
<b>UNIT-III</b>	Physical and chemical properties of metals, copper, iron, aluminium. General principle of metallurgy, minerals/ ores, ore dressing, roasting, smelting, base metalisation, fluxes, purification. Explanation of alloying purposes, composition and uses of alloy like brass, bronze, duralium, German silver, gun metal, solder, stainless steel, casting and bearing alloys. Corrosion, types of corrosion, factors effecting corrosion, corrosion control (protection against corrosion), metal and organic coating for corrosion control.	<b>10</b>
<b>UNIT-IV</b>	Glass: Basic raw materials and composition of glass, varieties of glass and annealing of glass. Cement: Constituting compounds in cement, Composition of Portland Cement, its manufacture, setting and hardening of cement. Refractories: Meaning, characteristics, use of common refractory materials. Lubricants: Meaning, type and theory of lubricants, properties of a good lubricants, Flash and fire point and cloud point, emulsification number, viscosity. Nano materials: Introduction and applications.	<b>10</b>
<b>UNIT-V</b>	Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation Properties and uses of PVC, polyethene, polystyrene, polyamides, polyesters, Bakelite. Synthetic fibres – nylon, rayon, decron, and polyesters. Definition, characteristics, classification and properties of insulators. Glass, wool and thermo Cole. Idea about rubber and vulcanization. Classification of fuel, gross and net calorific value, Determination of a solid fuel by bomb calorimeter, octane and cetane number. Proximate analysis of fuel, its utility, crude petroleum, products of fractional distillation. Fire extinguishers – Description and use.	<b>12</b>

	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Text Book of Chemistry for Class XI&amp; XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.</li> <li>2. Agarwal, &amp; Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.</li> <li>3. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.</li> </ol>	
	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Dara, S. S. &amp; Dr. S.S.Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Delhi, 2015.</li> <li>2. Jain &amp; Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.</li> <li>3. Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.</li> <li>4. Dr. G. H. Hugar &amp; Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.</li> <li>5. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.</li> </ol>	



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<b>Subject Name</b>		<b>Communication Skills in English</b>				
<b>Subject Code</b>		<b>D20S104</b>				
<b>Paper</b>	<b>English</b>					
	<b>Hindi</b>					
<b>Max. Marks</b>		<b>100</b>				

	<p><b>Course Objectives:</b> Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus, the main objectives of this course are:</p> <ol style="list-style-type: none"> <li>1. To develop confidence in speaking English with correct pronunciation.</li> <li>2. To develop communication skills of the students i.e. listening, speaking, reading and writing skills.</li> <li>3. To introduce the need for personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.</li> </ol>	
	<p><b>Course Outcomes</b> After completing this course, students will be able to:</p> <p><b>CO1:</b> Understand the theory component, practical learning experiences and the relevant soft skills associated with the course are to be taught, conducted and developed, so that the student demonstrates the following competencies sought by the industry for employability of the Diploma pass outs.</p> <p><b>CO2:</b> Demonstrate reading with reasonably correct pronunciations with comprehension.</p> <p><b>CO3:</b> Express orally and listen attentively to communicate the meaning of spoken material in English.</p> <p><b>CO4:</b> Formulate grammatically correct sentences in English using general purpose words.</p> <p><b>CO5:</b> Apply principles of effective communication in oral and written professional communication.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	Passages in the prescribed Text book: 1. The Language of Science 2. Safety Practices 3. Nonconventional Sources of Energy 4. Entrepreneurship Short Stories in the prescribed Text Book: 1. 'A Letter to God' written by Gregorio Lopex Y. Fuentes 2. 'An Astrologer's Day' written by R.K. Narayan, One word substitution, Word-expansion, Common Synonyms and Antonyms.	<b>8</b>
<b>UNIT-II</b>	Determiners a, an, the, some, any, much, many, each, every, all, no, none, few, a few, little, a little, plenty of, a lot of, a great deal of. Auxiliary Verbs Be: is, am, are, was, were, Do: does, did Has/have: had Will: would, Can: could, Shall: should, May: might, Must: has/have to, am to, had to Need, Dare, Ought to, Used to. Subject-verb Agreement, Tenses, Question tags and short form answers, Voice, and Prepositions	<b>10</b>
<b>UNIT-III</b>	Definition of Communication, Communication Process, Non-verbal Communication (Body language) Principles (7Cs) of effective communication, Barriers in communication and the ways to overcome them. Semantic Barriers Physical Barriers Socio-Psychological Barriers Organizational Barriers. Business Letters: Parts, mechanics and format. Characteristics of good business letters. Application for Job with CV, Enquiry, Order, Complaint.	<b>12</b>
<b>UNIT-IV</b>	Meaning and Characteristics of a good Technical Report, Types of Reports Report Writing (in the form of letter) 1. Progress Report 2. Proposal Report 3. Report on Industrial Accident	<b>10</b>
<b>UNIT-V</b>	Paragraph Writing (150 words) on topics of general interest e.g., Pollution, Ragging in colleges, Internet revolution, Solar energy, Entrepreneurship, Importance of Communication Skills. Unseen passages from various sources (appropriate for Diploma Level) Comprehension exercises, Precise writing. Giving a suitable title to the passage.	<b>10</b>
	<b>Text Books:</b> 1. Communication Skills for Technical Students (Text Book) TTTI Bhopal Somaiya Publications Mumbai, Delhi Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015. 2. A Course in Technical English Book Two TTTI Bhopal Somaiya Publications Mumbai, Delhi. 3. Business Correspondence and Report Writing R.C. Sharma and K. Mohan Tata McGraw Hill New Delhi.	
	<b>Reference Books:</b> 1. Living English Structure W. Stannard Allen. 2. Essential English Grammar Raymond Murphy Cambridge University Press, New Delhi. 3. Communication Skills for Engineers and Scientists Sangeeta Sharma Binod Sharma PHI Learning Pvt. Ltd. New Delhi. 4. Contemporary English Grammar, Structures and Composition David Green Macmillan. 5. Developing Communication Skills K. Mohan and Meera Banerjee Macmillan India Ltd. New Delhi.	

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<b>Subject Name</b>	<b>Engineering Graphics</b>				
<b>Subject Code</b>	<b>D20S105</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.</li> <li>2. To develop drafting and sketching skills, to know the applications of drawing equipment, and get familiarize with Indian Standards related to engineering drawings.</li> <li>3. To develop skills to visualize actual object or a part of it, on the basis of drawings.</li> <li>4. To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.</li> <li>5. To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.</li> </ol>	
	<p><b>Course Outcomes:</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Prepare basic engineering drawing formats.</p> <p><b>CO2:</b> Translate geometrical details into engineering drawing.</p> <p><b>CO3:</b> Draw projections of points, lines, planes and solids.</p> <p><b>CO4:</b> Draw the development of surfaces and section of solids.</p> <p><b>CO5:</b> Draw isometric view /orthographic projection.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	<p>Introduction: Introduction of drawing instruments, Designation and sizes of drawing sheet and drawing board planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988). Introduction of type of lines and their applications. Single stroke vertical capital letters and numerals. Dimensioning: Elements of dimensioning, dimensioning system. Dimensioning Different geometrical features.</p> <p>Scale: Introduction of scales and their applications, Concept of reduced, enlarged and full size scale .Classification of scales – plain, diagonal. Definition of R.F. Construction of plain and diagonal scales</p> <p>Geometrical construction &amp; curves: Divide a line into any number of equal parts by parallel line method, Bisecting the line and angle. Construction of triangles and polygons (up to hexagon)</p> <p>Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of cycloid , Involute of circle and polygon. Construction of Archemedian spiral.</p>	<b>12</b>
<b>UNIT-II</b>	<p>Definition of various term associated with theory of projection, Planes of projection, Quadrants, Introduction to first and third angle projection method. Projection of points in all the four quadrants.</p> <p>Projection of lines- - 1. Parallel to HP and VP both. –2. Perpendicular to one plane and parallel to other. 3. Inclined to one plane and parallel to other. 4. Line inclined to both the planes.</p> <p>Projection of planes circle and polygon (up to hexagon) Plane 1.Perpendicular to HP and VP both. 2 Perpendicular to one plane and parallel to other. 3. Inclined to one plane and perpendicular to other.</p> <p>Projection of solids: Projection of cylinder, cone, prism (up to hexagonal base) and pyramid (upto hexagonal base).</p> <p>Under the following conditions: - 1. Axis parallel to HP and VP 2. Axis perpendicular to HP and parallel to VP 3. Axis perpendicular to VP and parallel to HP 4. Axis inclined to HP and parallel to VP. 5. Axis inclined to VP and parallel to HP.</p>	<b>12</b>
<b>UNIT-III</b>	<p>Section of solids:-Section of cone, cylinder, prism (up to hexagonal base) and pyramid (up to hexagonal base). (Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP) in the following cases: 1 Section plane parallel to HP and perpendicular to VP. 2 Section plane parallel to VP and perpendicular to HP. 3 Section plane inclined to HP and perpendicular to VP. 4 Section plane inclined to VP and perpendicular to HP. – Drawing True shape of section.</p> <p>Development of lateral surface of solids:</p> <p>Introduction, Development of Cone, Cylinder, prism (up to hexagonal base) and pyramid (up to hexagonal base) (simple and truncated) under the condition solid resting on its base in the H.P. and axis perpendicular to H.P. and parallel to V.P.</p>	<b>12</b>
<b>UNIT-IV</b>	<p>Principles of orthographic projections, Selection of front view, Preparation of necessary orthographic views of simple objects from given pictorial views, Dimensioning orthographic views as per standard practice.</p>	<b>8</b>

<b>UNIT-V</b>	<p>Isometric view and projection: Concept of isometric view and isometric projection (Isometric Drawing), Construction of isometric scale, Construction of isometric view and projection of polygon (up to hexagon) and circle. Construction of isometric view of cone, cylinder, prism (up to hexagonal base) and pyramid (up to hexagonal base) and their combinations solids, Isometric view and projection of simple solids. Free hand sketching: Free hand sketching of orthographic and isometric views of simple objects.</p>	<b>10</b>
	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Bureau of Indian Standards. Engineering Drawing Practice for Schools and Colleges IS: Sp-46. BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.</li> <li>2. Bhatt, N. D. Engineering Drawing. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8.</li> <li>3. Jain &amp; Gautam, Engineering Graphics &amp; Design, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478).</li> </ol>	
	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Jolhe, D. A. Engineering Drawing. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07- 064837-1.</li> <li>2. Dhawan, R. K. Engineering Drawing. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.</li> <li>3. Shah, P. J. Engineering Drawing. S. Chand and Company, New Delhi, 2008, ISBN: 81-219-2964-4.</li> <li>4. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. Engineering Graphics with AutoCAD. PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.</li> <li>5. Jeyapooan, T. Essentials of Engineering Drawing and Graphics using AutoCAD. Vikas Publishing House Pvt. Ltd, Noida, 2011; ISBN: 978-8125953005.</li> </ol>	



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<b>Subject Name</b>	<b>Applied Physics Lab</b>				
<b>Subject Code</b>	<b>D20S106</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>50</b>				

#### Laboratory Experiments:

1. Use of Vernier calipers for the measurement of dimensions of given object.
2. Use of micrometer screw gauge for the measurement of dimensions of given object.
3. Verification of laws of refraction of light and determination of refractive index of glass slab.
4. Calculation of refractive index of refractive index of Glass of prism by  $i-\delta$  method.
5. Determine of focal length of a convex lens by U-V method.
6. Determination of the Young's modulus of steel by Searl's method.
7. Determination of the surface tension of water by capillary rise method.
8. Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).
9. Determine of focal length of a convex lens by Displacement method.
10. Determine coefficient of viscosity of given oil using stoke's method.



## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>1<sup>st</sup> Sem /1<sup>st</sup> year</b>	-	-	<b>2</b>	<b>1</b>
<b>Subject Name</b>	<b>Applied Chemistry Lab</b>				
<b>Subject Code</b>	<b>D20S107</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>50</b>				

#### Laboratory Experiments

1. To identify one Anion and Cation in a given sample solution (at least 5 samples).
2. Determination of flash point and fire point of a given sample of oil by any apparatus.
3. Determination of viscosity by Red Wood Viscometer no. 1 or no.2.
4. Volumetric Analysis: Acid base titration Determination of strength of ferrous ammonium sulphate.
5. Determination of hardness of water by any two methods: (i) EDTA Method (ii) Soap Solution Method. (iii) Determination of hardness of water by O. Hehner's method.
6. Determination of solid content in the given sample of water.
7. Determination of percentage of moisture in the given sample of coal by proximate analysis.



## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>1<sup>st</sup> Sem /1<sup>st</sup> year</b>	-	-	<b>2</b>	<b>1</b>
<b>Subject Name</b>	<b>Engineering Graphics Lab</b>				
<b>Subject Code</b>	<b>D20S108</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>50</b>				

#### List of Experiments:

1. To understand BIS conventions and its application, To Practice letters in single stroke vertical fashion with different heights.
2. To draw engineering curves and conic sections.
3. To describe the location of a point w.r.t. the reference planes when its projections are given.
4. To draw the projections of a straight line when its position w.r.t. the reference planes is known and estimate its true length.
5. To apply principles of projections of straight lines in solving problems.
6. To draw the projections of a plane when its position w.r.t. the reference planes is given.
7. To construct the projections of a prism / pyramid / cone / cylinder when the position of the axis w.r.t. the reference planes is given.
8. To construct orthographic views of an object from pictorial view.
9. To construct isometric views from the orthographic projections of machine parts.
10. To construct development of lateral surfaces of a prism / pyramid / cone / cylinder, cut by a section plane.



## SYLLABUS

### UG

<b>Class</b>		<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>		<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>
<b>Subject Name</b>		<b>Fundamentals of Electrical and Electronics Engineering</b>				
<b>Subject Code</b>		<b>D20S201</b>				
<b>Paper</b>	<b>English</b>					
	<b>Hindi</b>					
<b>Max. Marks</b>		<b>100</b>				

	<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To provide basic knowledge of the different elements and concepts of electrical engineering field.</li> <li>2. To learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications.</li> <li>3. Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.</li> </ol>	
	<b>Course Outcomes:</b> After completing this course, students will be able to: <b>CO1:</b> Define various terms used in electrical engineering. <b>CO2:</b> Explain fundamentals of Analog circuits and calculate electrical quantity. <b>CO3:</b> Explain fundamentals of Digital electronics. <b>CO4:</b> Describe Electric and Magnetic Circuits, explain the Analogy between electric and magnetic circuits. <b>CO5:</b> Explain fundamentals of A.C. circuit and determine electrical quantity of single phase AC circuit.	
<b>Unit</b>	<b>Syllabus</b>	<b>Periods</b>
<b>UNIT-I</b>	Overview of Electronic Components & Signals: Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent / dependent voltage current sources.	<b>10</b>

<b>UNIT-II</b>	Overview of Analog Circuits: Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.	<b>8</b>
<b>UNIT-III</b>	Overview of Digital Electronics:_Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach, Storage elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).	<b>10</b>
<b>UNIT-IV</b>	Electric and Magnetic Circuits: EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.	<b>10</b>
<b>UNIT-V</b>	<u>A.C. Circuits:</u> Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phase or representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle.	<b>12</b>
	<b>Text Books:</b> 1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House. 2. Mittal and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN: 978-0-07-0088572-5. 3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN: 9781107464353.	
	<b>Reference Books:</b> 1. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405. 2. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN: 97881236529513. 3. Sedha, R.S., A text book of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978-8121927833. 4. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi, 2015, ISBN-13: 0070634244-978.	

## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>
<b>Subject Name</b>	<b>Engineering Mechanics</b>				
<b>Subject Code</b>	<b>D20S202</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b> Following are the objectives of this course:</p> <ol style="list-style-type: none"> <li>To obtain resultant of various forces.</li> <li>To calculate support reactions through conditions of equilibrium for various structures.</li> <li>To understand role of friction in equilibrium problems.</li> <li>To know fundamental laws of machines and their applications to various engineering problems.</li> </ol>	
	<p><b>Course Outcomes:</b> After completing this course, students will be able to:</p> <p><b>CO1:</b> Describe forces, couples, and moments, centre of gravity, work, power and energy.</p> <p><b>CO2:</b> Calculate resultant force, moment and centre of gravity.</p> <p><b>CO3:</b> Calculate efficiency of simple lifting machines.</p> <p><b>CO4:</b> Discuss motion of particle and laws of motion.</p> <p><b>CO5:</b> Conceptualize friction and its laws.</p>	
<b>Unit</b>	<b>Syllabus</b>	<b>Periods</b>
<b>UNIT-I</b>	<p>Fundamentals: - Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units. Force: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility. Resolution of a force: Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular</p>	<b>12</b>

	<p>components. Moment of a force: - Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and its use, couple – definition, S.I. unit, measurement of a couple, properties of couple.</p> <p>Force system: - Definition, classification of force system according to plane and line of action. Composition of Forces: - Definition, Resultant force, methods of composition of forces I – Analytical method – (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution), II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.</p>	
<b>UNIT-II</b>	<p>Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system. Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems. Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system.</p> <p>Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, and continuous), Types of end supports (simple support, fixed, hinged, roller), classification of loads, point load, uniformly distributed load. Reaction's for a simply supported beam only.</p>	<b>8</b>
<b>UNIT-III</b>	<p>Centroid: Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, Semicircle and quarter circle. Centroid of composite figure. Center of gravity: Definition, centre of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.</p> <p>Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down. Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane.</p>	<b>12</b>
<b>UNIT-IV</b>	<p>Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load.</p> <p>Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self -locking machine. Study of simple machines : Simple axle and wheel, differential axle and wheel, single purchase crab, double purchase crab, simple screw jack, pulleys : First, second and third system of pulleys.</p>	<b>10</b>

<p><b>UNIT-V</b></p>	<p>Motion of particle - Definition of speed, velocity, acceleration, uniform velocity, uniform acceleration and variable acceleration. Motion under constant acceleration/ retardation (equations of motion), Motion under force of gravity, Concept of relative velocity. Definition of projectile, velocity of projection, angle of projection, time of light, maximum height, horizontal range and their determination.</p> <p>Definition of angular velocity, angular acceleration and angular displacement. Linear angular motion analogy. Relation between linear and angular velocity of a particle moving in a circular path. Motion of rotation under constant angular acceleration. Laws of motion - Newton are Laws of motion and their applications. Work, Power and Energy- Definition unit and graphical representation of work. Definition and unit of power and types of engine power and efficiency of an engine. Definition and concept of Impulse. Definition, unit and types of energies. Total energy of a body falling under gravity.</p>	<p><b>12</b></p>
	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. A text book of Applied Mechanics – R.S. Khurmi, S.C. Chand &amp; Co. , New Delhi.</li> <li>2. Applied Mechanics – I.B. Prasad, Khanna Publishers, New Delhi.</li> <li>3. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008).</li> </ol>	
	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Khurmi, R.S., Applied Mechanics, S. Chand &amp; Co. New Delhi.</li> <li>2. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.</li> <li>3. Ramamrutham, Engineering Mechanics, S. Chand &amp; Co. New Delhi.</li> <li>4. Dhade, Jamadar &amp; Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.</li> <li>5. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cam- bridge University Press.</li> <li>6. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.</li> </ol>	



## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>3</b>	<b>0</b>	<b>-</b>	<b>3</b>
<b>Subject Name</b>	<b>Introduction to IT Systems</b>				
<b>Subject Code</b>	<b>D20S203</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b></p> <p>Following are the objectives of this course:</p> <ol style="list-style-type: none"> <li>1. This course is intended to make new students comfortable with computing environment.</li> <li>2. Learning basic computer skills, learning basic application software tools.</li> <li>3. Understanding Computer Hardware, Cyber security awareness.</li> </ol>	
	<p><b>Course Outcomes:</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Explain computer system with its components, generations and i/o devices.</p> <p><b>CO2:</b> Describe storage devices with types of memory and data storage units.</p> <p><b>CO3:</b> Classify software, programming languages, language processors and number system.</p> <p><b>CO4:</b> Outline concept of operating system and office software.</p> <p><b>CO5:</b> Outline concept of system security and internet applications.</p>	
<b>Unit</b>	<b>Syllabus</b>	<b>Periods</b>
<b>UNIT-I</b>	<p>Block Diagram of Computer System. Major Components of Computer System: Central Processing Unit, Memory Unit, ALU, Control Unit, Input Unit and Output Unit. Computer Generations and Classification of Computers, Applications of Computer System.</p> <p>Computer System Characteristics and Capabilities: Speed, Accuracy, Reliability, Memory Capabilities, Repeatability Input Devices: Keyboard, mouse, joystick, scanner, OCR, OMR and webcam Output Device: Monitors, printers (dot matrix inkjet laser), Projectors.</p>	<b>10</b>

<b>UNIT-II</b>	Storage device fundamentals, Primary & Secondary Storage. Volatile and non-volatile memory. Primary Memory - RAM, ROM and types of RAM and ROM. Difference between RAM and ROM. Secondary storage - Floppy Disk, CD-ROM, DVD, Hard Disk, Flash(Pen) Drive Data Storage unit - Bit, Byte, Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte.	<b>10</b>
<b>UNIT-III</b>	Classification of programming Languages - High Level Language and low level language. Language processor and its types- compiler, interpreter, assembler. Software and its types - System software, application software and utility software. Number System - binary, octal, decimal, hexadecimal and their conversion.	<b>10</b>
<b>UNIT-IV</b>	Concept of BIOS, Booting process, POST, boots loader. Operating system and its features. Types of operating system - batch, time sharing, Real time, network, distributed Office management utilities - Word processing, presentations, spreadsheets. Features of Word processing. Uses of word processing. Description of various menu and sub menu items of word processing software example - file, edit, view etc. Features of spreadsheet (ppt). Description of various menu and sub menu items of spreadsheet software example - file, edit, view etc. Writing conditional expressions using IF and logical operators (AND, OR, NOT). Features of presentation (ppt). Description of various menu and sub menu items of presentation software example -file, edit, view etc.	<b>12</b>
<b>UNIT-V</b>	Introduction to computer networks and internet. Applications of internet. Concept of physical and IP-address. E-Mail and its utilities. Web-Browser and search engines. Malware and its types - viruses, worms, Trojans and anti-malware software.	<b>10</b>
	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.</li> <li>2. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Online Resources, Linux man pages, Wikipedia.</li> <li>2. Mastering Linux Shell Scripting: A practical guide to Linux command line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.</li> </ol>	

## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Subject Name</b>	<b>Environmental Science</b>				
<b>Subject Code</b>	<b>D20S204</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>100</b>				

	<p><b>Course Objectives:</b></p> <p>Following are the objectives of this course:</p> <p>Technicians working in industries or elsewhere essentially require the knowledge of environmental science so as to enable them to work and produce most efficient, economical and eco-friendly finished products.</p> <ol style="list-style-type: none"> <li>1. Solve various engineering problems applying ecosystem to produce eco – friendly products.</li> <li>2. Use relevant air and noise control method to solve domestic and industrial problems.</li> <li>3. Use relevant water and soil control method to solve domestic and industrial problems.</li> <li>4. To recognize relevant energy sources required for domestic and industrial applications.</li> <li>5. Solve local solid and e-waste problems.</li> </ol>	
	<p><b>Course Outcomes</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Explore the components of biosphere and impact of human activity on environment.</p> <p><b>CO2:</b> Summarize the causes and sources of pollutants, and their impact on global environment.</p> <p><b>CO3:</b> Develop ethics and scientific awareness about waste generation and treatment.</p> <p><b>CO4:</b> Identify sources and types of wastes and its management.</p> <p><b>CO5:</b> Understand noise, noise pollution and control.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	<p>Definition, scope and importance of environmental studies. Ecosystem, types, structure and function of ecosystem. Energy flow in ecosystem. Biodiversity and its importance, threats to biodiversity and conservation of biodiversity. Natural resources and associated problems. Renewable and non-renewable resources, forest resources- Description, benefits, Effects due to deforestation.</p> <p>Water resources –Use and conservation. Mineral resources–mining activity. Role and responsibility of engineer in environmental protection, health and safety. Fire hazards, prevention and precautions. Industrial hazards prevention and protection. Protection from air and noise pollution. Environment protection act Wild life protection act. Forest conservation act. Population growth aspects and importance and effects on environment. Human health and Human rights. Concept of carbon credits.</p>	<b>10</b>
<b>UNIT-II</b>	<p>Standard definition of air pollution ,Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols. Effect of air pollution on: human health, material properties, vegetation. Major toxic metals and their effects, Air (prevention and control of pollution) act.</p> <p>Major environmental phenomenon e.g., acid rain, global warming, green-house effect, ozone layer depletion. Air quality standards, Brief description of air pollution laws. Meteorological parameters influencing air pollution Environmental lapse rate, temperature inversion. Role of national green tribunal in India, Function of Regulatory boards like CPCB and State Pollution Control Boards.</p>	<b>10</b>
<b>UNIT-III</b>	<p>Water resources, 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. Water conservation, watershed management, Rain water harvesting: Definition, methods and benefits.</p> <p>Water (prevention and control of pollution) act, Waste water, Classification of waste water, Chemical oxygen demand. Basic processes of water treatment. Meaning of primary, secondary and tertiary treatment. Flow chart of a simple effluent treatment plant, Theory of industrial waste treatment, Volume reduction, neutralization and precipitation methods.</p>	<b>10</b>
<b>UNIT-IV</b>	<p>An overview of Bureau of Energy Efficiency (bee), The National Action Plan on Climate Change (NAPCC), Schemes under The National Mission for Enhanced Energy Efficiency (NMEEE), Energy Conservation Building Code (ECBC).</p> <p>Bio diversity and its conservation, Sustainable development, Kyoto Protocol, Conference of Parties (CoP), Clean Development Mechanism (CDM).</p>	<b>10</b>
<b>UNIT-V</b>	<p>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 plastic.</p> <p>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.</p>	<b>10</b>

	<b>Text Books:</b> <ol style="list-style-type: none"><li>1. Environmental pollution control Engineering by C.S. Rao</li><li>2. Air pollution and control by Seth Air pollution by M.N Rao.</li></ol>	
	<b>Reference Books:</b> <ol style="list-style-type: none"><li>1. Industrial waste and its treatment by Seth.</li><li>2. Paryavaran Yantriki Hindi granth akadami.</li><li>3. Sites to visit: Bureau of Energy Efficiency, Ministry of New and Renewable Energy Sources.</li></ol>	



## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
<b>Subject Name</b>	<b>Engineering Workshop Practice</b>				
<b>Subject Code</b>	<b>D20S205</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>50</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To understand basic engineering processes for manufacturing and assembly.</li> <li>2. To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipments.</li> <li>3. To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions.</li> <li>4. To understand the various types of wiring systems and acquire skills in house wiring.</li> <li>5. To understand, operate, and control different machines and equipments adopting safety practices.</li> </ol>	
	<p><b>Course Outcomes</b></p> <p>After completing this course, students will be able to:</p> <p><b>CO1:</b> Discuss general safety rules used in different shops.</p> <p><b>CO2:</b> Demonstrate making, measuring, cutting, holding, striking and planning tools and equipments.</p> <p><b>CO3:</b> Explain operations used in fitting, carpentry, smithy, sheet metal, welding and plumbing shops.</p> <p><b>CO4:</b> Prepare simple jobs in different shops.</p> <p><b>CO5:</b> Explain Sheet metal operation.</p>	
<b>Unit</b>	<b>Syllabus</b>	<b>Periods</b>
<b>UNIT-I</b>	Carpentry Shop: Introduction, Various types of woods, Different types of tools, machines and accessories.	<b>8</b>

<b>UNIT-II</b>	Welding Shop: Introduction, types of welding, ARC welding, Gas Welding, Gas Cutting, welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece, different types of flame, Elementary Symbolic representation, Safety precautions in welding safety equipment's and its use in welding processes.	<b>12</b>
<b>UNIT-III</b>	Fitting Shop: Introduction, various marking, measuring, cutting, holding and striking tools, different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc.	<b>10</b>
<b>UNIT-IV</b>	Plumbing Shop: Introduction, various marking, measuring, cutting, holding and striking tools, different G.I. pipes, PVC pipes, flexible pipes used in practice, G.I. pipes and PVC pipes fitting and accessories, adhesive solvents chemical action, piping layout.	<b>10</b>
<b>UNIT-V</b>	Sheet Metal Shop: Introduction, various types of tools, equipments and accessories, different types of operations in sheet metal shop, soldering and riveting, safety precautions.	<b>10</b>
	<b>Text Books:</b> 1. S.K. Hajara Chauadhary. Workshop Technology Media Promoters and publishers, New Delhi. 2. B.S. Raghuwanshi. Workshop Technology Dhanpat Rai and sons, New Delhi. 3. R.K. Jain. Production Technology Khanna Publishers, New Delhi.	
	<b>Reference Books:</b> 1. H.S. Bawa. Workshop Technology Tata McGraw Hill Publishers, New Delhi. 2. Kent's Mechanical Engineering Hand book John Wiley and Sons, New York.	

### **List of Experiments:**

1. Wood Working Shop: Demonstration of different wood working tools/machines, demonstration of different wood working processes, like planning, marking, chiseling, grooving, turning of wood etc. One job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
2. Welding Shop: Demonstration of different welding tools/machines. Demonstration on ARC Welding, Gas welding, Gas Cutting and rebuilding of broken parts with welding. One job involving butt and lap joint.
3. Fitting Shop: Demonstration of different fitting tools and drilling machines and power tools. Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. One fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
4. Plumbing Shop: Demonstration of different plumbing tools. Demonstration of different operations in plumbing, observing different pipe joint and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. One job on pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
5. Sheet Metal Shop: Demonstration of different sheet metal tools/machines. Demonstration of different sheet metal operations like sheet cutting, bending, engine, end curling, lancing, soldering and riveting. One job involving sheet metal operations and soldering and riveting.
6. Smithy Shop: Demonstration of different forging tools and Power Hammer. Demonstration of different forging processes, likes shaping, caulking, filleting, setting down operations etc. One job like hook peg, flat chisel or any hardware item.
7. Demonstration of power tools and practice of utility items: Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. Any other item as per the requirement of college/Dept.

**SYLLABUS**

**UG**

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>-</b>
<b>Subject Name</b>	<b>Sports and Yoga</b>				
<b>Subject Code</b>	<b>D20S206</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>00</b>				

	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To make the students understand the importance of sound health and fitness principles as they relate to better health.</li> <li>2. To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.</li> <li>3. To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.</li> <li>4. To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.</li> </ol>	
	<p><b>Course Outcomes:</b></p> <p>On successful completion of the course, the students will be able to:</p> <p><b>CO1:</b> Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.</p> <p><b>CO2:</b> Learn breathing exercises and healthy fitness activities.</p> <p><b>CO3:</b> Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.</p> <p><b>CO4:</b> Identify and apply injury prevention principles related to yoga and physical fitness activities.</p> <p><b>CO5:</b> Demonstrate an understanding of sound nutritional practices as related to health and physical performance and importance of games.</p>	

Unit	Syllabus	Periods
<b>UNIT-I</b>	<p>Introduction to Physical Education (i) Meaning &amp; definition of Physical Education, Aims &amp; Objectives of Physical Education, Changing trends in Physical Education.</p> <p>Olympic Movement: (i) Ancient &amp; Modern Olympics (Summer &amp; Winter), (ii) Olympic Symbols, Ideals, Objectives &amp; Values, (iii) Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)</p>	<b>8</b>
<b>UNIT-II</b>	<p>Physical Fitness, Wellness &amp; Lifestyle: (i) Meaning &amp; Importance of Physical Fitness &amp; Wellness, (ii) Components of Physical fitness, (iii) Components of Health related fitness, (iv) Components of wellness, (v) Preventing Health Threats through Lifestyle Change, (vi) Concept of Positive Lifestyle.</p> <p>Fundamentals of Anatomy &amp; Physiology in Physical Education, Sports and Yoga: (i) Define Anatomy, Physiology &amp; Its Importance. Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)</p>	<b>12</b>
<b>UNIT-III</b>	<p>Kinesiology, Biomechanics &amp; Sports: Meaning &amp; Importance of Kinesiology &amp; Biomechanics in Physical Edu. &amp; Sports. Newton's Law of Motion &amp; its application in sports. Friction and its effects in Sports.</p> <p>Postures: Meaning and Concept of Postures. Causes of Bad Posture. Advantages &amp; disadvantages of weight training. Concept &amp; advantages of Correct Posture. Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis. Corrective Measures for Postural Deformities.</p>	<b>10</b>
<b>UNIT-IV</b>	<p>Yoga: Meaning &amp; Importance of Yoga, Elements of Yoga, Introduction - Asanas, Pranayama, Meditation &amp; Yogic Kriyas, Yoga for concentration &amp; related Asanas (Sukhasana; Tadasana; Padmasana &amp; Shashankasana), Relaxation Techniques for improving concentration - Yognidra.</p> <p>Yoga &amp; Lifestyle: Asanas as preventive measures. Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. Obesity: Procedure, Benefits &amp; contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana. Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana. Diabetes: Procedure, Benefits &amp; contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana. Asthema: Procedure, Benefits &amp; contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.</p>	<b>12</b>

<b>UNIT-V</b>	<p>Training and Planning in Sports: Meaning of Training, Warming up and limbering down, Skill, Technique &amp; Style, Tournament – Knock-Out, League/Round Robin &amp; Combination.</p> <p>Sports / Games: Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc. History of the Game/Sport. Latest General Rules of the Game/Sport. Specifications of Play Fields and Related Sports Equipment. Important Tournaments and Venues. Sports Personalities. Proper Sports Gear and its Importance. Sports Medicine, First Aid – Definition, Aims &amp; Objectives. Sports injuries: Classification, Causes &amp; Prevention. Management of Injuries: Soft Tissue Injuries and Bone &amp; Joint Injuries.</p>	<b>12</b>
	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Modern Trends and Physical Education by Prof. Ajmer Singh.</li> </ol>	
	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Light On Yoga By B.K.S. Iyengar.</li> <li>2. Health and Physical Education – NCERT (11th and 12th Classes).</li> </ol>	



**SYLLABUS**

**UG**

<b>Class</b>		<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>		<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	-	-	<b>2</b>	<b>1</b>
<b>Subject Name</b>		<b>Electrical and Electronics Engineering Lab</b>				
<b>Subject Code</b>		<b>D20S207</b>				
<b>Paper</b>	<b>English</b>					
	<b>Hindi</b>					
<b>Max. Marks</b>		<b>50</b>				

**List of Experiments:**

1. Determine the permeability of magnetic material by plotting its B-H curve.
2. Measure voltage, current and power in 1-phase circuit with resistive load.
3. Measure voltage, current and power in R-L series circuit.
4. Determine the transformation ratio (K) of 1-phase transformer.
5. Connect single phase transformer and measure input and output quantities.
6. Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.
7. Identify various active electronic components in the given circuit.
8. Use multimeter to measure the value of given resistor.
9. Use LCR-Q tester to measure the value of given capacitor and inductor.
10. Determine the value of given resistor using digital multimeter to confirm with colour code.
11. Test the performance of PN-junction diode.
12. Test the performance of Zener diode.
13. Test the performance of NPN transistor.



## SYLLABUS

### UG

<b>Class</b>	<b>Diploma</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Semester/Year</b>	<b>2<sup>nd</sup> Sem /1<sup>st</sup> year</b>	-	-	<b>2</b>	<b>1</b>
<b>Subject Name</b>	<b>Engineering Mechanics Lab</b>				
<b>Subject Code</b>	<b>D20S208</b>				
<b>Paper</b>	<b>English</b>				
	<b>Hindi</b>				
<b>Max. Marks</b>	<b>50</b>				

#### List of Experiments:

1. Verification of law of parallelogram of forces.
2. Verification of law of polygon of forces.
3. Verification of laws of moments.
4. Determination of forces in the members of Jib Crane.
5. Determination of Centroid of plane lamina by graphical method.
6. Determination of coefficient of friction for surfaces of different materials on horizontal plane.
7. Determination of coefficient of friction for surfaces of different materials on an inclined plane.
8. Determination of mechanical advantage, velocity ratio and efficiency of the following lifting machines: Simple wheel and axle Differential wheel axle Single purchase crab Double purchase crab Simple pulley block Simple screw jack.



## SYLLABUS

### UG

Class		Diploma	L	T	P	C
Semester/Year		2 <sup>nd</sup> Sem /1 <sup>st</sup> year	-	-	4	2
Subject Name		IT Systems Lab				
Subject Code		D20S209				
Paper	English					
	Hindi					
Max. Marks		50				

#### List of Experiments:

1. Perform basic operating system operations - start, shutdown, restart etc.
2. Identify system properties such as RAM, processor, hard disk size, system type, computer name, work group information.
3. Uses of following devices a. Input-output devices. b. Storage devices. c. Central processing unit.
4. Exploring the desktop. a. Start button and start menu b. File explorer - minimize, maximize, move, resize. c. Desktop icons handling.
5. Recognize file system. a. Storage and partitions. b. Folder and file - creating, deletion, renaming, moving, copy. c. Deletion process - temporary deletion and recovering those files, permanent deletion. d. File permission and attributes.
6. Working with documents on office software. a. Creating, editing, formatting, saving a document. b. Cut, copy and paste text. c. Find and replace text inside a document. d. Insert, modify table. e. Formatting document - changing font colour, type, size, bold, italics. f. Ways to indent a paragraph - Left, right, centre indentation. g. Working with tables - Creating, adding row/columns, removing row/column.
7. Working with worksheets on office software. a. Create, edit, format, save, preview and move worksheets. b. using formulas and functions. c. Sorting and filtering data d. Use of freeze pan.
8. Working with power point slides on office software. a. Create, edit, insert and move slides. b. Insert picture, tables to the slide. c. Changing background.
9. Using internet. a. Using web browser for internet surfing. b. Using search engine to search contents on the internet. c. Basic email operations - creating, sending, receiving emails, saving to drafts. d. Sending an attachment with email.