

**REVISED DIPLOMA CURRICULUM OF FIRST
YEAR
(PART – I)**

**For the State of Meghalaya
(2023-24)**



National Institute of Technical Teachers' Training & Research
Block – FC, Sector – III, Salt Lake City, Kolkata – 700 106

REVISED DIPLOMA CURRICULUM OF

- **AUTOMOBILE ENGINEERING**
- **COSTUME DESIGN & GARMENT TECHNOLOGY**
- **ARCHITECTURAL ASSISTANTSHIP**

(PART – I)

For the State of Meghalaya
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**CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING
FOR THE STATE OF MEGHALAYA**

SEMESTER-I

SL. No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme							Total Marks	Credits	
				Pre-requisite	Contact Hours/ week			Theory			Practical					
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
									Class Test	Assignment	Attendance		Sessional			Viva voce
1	Basic Science	BS101	Mathematics -I		2	1	0	60	20	15	5	-	-	-	100	3
2		BS103	Applied Physics -I		2	1	0	60	20	15	5	-	-	-	100	3
3		BS 105	Applied Chemistry		2	1	0	60	20	15	5	-	-	-	100	3
4		BS107	Applied Physics –I Lab		0	0	2	0	-	-	-	40	40	20	100	1
5		BS109	Applied Chemistry Lab		0	0	2	0	-	-	-	40	40	20	100	1
6	Humanities & Social Science	HS101	Communication skills in English		2	0	0	60	20	15	5	-	-	-	100	2
7		HS 103	Sports & Yoga/ NCC/NSS		0	0	2	-	-	-	-	40	40	20	100	1
8		HS 105	Communication skills in English Lab		0	0	2	-	-	-	-	40	40	20	100	1
9	Engineering Science	ES101	Engineering Graphics		0	0	3	-	-	-	-	-	60	40	100	1.5
10		ES103	Engineering Workshop Practice		0	0	3	-	-	-	-	-	60	40	100	1.5
TOTAL					8	3	14	240	80	60	20	160	280	160	1000	18

SEMESTER-II

SL. No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme								Total Marks	Credits
				Pre-requisite	Contact Hours/ week			Theory			Practical					
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
									Class Test	Assignment	Attendance		Sessional	Viva voce		
1	Basic Science	BS102	Mathematics - II	BS101	3	1	0	60	20	15	5	-	-	-	100	4
2		BS104	Applied Physics - II	BS103	2	1	0	60	20	15	5	-	-	-	100	3
3		BS106	Applied Physics – II Lab	BS107	0	0	2	-	-	-	-	40	40	20	100	1
4	Engineering Science	ES102	Introduction to IT Systems		2	0	0	60	20	15	5	-	-	-	100	2
5		ES104	Fundamentals of Electrical & Electronics Engineering		2	1	0	60	20	15	5	-	-	-	100	3
6		ES106	Engineering Mechanics		2	1	0	60	20	15	5	-	-	-	100	3
7		ES108	Introduction to IT Systems Lab		0	0	4	-	-	-	-	40	40	20	100	2
8		ES110	Fundamentals of Electrical & Electronics Engineering Lab		0	0	2	-	-	-	-	40	40	20	100	1
9		ES112	Engineering Mechanics Lab		0	0	2	-	-	-	-	40	40	20	100	1
10	Mandatory	AU102	Environmental Science		2	0	0	0	0	0	0	0	0	0	0	0
TOTAL					13	4	10	300	100	75	25	160	160	80	900	20

**CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN COSTUME DESIGN & GARMENT TECHNOLOGY
FOR THE STATE OF MEGHALAYA**

SEMESTER-I

SL · No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme							Total Marks	Credits	
				Pre- requisite	Contact Hours/ week			Theory			Practical					
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
					Class Test	Assign ment	Attend ance		Sessio nal	Viva voce						
1	Prog. Core	CGTPC101	History of Fashion		3	0	0	60	20	15	5	-	-	-	100	3
2		CGTPC103	Introduction to Textiles		3	0	0	60	20	15	5	-	-	-	100	3
3		CGTPC105	Material Studies		1	1	0	60	20	15	5	-	-	-	100	2
4		CGTPC107	Machine Tools & Equipment		2	0	0	60	20	15	5	-	-	-	100	2
5		CGTPC109	Introduction to Textiles Lab		0	0	2	-	-	-	-	40	40	20	100	1
6		CGTPC111	Material Studies Lab		0	0	4	-	-	-	-	40	40	20	100	2
7		CGTPC113	Machine Tools & Equipment lab		0	0	2	-	-	-	-	40	40	20	100	1
8	Humanities & Social Science	CGTHS101	Communication skills in English		2	0	0	60	20	15	5	-	-	-	100	2
9		CGTHS103	Sports & Yoga/ NCC/NSS		0	0	2	-	-	-	-	40	40	20	100	1
10		CGTHS105	Communication skills in English Lab		0	0	2	-	-	-	-	40	40	20	100	1
TOTAL					11	1	12	300	100	75	25	200	200	100	1000	18

SEMESTER-II

SL · No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme							Total Marks	Credits	
				Pre- requisite	Contact Hours/ week			Theory			Practical					
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
							Class Test	Assig nment	Atten dance			Sessio nal	Viva voce			
1	Program Core	CGTPC102	Fashion Illustration Lab		0	0	4	-	-	-	-	40	40	20	100	2
2		CGTPC104	Introduction to Coral draw and Photoshop lab		0	0	6	-	-	-	-	40	40	20	100	3
3		CGTPC106	Basic Garment Design Lab		0	1	4	-	-	-	-	40	40	20	100	3
4		CGTPC108	Pattern making Lab		0	1	6	-	-	-	-	40	40	20	100	4
5		CGTPC110	Garment Construction I lab		0	1	4	--	-	-	-	40	40	20	100	3
6	Engg. Sc.	CGTES102	Introduction to IT Systems		2	0	0	60	20	15	5	0	0	0	100	2
7		CGTES104	Introduction to IT Systems Lab		0	0	4	0	0	0	0	40	40	20	100	2
8	Audit	AU102	Environmental Science		2	0	0	0	0	0	0	0	0	0	0	0
TOTAL					4	3	28	60	20	15	05	240	240	120	700	19

CURRICULUM STRUCTURE FOR DIPLOMA PROGRAMME IN ARCHITECTURAL ASSISTANTSHIP

FOR THE STATE OF MEGHALAYA

SEMESTER- I

Sl. No	Category of Course	Code	Course	Study Scheme			Evaluation Scheme							Total Marks	Credit	
				Contact Hour/Week			Theory			Practical						
				L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment				
								Class Test	Assignment*	Attendance		Sessio nal	Viva			
1	Basic Science	AABS101	Mathematics -I	-	2	1	0	60	20	15	5	0	0	0	100	3
2		AABS103	Applied Physics-I	-	2	0	0	60	20	15	5	0	0	0	100	2
3		AABS105	Applied Chemistry	-	2	0	0	60	20	15	5	0	0	0	100	2
4		AABS107	Applied Physics-I Lab	-	0	0	2	0	0	0	0	40	40	20	100	1
5		AABS109	Applied Chemistry Lab		0	0	2	0	0	0	0	40	40	20	100	1
6	Humanities & Social Science	HS101	Communication Skills in English	-	2	0	0	60	20	15	5	0	0	0	100	2
7		HS103	Sports/NCC/NSS		0	0	2	0	0	0	0	0	100	0	100	1
8		HS105	Communication Skills in English Lab	-	0	0	2	0	0	0	0	40	40	20	100	1
9	Program Core	AAPC101	Descriptive Geometry-I	-	0	0	4	0	0	0	0	0	100	0	100	2
10		AAPC103	Basic Design-I	-	0	0	4	0	0	0	0	0	100	0	100	2
11		AAPC105	Architectural Delineation		0	0	4	0	0	0	0	0	100	0	100	2
TOTAL				-	08	01	20	240	80	60	20	120	520	60	1100	19

Semester – II

Sl. No	Category of Course	Code	Course	Study Scheme			Evaluation Scheme								Total Marks	Credit
				Contact Hour/Week			Theory				Practical					
				L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment				
								Class Test	Assignment*	Attendance		Sessio nal	Viva			
1	Basic Science	AABS102	Mathematics -II	AABS101	2	1	0	60	20	15	5	0	0	0	100	3
2		AABS104	Applied Physics-II	BS103	2	0	0	60	20	15	5	0	0	0	100	2
3		AABS106	Applied Physics-II Lab	BS107	0	0	2	0	0	0	0	40	40	20	100	1
4	Engg. Sc.	ES102	Introduction to IT System		2	0	0	60	20	15	5	0	0	0	100	2
5		ES106	Engineering Mechanics	-	2	1	0	60	20	15	5	0	0	0	100	3
6		ES108	Introduction to IT System Lab		0	0	4	0	0	0	0	40	40	20	100	2
7		ES112	Engineering Mechanics Lab		0	0	2	0	0	0	0	40	40	20	100	1
8	Program Core	AAPC102	Descriptive Geometry-II	AAPC 101	0	0	2	0	0	0	0	0	100	0	100	1
9		AAPC104	Basic Design-II	AAPC 103	0	0	4	0	0	0	0	0	100	0	100	2
10		AAPC106	Building Material	-	3	0	0	60	20	15	5	0	0	0	100	3
11		AAPC108	Model Making and Workshop	-	1	0	2	0	0	0	0	0	100	0	100	2
TOTAL				-	12	02	16	300	100	75	25	120	420	60	1100	22

FIRST YEAR COURSES
(For Automobile Engineering)

MATHEMATICS- I

L	T	P		Course Code No.: BS101
2	1	0		
Total Contact hrs.: Lecture: 30 Tutorial: 15 Practical: 0 Credit :3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

COURSE OUTCOMES

By the end of the course, the students will be able to

- Apply Trigonometry for the calculation and the mathematical analysis.
- Find the effects of changing conditions on a system.
- Relate application of Complex numbers in studies of physical phenomena
- Use the concept of partial fraction decomposition.

COURSE CONTENT DETAILS

NIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I: TRIGONOMETRY	Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of $\sin x$, $\cos x$, $\tan x$ and e^x	08 + 02
UNIT – II: DIFFERENTIAL CALCULUS	Definition of function; Concept of limits. Four standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}, \quad \lim_{x \rightarrow 0} \frac{\sin x}{x}, \quad \lim_{x \rightarrow a} \left(\frac{a^x - 1}{x} \right) \quad \text{and} \quad \lim_{x \rightarrow a} (1 + x)^{\frac{1}{x}}$ Differentiation by definition of $x^n, \sin x, \cos x, \tan x, e^x$ and $\log_a x$. Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.	13+ 06
UNIT - III: ALGEBRA	Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-moivre's theorem, its application. Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction. Permutations and Combinations: Value of ${}^n P_r$ and ${}^n C_r$. Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems	14 + 07

REFERENCES:

- 1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
- 2) G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
- 3) Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
- 4) V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.
- 5) Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

APPLIED PHYSICS –I

L	T	P		Course Code No.: BS103
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit :3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

Applied Physics includes the study of a large number of diverse topics all related to materials/things that exist in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which such objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. 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.

LEARNING OUTCOME

After undergoing this subject, the student will be able to:

- Select physical quantities and their units for use in engineering solutions
- Represent physical quantities as scalar and vectors
- Apply the formulation to understand banking of roads/railway tracks and conservation of momentum principle to describe rocket propulsion, recoil of gun etc.
- Solve simple problems related to work, energy and power and their relationship.
- Describe forms of friction and methods to minimize friction between different surfaces.
- Explain various forms of energy, and energy transformations and the principle of conservation of energy.
- Relate physical properties associated with linear motion and rotational motion and apply conservation of angular momentum principle to known problems.
- Describe the phenomenon of surface tension, effects of temperature on surface tension
- Describe the viscosity of liquids, coefficient of viscosity and the various factors affecting its value.
- Explain stress and strain and Hooke’s law, elastic limits, stress–strain diagram,
- Determine; (a) the modulus of elasticity, (b) the yield strength (c) the tensile strength, and (d) estimate the percent elongation.
- Illustrate the terms; heat and temperature, measure temperature in various processes on different scales (Celsius, Fahrenheit, and Kelvin etc.)
- Distinguish between conduction, convection and radiation;
- Identify different methods for reducing heat losses and mode of heat transfer between bodies at different temperatures.
- Explain specific heats

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNITS:- DIMENSION AND MEASUREMENTS	<p>1.1 Units, Dimensionⁱ</p> <ul style="list-style-type: none"> • Concept of unit of physical parameters • Fundamental and derived units – FPS, CGS and SI • SI system of units of different physical parameters • Dimension with examples of different physical parameters. <p>1.2 Measurements</p> <ul style="list-style-type: none"> • Measuring devices e.g., slide callipers, screw gauge, spherometer with concept of Vernier constant, least count and zero error. • Physical Balance 	02+01
Unit II: MECHANICS	<p>2.1 Motion along a straight line and Force</p> <ul style="list-style-type: none"> • Concept of scalar and vector quantities. Resolution of a Vector and its application to inclined plane and lawn roller (introductory idea). • Speed, velocity and linear acceleration • Equations of motion with constant acceleration (derivation not required) • Equations of motion of falling body under gravity • Simple problems on linear motion • Newton’s laws of motion, Action and reaction, tension • Force, inertia, momentum, impulse and impulsive force with practical examples • Conservation of linear momentum, its applications such as recoil of gun, rockets. <p>2.2 Rotational Motion</p> <ul style="list-style-type: none"> • Translational and rotational motions with examples • Definition of torque and angular momentum, moment of inertia and their examples • Concept of conservation of angular momentum with its applications • Simple examples such as banking of roads and bending of cyclist. 	04+02
Unit -III: GRAVITATION	<p>3.1 Newton’s laws of gravitation</p> <ul style="list-style-type: none"> • Newton’s gravitational constant G and its SI unit • Acceleration due to gravity (g) and its relation with “G”. • Variation of g with altitude and latitude (deduction not required) • Difference between mass and weight • Simple problems 	03+02
Unit IV: WORK, POWER AND ENERGY	<p>4.1 Work, power and energy</p> <ul style="list-style-type: none"> • Definition with their units and mathematical expressions • Relation between Horse power and Watt • Different forms of mechanical energy : PE, KE and their expressions • Conservation of energy and transformation of energy with examples • Simple problems 	03+02

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
Unit V: PROPERTIES OF MATTER	<p>5.1 Properties of solid Plasticity and elasticity in solids</p> <ul style="list-style-type: none"> • Deformation of bodies by the action of external forces change in size and change in shape • Unit of stress – tensile stress, compressive stress and Shear stress with examples • Unit of strain – tensile strain., volumetric strain and shear strain & Hooke's law • Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. • Modulus of elasticity – Young's modulus, Bulk modulus and Modulus of rigidity, Poisson's ratio and their units. Stress – Strain curve • Definition & basic concepts only, no deduction. <p>5.2 Properties of Fluid</p> <ul style="list-style-type: none"> • Thrust and pressure • Law of fluid pressure, Pascal's law and working principles of hydraulic press • Archimedes Principle and its applications • Specific gravity and relative density • Hydrometers and their uses • Properties of gas : Toricelli's Expt. & Simple Barometer • Simple idea of surface tension , viscosity with applications. 	06+02
Unit VI: HEAT	<p>6.1 Heat and temperature</p> <ul style="list-style-type: none"> • Heat and temperature • Fixed points and different scales of temperature - Fahrenheit, Celsius and Kelvin and their relationships • Simple problems <p>6.2 Measurement of heat</p> <ul style="list-style-type: none"> • Quantity of heat, units of heat:Joule and Calorie • Specific heat of solid, heat capacity, water equivalent • Principle of calorimeter, Measurement of specific heat • Change of state: Latent heat, evaporation & boiling, effect of pressure • Boyle's law and Charles law, Universal gas law and universal gas constant. • Idea of two specific heat capacities of gas: Cp and Cv and their relationships (deduction not required) <p>6.3 Thermal expansion & Transmission of heat</p> <ul style="list-style-type: none"> • Expansion of solid – linear, superficial and cubical co-efficient of expansion & their units • Interrelationship between different • co-efficient of expansion with examples • Different methods of transmission of heat: conduction, convection and radiation • Co-efficient of thermal expansion & its unit • Good conductors and bad conductors of heat 	06+03

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
Unit VII: SOUND	<p>7.1 Simple Harmonic Motion</p> <ul style="list-style-type: none"> • Simple harmonic motion and its characteristics • Time period, frequency & amplitude of vibration • Mathematical expression of SHM • Examples of SHM: Simple Pendulum • Idea on Longitudinal & Transverse wave <p>7.2 Production and propagation of Sound</p> <ul style="list-style-type: none"> • Natural vibration, forced vibration with examples • Resonance of sound with examples • Principle of resonance to find out velocity of sound in air. • Velocity of sound, Newton's formula and Laplace correction (Idea only, no deduction) <p>7.3 Reflection of sound</p> <ul style="list-style-type: none"> • Echo, reverberation • Simple problems <p>7.4 Musical sound, noise</p> <ul style="list-style-type: none"> • Characteristics of musical sound and noise with examples • Factors affecting sound 	06+03

REFERENCES:

1. Principle of Physics – Subrahmanyam & Brizal
2. Intermediate Physics – S.C.Roy Chaudhury & D.B.Sinha
3. Fundamentals Of Physics – David Halliday, Robert Resnick & Jeal Walka
4. University Physics – Francis W. Sears, Mark W. Zemans Key & Hugh D. Young
5. University Physics – Hugh D. Young & Roger H. Freedman
6. A text book of Physics (Part I) – C. R. Dasgupta
7. Elements of Higher Secondary Physics (Part I) - D. Dutta, B. Pal & B. Chaudhuri
8. Physics (Volume I) - Ajoy Chakraborty
9. Applied Physics (Vol. 1) - Saxena H.C. & Singh Prabhakar
10. Physics for 10+2 students (Part I) - Das, S.K, Sisodia M.L, Neher P.K., Kachhawa C.M.
11. Text Book of Physics for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi
12. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.
13. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
14. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
15. Engineering Physics by DK Bhattacharya & Poonam Tandan; Oxford University Press, New Delhi.
16. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
17. e-books/e-tools / learning physics software / websites etc.

APPLIED CHEMISTRY

L	T	P		Course Code No.: BS105
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE:

There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. 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.

COURSE OUTCOMES

At the end of the course student will be able to

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
Unit I: ATOMIC STRUCTURE, CHEMICAL BONDING AND SOLUTIONS	Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration. Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H ₂ , F ₂ , HF hybridization in BeCl ₂ , BF ₃ , CH ₄ , NH ₃ , H ₂ O), coordination bond in NH ⁺ , and anomalous properties of NH ₃ , H ₂ O due to hydrogen bonding, and metallic bonding. Solution – idea of solute, solvent and solution, methods to express the concentration of solution- molarity ($M = \text{mole per liter}$), ppm, mass percentage, volume percentage and mole fraction.	06+03
Unit II: WATER	Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness. Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by EDTA method, total dissolved solids (TDS) alkalinity estimation. <ol style="list-style-type: none"> i. Water softening techniques – soda lime process, zeolite process and ion exchange process. ii. Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization. Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).	06+03
Unit III:	Natural occurrence of metals – minerals, ores of iron, aluminium and	06+03

ENGINEERING MATERIALS	<p>copper, gangue (ma-trix), flux, slag, metallurgy – brief account of general principles of metallurgy.</p> <p>Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite alongwith reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.</p> <p>General chemical composition, composition based applications (elementary idea only detailsomitted):</p> <p>Port land cement and hardening, Glasses Refractory and Composite materials.</p> <p>Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.</p>	
Unit IV: CHEMISTRY OF FUELS AND LUBRICANTS	<p>Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.</p> <p>Proximate analysis of coal solid fuel petrol and diesel - fuel rating (octane and cetane numbers), Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.</p> <p>Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication, physical proper- ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.</p>	08+03
Unit V: ELECTRO CHEMISTRY	<p>Electronic concept of oxidation, reduction and redox reactions.</p> <p>Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems. Industrial Application of Electrolysis –</p> <ul style="list-style-type: none"> • Electrometallurgy • Electroplating • Electrolytic refining. <p>Application of redox reactions in electrochemical cells –</p> <ul style="list-style-type: none"> • Primary cells – dry cell, • Secondary cell - commercially used lead storage battery, fuel and Solar cells. <p>Introduction to Corrosion of metals –</p> <ul style="list-style-type: none"> • definition, types of corrosion (chemical and electrochemical), H₂ liberation and O₂ absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion. <p>Internal corrosion preventive measures –</p> <ul style="list-style-type: none"> • Purification, alloying and heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors. 	06+03

REFERENCES/SUGGESTED LEARNING RESOURCES:

- 1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
- 2) Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
- 3) C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
- 4) Dara, S. S. & Dr.S.S.Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Del-hi, 2015.
- 5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
- 6) Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
- 7) Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II,NITTTTR, Chandigarh, Publications, 2013-14.
- 8) Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

APPLIED PHYSICS –I LAB

L	T	P		Course Code No.: BS107
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit :1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology-based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

LEARNING OUTCOME

After undergoing this lab work, the student will be able to:

- Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometer etc.) for determining dimensions of physical quantities and make measurements with accuracy and precision.
- Determine dimensions of plane, curved and regular surfaces/bodies.
- Apply laws of forces to determine resultant force acting on a body.
- Measure co-efficient of friction between different surfaces.
- Verify Hook's law and law of conservation of energy.
- Identify various forms of energy, energy transformations
- Demonstrate rotational motion and M.I. of a rotating body (flywheel)
- Determine linear expansion coefficient for a given material rod.
- Use Fortin's barometers for determining pressure at a place.
- Demonstrate use of thermometers to measure temperature under different conditions and different scales of temperature measurements.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS
1	To measure the volume of a wooden block by using Vernier callipers.
2	To measure the surface area of a metal washer by Vernier inside callipers
3	To measure the depth of a hole by Depth Gauge (Vernier callipers)
4	To measure the cross-section of a wire by Screw Gauge.
5	To determine radius of curvature of a convex and a concave mirror/surface using a spherometer.
6	To adjust a common balance and to determine the specific gravity of a liquid by specific gravity bottle.
7	To establish the relation between pressure and volume of a fixed mass of gas at a constant temperature using Boyle's apparatus.
8	To determine the acceleration due to gravity (g) of a place by simple pendulum
9	To measure the velocity of sound in air by air resonance column method.
10	To measure room temperature and temperature of a hot bath using mercury thermometer and convert it into different scales.
11	To determine atmospheric pressure at a place using Fortin's barometer.

REFERENCE BOOK

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P)Ltd.,
3. Practical Physics by C. L. Arora, S. Chand Publication.
4. e-books/e-tools/ learning physics software/YouTube videos/websites etc.

APPLIED CHEMISTRY LAB

L	T	P		Course Code No.: BS109
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE:

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

COURSE OUTCOMES

At the end of the course student will be able to

- Express quantitative measurements accurately.
- Practice and adapt good measuring techniques.
- Use various apparatus for precise measurements.
- Differentiate different methods of quantitative analysis.
- Explain principles of quantitative analysis using instruments.
- Construct different electrochemical cells used in developing batteries.
- Explain methods of corrosion abetments.

COURSE CONTENT DETAILS

LIST OF PRACTICALS (Perform any 12 (twelve)).

Sl. No.	Experiments
1	Volumetric and Gravimetric analysis:
	i. Preparation of standard solution of oxalic acid or potassium permanganate. ii. Determination of strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator. iii. Standardization of $KMnO_4$ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by $KMnO_4$ solution. iv. Iodometric estimation of copper in the copper pyrite ore. v. Volumetric estimation of total acid number (TAN) of given oil. vi. Volumetric estimation of a. Total hardness of given water sample using standard EDTA solution. b. Alkalinity of given water sample using 0.01M sulphuric acid vii. Proximate analysis of coal a. Gravimetric estimation moisture in given coal sample b. Gravimetric estimation ash in given coal sample
2	Instrumental analysis
	i. Determine the conductivity of given water sample. ii. Determination of the Iron content in given cement sample using colorimeter. iii. Determination of calorific value of solid or liquid fuel using bomb calorimeter. iv. Determination of viscosity of lubricating oil using Redwood viscometer. v. Determination of flash and fire point of lubricating oil using Able's flash point apparatus. vi. Verification of the first law of electrolysis of copper sulfate using copper electrode. vii. Construction and measurement of emf of elector chemical cell (Daniel cell). viii. Study of the effect of dissimilar metal combination.

REFERENCE BOOKS

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

COMMUNICATION SKILLS IN ENGLISH

L	T	P		Course Code No.: HS101
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

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:

- To develop confidence in speaking English with correct pronunciation.
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills.

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.

COURSE OUTCOMES

At the end of this course, the participants will be able to

- Demonstrate basic speaking and writing skills including proper usage of language and vocabulary
- Demonstrate the latest trends in basic verbal activities such as presentations, facing interview and other forms of oral communication.
- Develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs)
Unit I: COMMUNICATION: THEORY AND PRACTICE	<ul style="list-style-type: none"> • Basics of communication: Introduction, meaning and definition, process of communication etc. • Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication. • 7Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous). • Art of Effective communication, <ul style="list-style-type: none"> ○ Choosing words ○ Voice ○ Modulation ○ Clarity ○ Time ○ Simplification of words • Technical Communication. 	03
Unit II: SOFT SKILLS FOR PROFESSIONAL EXCELLENCE	<ul style="list-style-type: none"> • Introduction: Soft Skills and Hard Skills. • Importance of soft skills. • Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc. • Applying soft skills across cultures. • Case Studies. 	03
Unit III: READING COMPREHENSION	<ul style="list-style-type: none"> • Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts: 	16

	<ul style="list-style-type: none"> ❖ Section-1 <ul style="list-style-type: none"> ○ Malgudi Days: R.K. Narayan ○ The Room on Roof: Ruskin Bond ○ “The Gift of the Magi” by O. Henry ○ “Uncle Podger Hangs a Picture” Jerome K. Jerome ❖ Section-2 <ul style="list-style-type: none"> ○ Night of the Scorpion by Nissim Ezekiel, ○ Stopping by Woods on a Snowy Evening by Robert Frost, ○ Where the Mind is Without Fear by Rabindranath Tagore, ○ Ode to Tomatoes by Pablo Neruda 	
Unit IV: PROFESSIONAL WRITING	<ul style="list-style-type: none"> • The art of précis writing, • Letters: business and personnel, • Drafting e-mail, notices, minutes of a meeting etc. • Filling-up different forms such as banks and on-line forms for placement etc. 	06
Unit V: VOCABULARY AND GRAMMAR	<ul style="list-style-type: none"> • Vocabulary of commonly used words • Glossary of administrative terms (English and Hindi) • One-word substitution, Idioms and phrases etc. • Parts of speech, active and passive voice, tenses etc., Punctuation 	02

REFERENCES

1. J.D.O’Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
2. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilsonand Sons, 1908.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition 2018)
4. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
5. M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.
6. John Nielson. Effective Communication Skills. Xlibris, 2008.
7. Oxford Dictionary
8. Roget’s Thesaurus of English Words and Phrases
9. Collin’s English Dictionary

SPORTS AND YOGA

L	T	P		Course Code No.: HS103
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course will enable students to understand the importance of sound health and fitness principles as they relate to better health. Students will be exposed to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, NCC, NSS, health and fitness. Students will develop an appreciation of physical activity as a lifetime pursuit and a means to better health.

COURSE OUTCOMES

On successful completion of the course the students will be able to:

- Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
- Demonstrate techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
- Demonstrate breathing exercises and healthy fitness activities
- Explain basic skills associated with yoga and physical activities including strength and flexibility, balance, and coordination.
- Perform yoga movements in various combination and forms.
- Assess current personal fitness levels.
- Identify opportunities for participation in yoga and sports activities.
- Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
- Participate in sports and yogic activities.
- Demonstrate understanding of psychological problems associated with the age and lifestyle.
- Demonstrate understanding of sound nutritional practices as related to health and physical performance
- Assess yoga activities in terms of fitness value.
- Apply injury prevention principles related to yoga and physical fitness activities.
- Apply biomechanical and physiological principles related to exercise and training.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT
UNIT – I INTRODUCTION TO PHYSICAL EDUCATION	<ul style="list-style-type: none"> • Meaning & definition of Physical Education • Aims & Objectives of Physical Education • Changing trends in Physical Education
UNIT – II OLYMPIC MOVEMENT	<ul style="list-style-type: none"> • Ancient & Modern Olympics (Summer & Winter) • Olympic Symbols, Ideals, Objectives & Values • Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhyanchand Award, Rajiv Gandhi Khel Ratna Award etc.)
UNIT – III PHYSICAL FITNESS, WELLNESS & LIFESTYLE	<ul style="list-style-type: none"> • Meaning & Importance of Physical Fitness & Wellness • Components of Physical fitness • Components of Health-related fitness • Components of wellness • Preventing Health Threats through Lifestyle Change • Concept of Positive Lifestyle

<p>UNIT – IV FUNDAMENTALS OF ANATOMY & PHYSIOLOGY IN PHYSICAL EDUCATION, SPORTS AND YOGA</p>	<ul style="list-style-type: none"> • Define Anatomy, Physiology & Its Importance • Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)
<p>UNIT – V KINESIOLOGY, BIOMECHANICS & SPORTS</p>	<ul style="list-style-type: none"> • Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports • Newton’s Law of Motion & its application in sports. • Friction and its effects in Sports.
<p>UNIT – VI POSTURES</p>	<ul style="list-style-type: none"> • Meaning and Concept of Postures. • Causes of Bad Posture. • Advantages & disadvantages of weight training. • Concept & advantages of Correct Posture. • Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Ky- phosis, Bow Legs and Scoliosis. • Corrective Measures for Postural Deformities
<p>UNIT -VII YOGA</p>	<ul style="list-style-type: none"> • Meaning & Importance of Yoga • Elements of Yoga • Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas • Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana) • Relaxation Techniques for improving concentration - Yognidra
<p>UNIT – VIII YOGA & LIFESTYLE</p>	<ul style="list-style-type: none"> • Asanas as preventive measures. • Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. • Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, • Ardh Matsyendrasana. • Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana. • Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, • Pavan Muktasana, Ardh Matsyendrasana. • Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, • Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
<p>UNIT – IX TRAINING AND PLANNING IN SPORTS</p>	<ul style="list-style-type: none"> • Meaning of Training • Warming up and limbering down • Skill, Technique & Style • Meaning and Objectives of Planning. • Tournament – Knock-Out, League/Round Robin & Combination.
<p>UNIT – X PSYCHOLOGY & SPORTS</p>	<ul style="list-style-type: none"> • Definition & Importance of Psychology in Physical Edu. & Sports • Define & Differentiate Between Growth & Development • Adolescent Problems & Their Management • Emotion: Concept, Type & Controlling of emotions • Meaning, Concept & Types of Aggressions in Sports. • Psychological benefits of exercise. • Anxiety & Fear and its effects on Sports Performance. • Motivation, its type & techniques. • Understanding Stress & Coping Strategies.

UNIT – XI DOPING	<ul style="list-style-type: none"> ● Meaning and Concept of Doping ● Prohibited Substances & Methods ● Side Effects of Prohibited Substances
UNIT – XII SPORTS MEDICINE	<ul style="list-style-type: none"> ● First Aid – Definition, Aims & Objectives. ● Sports injuries: Classification, Causes & Prevention. ● Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries
UNIT - XIII SPORTS / GAMES	<p>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, Vol- leyball, Yoga etc.</p> <ul style="list-style-type: none"> ● 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.

REFERENCES:

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

COMMUNICATION SKILLS IN ENGLISH LAB

L	T	P		Course Code No.: HS105
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students.

COURSE OUTCOMES

At the end of this course the students will be able to

- Communicate effectively with an increase in their confidence to read, write and speak English fluently.
- Demonstrate a significant increase in word power.
- Participate in a conversation like listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly
- Engage audience through preparation, organization, and effective delivery of oral presentation.
- Demonstrate non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I LISTENING SKILLS	Listening Process and Practice: Introduction to recorded lectures, poems, interviews, and speeches, listening tests	06
UNIT – II INTRODUCTION TO PHONETICS	Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.	06
UNIT – III SPEAKING SKILLS	Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.	10
UNIT – IV BUILDING VOCABULARY	Etymological Study Of Words And Construction Of Words, Phrasal Verbs, Jargon/ Register Related To Organizational Set Up, Word Exercises And Word Games To Enhance Self-Expression And Vocabulary Of Participants	08

REFERENCES:

1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press, 1956.
2. James Hartman & et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
5. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.
6. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
7. J. Sethi & et al. A Practice Course in English Pronunciation. New Delhi: Prentice Hall, 2004.
8. Pfeiffer, William Sanborn and T.V.S Padmaja. Technical Communication: A Practical Approach. 6th ed. Delhi: Pearson, 2007.

ENGINEERING GRAPHICS

L	T	P		Course Code No.: ES101
0	0	3		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 45 Credit : 1.5			Total marks: 100	Practical: End Term Exam.:00 P.A: 100

RATIONALE

Engineering Graphics is the precise means of communicating the ideas of the engineer, designer, and architect to the workmen who will produce/build the desired object. It is necessary that all diploma engineers have command over making and reading of engineering drawing and For which they have thorough understanding of engineering graphics.

COURSE OUTCOMES

After completion of the course, the students will be able to

- Illustrate the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.
- Make draft and sketches using drawing equipment and Indian Standards related to engineering drawings.
- Develop skills to visualize actual object or a part of it, on the basis of drawings.
- Translate ideas into sketches
- Draw various engineering curves, projections and dimensioning styles.
- Demonstrate basic skills related to computer aided drafting including how to draw, modify, and edit basic shapes (2D), using AUTOCAD

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT
UNIT – I BASIC ELEMENTS OF DRAWING	<ul style="list-style-type: none"> • Drawing Instruments and supporting materials: method to use them with applications. Convention of lines and their applications. • Representative Fractions reduced, enlarged and full size scales; engineering scales such as plain and diagonal scale. • Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning. • Geometrical and Tangency constructions. (Redraw the figure)
UNIT – II ORTHOGRAPHIC PROJECTIONS	<ul style="list-style-type: none"> • Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination). • Introduction to orthographic projection, First angle and Third angle method, their symbols. • Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)
UNIT – III ISOMETRIC PROJECTIONS	<ul style="list-style-type: none"> • Introduction to isometric projections. Isometric scale and Natural scale. Isometric view and isometric projection. • Illustrative problems related to objects containing lines, circles and arcs shape only. Conversion of orthographic views into isometric view/projection.
UNIT – IV FREE HAND SKETCHES OF ENGINEERING ELEMENTS	<ul style="list-style-type: none"> • Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, wash-er, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching) • Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)
UNIT – V COMPUTER AIDED DRAFTING INTERFACE	<ul style="list-style-type: none"> • Computer Aided Drafting: Concept. Hardware and various CAD software available. System requirements and understanding the interface. • Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

	<ul style="list-style-type: none"> File features: new file, Saving the file, Opening an existing drawing file, Creating templates, Quit. Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.
UNIT – VI COMPUTER AIDED DRAFTING	<ul style="list-style-type: none"> Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Polyline. Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates. Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers. Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions. Dim scale variable. Editing dimensions. Text: Single line Text, Multiline text. Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

Sl. No.	Practical Exercises	Unit No.	Time Allotted (Hrs.)
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I	02
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II	02
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II	02
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III	02
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III	02
7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs. Part I	III	02
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV	02
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV	02
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. Part I	V	02
11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V	02
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD(Print out should be a part of progressive assessment). Part I	V	02
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V	02
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD(Printout should be a part of progressive assessment). Part III	V	02
15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V	02
16	Draw basic branch specific components in 2D using AutoCAD (Print out should be a part of term work). Part I	VI	02
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI	02

REFERENCES

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.
2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN:978-93-80358-17-8.
3. Jain & Gautam, *Engineering Graphics & Design*, Khanna Publishing House, New Delhi (ISBN:978-93-86173-478)
4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN:978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD*. PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapooan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas PublishingHouse Pvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers*. Dreamtech Press; GalgotiaPublication, New Delhi, 2015; ISBN 978-9351199113.

Software/Learning Websites

1. <https://www.youtube.com/watch?v=TJ4jGyD-WCw>
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. <https://www.youtube.com/watch?v=MQScnLXL0M>
4. <https://www.youtube.com/watch?v=3WXPanCq9LI>
5. <https://www.youtube.com/watch?v=fvjk7PlxAuo>

ENGINEERING WORKSHOP PRACTICE

L	T	P		Course Code No.: ES103
0	0	3		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 45 Credit : 1.5			Total marks: 100	Practical: End Term Exam.:00 P.A: 100

RATIONALE

Workshop practice is an important work related to the direct hands-on experiences of learners, which are useful for application of engineering and technology. All engineering / technological activities demand more of such workshop practices of different kinds which are vital for the ongoing processes of various manufacturing industries. This course will develop abilities for different skills through direct hands-on-experiences of learners, related to various works on (a) Carpentry (b) Fittings (c) Sheet metal/Smithy (d) Welding (e) Electrical wiring.

COURSE OUTCOMES

At the end of the course, the student will be able to

- Demonstrate skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines
- Prepare jobs as per specifications in allotted time
- Inspect the job for the desired dimensions and shape
- Operate different machines and equipment following safety practices

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT
UNIT – I CARPENTRY	<ul style="list-style-type: none"> • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like planing, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
UNIT – II FITTING	<ul style="list-style-type: none"> • Demonstration of different fitting tools and drilling machines and power tools • Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
UNIT – III WELDING	<ul style="list-style-type: none"> • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint
UNIT – IV SHEET METAL WORKING	<ul style="list-style-type: none"> • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting. • One simple job involving sheet metal operations and soldering and riveting.
UNIT – V ELECTRICAL HOUSE WIRING	<p>Practice on simple lamp circuits</p> <ul style="list-style-type: none"> • one lamp controlled by one switch by surface conduit wiring, • Lamp circuits- connection of lamp and socket by separate switches, • Connection of Fluorescent lamp/tube light, • simple lamp circuits-in- stall bedroom lighting. • Simple lamp circuits- install stair case wiring.
UNIT – VI DEMONSTRATION	<ul style="list-style-type: none"> • Demonstration of measurement of Current, Voltage, Power and Energy. • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • iii) Tools for Cutting and drilling

REFERENCES:

1. S. K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B. S. Raghuvanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York

MATHEMATICS – II

L	T	P		Course Code No.: BS102
3	1	0		
Total Contact hrs.: Lecture:45 Tutorial:15 Practical: 0 Credit : 4			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The purpose of teaching Engineering Mathematics-II to diploma students is to enable them to understand advance uses of mathematics and solving engineering problems. Continuity and sequence is necessary for logical Development of subject. The topic includes Determinants and Matrices, Integral Calculus, Coordinate geometry and Vector Algebra. This course will be helpful for the learners those who like to go for higher studies.

COURSE OUTCOMES

By the end of the course the students will be able to

- Apply the knowledge of Determinants and Matrices with an understanding of importance of that for solving problems.
- Demonstrate capability of encoding the inherent geometry of the original shape.
- Explain cumulative effect of the original quantity or equation is the Integration
- Relate coordinate geometry with algebra and geometry through graphs of lines and curves.
- Differentiate between a resultant and a concurrent force to model simple physical problems in the form of a differential equation with analyze and interpretation of the solutions.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I: DETERMINANTS AND MATRICES	Elementary properties of determinants up to 3rd order, consistency of equations, Cramer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.	08
UNIT - II: INTEGRAL CALCULUS	Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulae $\int_0^{\frac{\pi}{2}} \sin^n x dx$, $\int_0^{\frac{\pi}{2}} \cos^n x dx$ and $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$ for solving problems Where m and n are positive integers. Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes. ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems)	15
UNIT - III: CO-ORDINATE GEOMETRY	Equation of straight line in various standard forms (without proof), inter section of two straightlines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula. General equation of a circle and its characteristics. To find the equation of a circle, given: i. Centre and radius, ii. Three points lying on it and iii. Coordinates of end points of a diameter; Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directrices or vertices are given.	10

UNIT - IV: VECTOR ALGEBRA	Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.	06
UNIT-V: DIFFERENTIAL EQUATIONS	Solution of first order and first degree differential equation by variable separation method (simple problems). MATLAB – Simple Introduction	06

REFERENCES:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
3. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
4. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

APPLIED PHYSICS –II

L	T	P		Course Code No.: BS104
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. 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.

LEARNING OUTCOME:

After undergoing this subject, the student will be able to;

- Solve simple problems on waves and wave motion, periodic and simple harmonic motions.
- Establish wave parameters: frequency, amplitude, wavelength, and velocity
- Explain ultrasonic waves and engineering, medical and industrial applications of Ultrasonic
- Apply acoustics principles to various types of buildings for best sound effect
- Establish the location of the images formed by mirrors and thin converging lens,
- Describe refractive index of a liquid or a solid and conditions for total internal reflection
- Solve simple problems on capacitors in simple circuits
- Illustrate the differentiate between insulators, conductors and semiconductors, and potential, potential difference, electromotive force
- Explain measurement of the circuit parameters: electric current, potential difference, resistance.
- Calculate the equivalent resistance of a variety of resistor combinations, the energy consumed by an appliance
- Describe the effect on a current-carrying conductor when placed in a magnetic field
- Explain the operation of appliances like moving coil galvanometer, simple DC motors.
- Apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits.
- Demonstrate the use of semiconductors in various technical gadgets like mobile phones, computers, LED, photocells, solar lights etc.
- Illustrate the conditions for light amplification in various LASER and laser-based instruments and optical devices
- Discuss the potential of optical fiber in fields of medicine and communication.
- Express importance of nanoscience and nanotechnology and impact of nanotechnology to the society

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT - I: LIGHT	<p>1.1 Reflection of light</p> <p>1.1.1. Reflection of light on plane surface (Review) :</p> <ul style="list-style-type: none"> • Laws of reflection • Image formation for reflection in a plane mirror. • Geometrical method of locating image. <p>1.1.2 Reflection of light on spherical surface :</p> <ul style="list-style-type: none"> • Different types of spherical mirror • Radius of curvature and focus of a spherical mirror. • Reflection by a spherical mirror: real and virtual images, magnification 	08+03

	<ul style="list-style-type: none"> • Geometrical method of determination of image position, size and nature of the images formed • Relation between focal length and radius of curvature of the spherical mirror, • Relation between object distance, image distance and focal length (no deduction). • Uses of different types of mirrors. <p>1.2 Refraction of light:</p> <p>1.2.1 Refraction of light through plane surface (Review)</p> <ul style="list-style-type: none"> • Laws of refraction • Refractive index in terms of velocity of light in different media • Total internal reflection and critical angle, concept of fibre optics & its various practical applications • Dispersion of light through a prism. <p>1.2.2 Optical Lens :</p> <ul style="list-style-type: none"> • Different types of lenses • Position and nature of images formed by convex and concave lenses • Image formation formula (no deduction) • Power of a lens • Electromagnetic spectrum : Infrared, Ultra violet & visible light • Simple problems 	
UNIT - II: MAGNETISM	<p>2.1 Magnetic properties (Review)</p> <ul style="list-style-type: none"> • Natural and artificial magnets • Properties of magnets • Types of magnets – bar, horse-shoe, needle • Preparation of temporary and permanent magnets • Induced magnetism <p>2.2 Magnetic Measurements:</p> <ul style="list-style-type: none"> • Uniform and non-uniform field • Magnetic moment • Inverse square law • Magnetic lines of force • Elements of Earth magnetism : dip, declination and horizontal component 	03+01
UNIT- III: ELECTROSTATIC S	<p>3.1 Electrostatics Basic:</p> <ul style="list-style-type: none"> • Basic concept of Electric charge • Its production and nature – electrification by rubbing : Kinds of electrification • Electrostatic induction and conduction • Conductors and non-conductors • Surface density of charge, The lightning conductor • Coulomb’s law between electric charges • Field intensity and electric potential • Electric permittivity • Lines of force in electrostatic field 	03+01
UNIT - IV: CURRENT ELECTRICITY	<p>4.1 Electric current:</p> <ul style="list-style-type: none"> • Cell: Primary & Secondary • Flow of charge – electric current and its unit • Electric motive force (EMF) • Ohm’s law • Resistance and its unit, specific resistance • Resistance in series and parallel • Factors affecting resistance • Wheatstone bridge circuit • Relation for balanced Wheatstone bridge (No deduction) • Meter bridge, P.O. Box • Simple problems 	10+06

	<p>4.2 Heating Effects of Current:</p> <ul style="list-style-type: none"> • Joule’s law • Electrical work, energy and power with units • Simple problems. <p>4.3 Magnetic Effect of Electric Current:</p> <ul style="list-style-type: none"> • Magnetic effect of electric current, Bio-Savart law • Fleming’s left-hand rule • Application of Magnetic effect of electric current – Galvanometer (concept only) • Electromagnetic Induction: Faraday’s law, Fleming right-hand rule, Basic concept of A.C. generator. 	
UNIT - V: MODERN PHYSICS	<p>5.1 Photo-electric effect:</p> <ul style="list-style-type: none"> • Photo-electron, Work function, photo electric effect • Photo cell • Einstein photo electric equation • Stopping potential, Threshold Frequency • Principle of solar photo-voltaic cell and its uses. <p>5.2 Semiconductor:</p> <ul style="list-style-type: none"> • Energy band in solids (Idea) • Distinction between conductor, insulators & semi-conductors in terms of energy band diagram, • Intrinsic and extrinsic (P-type; N-type) semiconductor, • P – N junction diode, depletion region, potential barrier. • Forward and reverse biasing; Forward and reverse bias characteristic curve. • Application of P – N junction diode 	06+04

REFERENCES:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
5. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
6. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
7. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University PressIndia Pvt. Ltd, New Delhi.
8. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd. NewDelhi.
9. Nanotechnology: Importance and Applications, M.H. Fulekar, IK International PublishingHouse Pvt. Ltd, New Delhi.
10. e-books/e-tools/ learning physics software/websites etc.

APPLIED PHYSICS -II LAB

L	T	P		Course Code No.: BS 106
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit: 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

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.

LEARNING OUTCOME

On completion of this course, the student will be able to;

- Verify optical laws; reflection, refraction from plane interfaces and surfaces.
- Apply knowledge of optics to determine focal length and magnifying power of optical lenses.
- Use electrical components and meters to verify Ohm's law for flow of current.
- Quantify resistances for series and parallel combination of resistances.
- Demonstrate measurement of unknown resistance of a wire.

SUGGESTED LIST OF EXPERIMENTS / PRACTICALS

SL. NO.	EXPERIMENTS
1	To determine refractive index of the material of glass slab by pin method.
2	To determine the focal length of a concave mirror by u , v method
3	To determine the focal length of the convex lens by u , v method
4	To plot magnetic lines of force of a bar magnet with North Pole pointing north and to locate the neutral points & measure the magnetic length
5	To plot magnetic lines of force of a bar magnet with South Pole pointing north and to locate the neutral points & measure the magnetic length.
6	To verify Ohm's law by ammeter and Voltmeter method with — Series connection of resistances; Parallel connection of resistances.
7	To measure the unknown resistance / resistivity of the material of a wire by meter Bridge
8	To measure the unknown resistance of the material of a wire by P. O. box.

REFERENCE

1. Principle of Physics – Subrahmanyam & Brizal
2. Intermediate Physics – S.C.Roy Chaudhury & D.B.Sinha
3. Fundamentals of Physics – David Halliday, Robert Resnick & Jeal Walka
4. University Physics – Francis W. Sears, Mark W. Zemans Key & Hugh D. Young
5. University Physics – Hugh D. Young & Roger H. Freedman
6. A text book of Physics (Part II) – C. R. Dasgupta
7. Elements of Higher Secondary Physics (Part II) - D. Dutta, B. Pal & B. Chaudhuri
8. Physics (Volume II) - Ajoy Chakraborty
9. Applied Physics (Vol. II) –H.C. Saxena & Singh Prabhakar
10. Physics for 10+2 students (Part II) - Das, S.K, Sisodia M.L, Neher P.K.,Kachhawa C.M
11. Optical Fibre and Laser: Principles and Applications –Anuradha De, 2nd Edition, New Age International Publications.

INTRODUCTION TO IT SYSTEMS

L	T	P		Course Code No.: ES102
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is intended to make new students comfortable with computing environment - learning basic computer skills, learning basic application software tools, Understanding Computer Hard-ware, Cyber security awareness.

COURSE OUTCOMES

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT-I	Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. General understanding of various computer hardware components – CPU, Memory, Display, Key-board, Mouse, HDD and other Peripheral Devices.	06
UNIT-II	OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.	08
UNIT-III	HTML4, CSS, making basic personal webpage.	06
UNIT-IV	Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.	10

NOTE: Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place in the Lab by practicing regularly.

REFERENCES:

1. Online resources, Linux man pages, Wikipedia.
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
5. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
6. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P		Course Code No.: ES104
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is to provide basic knowledge of the different elements and concepts of electrical engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.

COURSE OUTCOMES

At the end of the course student will be able to:

- Explain basic principle and operation of electric circuits and machines.
- Solve basic problems related to electrical, magnetic circuits and machines.
- Explain the operation of different electrical technologies.
- Describe the basic electronic circuit elements
- Explain different types of signal waveforms.
- Apply understanding of logic gates in various electronic circuits.
- Illustrate the basic concepts of op-amps, and their applications.
- Use relevant electric/electronic protective devices safely.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT I 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.	03+01
UNIT II 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.	03+01
UNIT III 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).	04+01
UNIT IV 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.	06+04
UNIT V A.C. CIRCUITS	Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor 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.	08+04

UNIT VI TRANSFORMER AND MACHINES	General construction and principle of different type of trans- formers; EMF equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.	06+04
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REFERENCES

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House
2. Mittle 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
4. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405
5. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924375
6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
7. Sedha, R.S., A text book of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978-8121927833
8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi, 2015, ISBN-13: 0070634244-978
9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504
10. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

ENGINEERING MECHANICS

L	T	P		Course Code No.: ES106
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The subject of Engineering mechanics deals with the static and dynamic behaviour of rigid bodies under the action of forces. This course will develop basic concepts and working principles of mechanics applied to engineering problems dealing mainly with statics and dynamics of materials under the action of mechanical forces.

COURSE OUTCOMES

After completing this course, student will be able to:

- Obtain resultant of various forces
- Calculate support reactions through conditions of equilibrium for various structures
- Explain role of friction in equilibrium problems
- Explain fundamental laws of machines and their applications to various engineering problems

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT – I BASICS OF MECHANICS AND FORCE SYSTEM	Basics of mechanics and force system Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow’s notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon’s Theorem. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.	04+02
UNIT– II EQUILIBRIUM	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium Lami’s Theorem – statement and explanation, Application for various engineering problems. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple), Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load. Beam reaction graphically for simply supported beam subjected to vertical point loads only.	06+03
UNIT– III FRICTION	Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between coefficient of friction and angle of friction. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only. First Year Curriculum Structure Common to All Branches	06+03
UNIT– IV CENTROID AND CENTRE OF GRAVITY	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle) Centroid of composite figures composed of not more than three geometrical figures Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre of Gravity of composite solids composed of not more than two simple solids.	06+04

UNIT – V SIMPLE LIFTING MACHINE	Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston’s differential pulley block, geared pulley block.	08+03
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REFERENCES:

1. D. S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R. S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R. K., A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

INTRODUCTION TO IT SYSTEMS LAB

L	T	P		Course Code No.: ES 108
0	0	4		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Systems' and become proficient in using computing environment - basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

LEARNING OUTCOME

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components inlab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times
8	Explore security features of Operating Systems and Tools, try using them and see what happens.

REFERENCES

1. Online resources, Linux man pages, Wikipedia.
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
5. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
6. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

L	T	P		Course Code No.: ES 110
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course will develop an understanding of components of electrical and electronic circuits and machines and enable the learners to be familiar with the basic applications through practical exposure.

LEARNING OUTCOME

At the end of the course student will be able to:

1. Demonstrate basic operation of electric circuits and machines.
2. Demonstrate use of measuring instruments for voltage, current and power measurement in electrical circuits and machines.
3. Demonstrate operation of different electrical technologies.
4. Identify different types of signal waveforms.
5. Test logic gates in various electronic circuits.
6. Demonstrate basic applications of op-amps.
7. Use relevant electric/electronic protective devices safely.

LIST OF PRACTICALS (Any 15 experiments)

S. No.	List of Experiments / Practical	Approx. Hrs.
1.	Determine the permeability of magnetic material by plotting its B-H curve.	02
2.	Measure voltage, current and power in 1-phase circuit with resistive load.	02
3.	Measure voltage, current and power in R-L series circuit.	02
4.	Determine the transformation ratio (K) of 1-phase transformer.	02
5.	Connect single phase transformer and measure input and output quantities.	02
6.	Make Star and Delta connection in induction motor starters and measure the line and phase values.	02
7.	Identify various passive electronic components in the given circuit	02
8.	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.	02
9.	Connect capacitors in series and parallel combination on bread board and measure its value using multimeter.	02
10.	Identify various active electronic components in the given circuit.	02
11.	Use multimeter to measure the value of given resistor.	02
12.	Use LCR-Q tester to measure the value of given capacitor and inductor.	02
13.	Determine the value of given resistor using digital multimeter to confirm with colour code.	02*
14.	Test the PN-junction diodes using digital multimeter.	02*
15.	Test the performance of PN-junction diode.	02
16.	Test the performance of Zener diode.	02
17.	Test the performance of LED.	02
18.	Identify three terminals of a transistor using digital multimeter.	02
19.	Test the performance of NPN transistor.	02*
20.	Determine the current gain of CE transistor configuration.	02
21.	Test the performance of transistor switch circuit.	02
22.	Test the performance of transistor amplifier circuit.	02
23.	Test Op-Amp as amplifier and Integrator	02

REFERENCES:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House, 2018
2. Mittle 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
4. Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN: 9788121924405
5. Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN: 9788121924375
6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
7. Sedha, R.S., A text book of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978-8121927833
8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015, ISBN-13: 0070634244-978
9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504
10. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

SUGGESTED SOFTWARES/LEARNING WEBSITES:

- en.wikipedia.org/wiki/Transformer
- www.animations.physics.unsw.edu.au/~jw/AC.html
- www.alpharubicon.com/altenergy/understandingAC.htm
- www.electronics-tutorials
- learn.sparkfun.com/tutorials/transistors
- www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
- www.learningaboutelectronics.com
- www.electrical4u.com

ENGINEERING MECHANICS LAB

L	T	P		Course Code No.: ES 112
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

In most of the engineering applications of all disciplines the material bodies are subjected to various forces and to understand the behaviour of such bodies, knowledge and use of engineering mechanics is essential.

LEARNING OUTCOME

After completing this course, student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Select the relevant simple lifting machine(s) for given purposes.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	To study various equipment related to Engineering Mechanics.
2	To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3	To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4	Derive Law of machine using Worm and worm wheel.
5	Derive Law of machine using Single purchase crab.
6	Derive Law of machine using double purchase crab.
7	Derive Law of machine using Weston's differential or wormed geared pulley block.
8	Determine resultant of concurrent force system applying Law of Polygon of forces using force table.
9	Determine resultant of concurrent force system graphically.
10	Determine resultant of parallel force system graphically.
11	Verify Lami's theorem.
12	Determine coefficient of friction for motion on horizontal and inclined plane.
13	Determine centroid of geometrical plane figures.

REFERENCES:

1. Bedi D. S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R. S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R. K., A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S., S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
6. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L. G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

ENVIRONMENTAL SCIENCE (AUDIT COURSE)

L	T	P		Course Code No.: AU102
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:00 Practical: 00 Credit : 0			Total marks: 00	Theory: End Term Exam.:00 P.A: 00

RATIONALE

Management of Environmental Degradation and its control using innovative technologies is of prime importance. Technically qualified people, such as the Diploma Engineers, should not only be aware about new technologies to combat environmental degradation at their disposal but also various aspects of environment, ecology, bio-diversity, management, and legislation so that they can perform their jobs with a wider perspective and informed citizens. This course can be taken by all diploma students irrespective of their specializations.

COURSE OUTCOMES

At the end of the course student will be able to

- Explain the ecosystem and terminology
- Solve various engineering problems applying ecosystem knowledge to produce eco-friendly products.
- Explain suitable air, extent of noise pollution, and control measures and acts.
- Discuss water and soil pollution, and control measures and acts.
- Identify different renewable energy resources and efficient process of harvesting.
- Explain solid Waste Management, ISO 14000 & Environmental Management.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT-I ECOSYSTEM	<ul style="list-style-type: none"> • Structure of ecosystem, Biotic & Abiotic components • Food chain and food web • Aquatic (Lentic and Lotic) and terrestrial ecosystem Carbon, Nitrogen, Sulphur, Phosphorus cycle. • Global warming -Causes, effects, process, Green House Effect, Ozone depletion 	04
UNIT- II AIR AND, NOISE POLLUTION	<ul style="list-style-type: none"> • Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.c., Boiler) • Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator)Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.c., Boiler • Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000 	06
UNIT- III WATER AND SOIL POLLUTION	<ul style="list-style-type: none"> • Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation • Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis). • Causes, Effects and Preventive measures of Soil Pollution: Causes- Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste. 	08

UNIT- IV RENEWABLE SOURCES OF ENERGY	<ul style="list-style-type: none"> • Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills. • Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas. • Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. • New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy. 	10
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REFERENCES

BOOKS:

1. S.C. Sharma & M.P. Poonia, Environmental Studies, Khanna Publishing House, New Delhi
2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
3. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and
4. Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000, ISBN 10: 0471144940.
6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
7. Rao, C. S., Environmental Pollution Control and Engineering, New Age International PublicaMon, 2007, ISBN: 81-224-1835-X.
8. Rao, M. N.Rao, H.v.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07451871-8.
9. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978, ISBN: 9780070354760.
10. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.
11. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6
12. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.
13. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

OPEN SOURCE SOFTWARE AND WEBSITE ADDRESS:

- 1) www.eco-prayer.org
- 2) www.teriin.org
- 3) www.cpcp.nic.in
- 4) www.cpcp.gov.in
- 5) www.indiaenvironmentportal.org.in
- 6) ww.whatis.techtarget.com
- 7) www.sustainabledevelopment.un.org
- 8) www.conserve-energy-future.com

FIRST YEAR COURSES
(For Costume Design & Garment Technology)

HISTORY OF FASHION

L	T	P		Course Code No.: CGTPC101
3	0	0		
Total Contact hrs.: Lecture:45 Tutorial:0 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The students of fashion technology should be able to appreciate our ancient civilization, the fashion existing in the different periods, their contribution in shaping the present and promoting the future trends in the field of fashion.

LEARNING OUTCOMES

After completion of the course, the students will be able to

- Analyze the fundamental aspects of fashion evolution critically
- Explain how artistic developments affected clothing, fabrics, and luxury goods
- Connect fashion to wider cultural/economic trends

COURSE CONTENT DETAILS

UNIT NO.	CONTENT	LECTURE HOURS
1.0	ANCIENT AGE - Ancient Egypt - Germanic (Prehistory & Easy times) - Ancient Greece - Ancient Rome - Byzantine - middle age - Romanesque - Gothic	8
2.0	MODERN AGE - Renaissance Fashion - The Landsknecht - Spanish Fashion Baroque - Netherlands Fashion - Rhineland Fashion - Rococo Fashion	8
3.0	RECENT TIMES - Neoclassicism - Romanticism - Art Nouveau	6
4.0	PRESENT DAY : 21st Century - The Twenties - The Thirties - The Forties - The Fifties - The Sixties - The Seventies - The Eighties	7
5.0	HISTORY OF INDIAN COSTUME - Classification of Indian history period- wise from prehistoric period to 20th century history and modern history.	6
6.0	Evolution of costumes pertaining to inner, outer, upper and lower garments.	6
7.0	Study of traditional basic Indian costume of men's, and women's	4

SUGGESTED LIST OF ASSIGNMENT

- Preparation of a portfolio of select fashion silhouettes and accessories of all periods
- Design few contemporary silhouettes based on inspirations drawn from different periods

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS:

Title	Author; Publication; Edition; Year
History of Costume in the West	Francois Boucher; Thames & Hudson; Reprint ;1996
The Guide to Historic Costume	Karen Baclawski; Drama Book Publishers; Reprint; 1995
The Chronicle of Western Costume	John Peacock; Thames & Hudson; Reprint ; 2010
Folk Costumes of the World	Robert Harrold, Phyllida Legg; Blandford Press; 1989
The Complete Costume History	Auguste Racinet; Taschen America ; reprint ; 2006
What People Wore When	Melissa Leventon; St. Martin's Griffin; 1st; 2008
Costume & Fashion in Colour:1550-1760	Jack Cassin-Scott, Ruth M. Green; Blandford Press; Reprint ;1975
Survey of Historic Costume: A History of Western Dress	Phyllis G. Tortora, Keith Eubank; Fairchild Books, 5th; 2010
Traditional Indian Costume & Textiles	Parul Bhatnagar; Abhishek Publications; 2nd; 2004
Indian Costume	G.S.Ghurye; Popular Prakashan;2nd; 1995
Indian Costume	B.N.Goswamy, K.Krishna, T.P. Dundh; Calico Museum of Textiles; Reprint ;2002
Survey of Historic Costume	Tortora, P. & Eubank, K; Fairchild Publications; 4th;2005

INTRODUCTION TO TEXTILES

L	T	P		Course Code No.: CGTPC103
3	0	0		
Total Contact hrs.: Lecture:45 Tutorial:0 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fibers, yarns and relevant properties affecting the ultimate performance and use of fabrics by the consumer. The subject will educate students about the various stages from fibre to fabric and familiarize them with the fabric properties to enable better design skills.

LEARNING OUTCOMES

After completion of this course, the students will be able to

- Identify different textile fibres
- Describe properties of different textile fibres
- Analyze the application of each textile fibre.

COURSE CONTENT DETAILS

UNIT NO.	CONTENT	LECTURE HOURS
1.0	CLASSIFICATION OF TEXTILE FIBRES History, origin.	2
2.0	MANUFACTURING - Uses of Different Textile Fibres	3
3.0	PROPERTIES OF TEXTILE FIBRES -Physical and Chemical properties - General properties of fibers (Durability, Serviceability, Suitability according to Weather and Climate, Washability, Satisfactory length, Adequate strength, Cohesiveness or Spinnability, Elasticity, Flexibility, Pliability, Softness, Luster, Absorbency)	2
4.0	FIBER IDENTIFICATION TESTS Burning, Physical, Chemical	2
5.0	LOOMS Parts of looms, types of looms.	3
6.0	YARNS Types of yarns. Yarn twist.	3
7.0	WEAVING Selvedge-different types of weaves. Plain, Basket, Rib, Twill, Satin, Sateen, Bird's – Eye. Fabric Count.	4
8.0	STUDY OF FINISHES Special finishing such as Mercerizing, Sanforising, Bleaching, Crease Resistance, Embossing, Tentering, Calendaring etc.	4
9.0	DYEING & PRINTING Classification of dyes, pigment; Definition stages of dyeing (fibre, yarn, piece, garment); Methods and Style of Printing	4
10.0	STUDY OF DIFFERENT TYPES OF FABRICS Name of different fabrics and their texture, such as cambric, canvas, casement, china silk, cheese cloth, flannel, gauge, buckram, longcloth, linen, velvet, dimity, denim, jean, organdy, voile, lawn, taffeta, chiffon, georgette, wash and wear, rubia, tissue, pure silk. All varieties of handloom fabric, etc.	3

SUGGESTED IMPLEMENTATION STRATEGIES

Theory classes are to be supplemented by:

- Demonstration of samples of different types of weaves and looms
- Visit to local handloom and powerloom industry to be organized
- Visit to weavers unit
- Hands on experience of looms
- Weeks training at powerloom unit
- Demonstration of different weaving samples.

SUGGESTED LEARNING RESOURCES

(a) Reference Books:

Title	Author; Publication; Edition; Year
1. Fabric Science	Joseph Pizzuto; Fairchild Books; 6 th ; 1994
2. Textiles-Fibre to Fabric	P. B. Corbman; McGraw-Hill ; 6 th ;1989
3. Classification of Textile Techniques	Calico Museum of Textiles, Ahmedabad, Vol.14, 1979
4. Basic process and clothing construction	S Doongaji & R.Deshpande; Raaj Prakashan; 6 th ;1990
5. Essentials of Textiles	M.L. Joseph; Holt Rinehart & Winston;5 th ; 1988
6. Understanding Textiles	Tortora, G. Phyllis; McMillan Co.; 2 nd ;1987
7. Textile Fibres and their Use	K. P. Hess; Oxford and IBH Co.;2 nd ; 1978
8. Textile Fabrics and their Selection	Wingate, B. Isabel; Prentice Hall ; 7 th ; 1976

(b) Others :

- Slides/Video clipping of different types of looms
- Weaving samples for ready reference
- Sample of looms of local textiles
- Sample of different types of finishes

MATERIAL STUDIES

L	T	P		Course Code No.: CGTPC105
1	1	0		
Total Contact hrs.: Lecture:15 Tutorial:15 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fibers, yarns and relevant properties affecting the ultimate performance and use of fabrics by the consumer. The subject will educate students about the various stages from fibre to fabric and familiarize them with the fabric properties to enable better design skills.

LEARNING OUTCOME

After completion of this course, the students will be able to

- Identify various materials used in design
- Describe properties and uses of the materials.
- Demonstrate the importance of materials practices.

COURSE CONTENT DETAILS

UNIT NO & TITLE	CONTENT	LECTURE HOURS
UNIT – I MATERIAL: PAPERS	<ul style="list-style-type: none"> • Learning about the types of papers/boards, properties and uses. (e.g. Differences between News Print / Foreign Art Board / Snow white etc.) • About international sizes and varieties of papers • Introduction to Origami/Kirigami or similar methods • Introduction to Paper Mache or similar methods. (to create awareness regarding environment issues/recycling with respect to paper. 	10
UNIT – II MATERIAL: YARNS	<ul style="list-style-type: none"> • Introduction to yarns and types used in yarn crafts. Region wise introduction of Indian traditional yarn crafts. • Region wise introduction to International yarn crafts. • On value addition for different knots/braiding methods learnt. Uses in the industry. 	10
UNIT – III : MATERIAL: METAL	<ul style="list-style-type: none"> • Introduction to Gold, Silver, Platinum (Designer application) • Introduction to Lurex (zari)/wires/rods etc. (Designer application) • Procedures related to metallic Staining. • Introduction to aluminium, copper, steel & brass (industrial application), properties and uses • Traditional/manual manufacturing procedures compared to modern / Mechanized manufacturing procedures. • Suitability of the procedures with respect to design • Input with respect to simple methods like Drilling, Riveting, Soldering, etc. • Finishing methodologies used in the fashion industry. Eg. Press buttons, Fancy zippers, jewellery etc. • Input with respect to simple finishing methods - filing, buffing, polishing etc. 	10

SUGGESTED IMPLEMENTATION STRATEGIES

- Lecture, demonstration (Faculty, Experts / craftsmen)
- Methodology based individual assignments
- Exploration and presentation

- Field visit/ industry visit with respect to each of the materials
- Review and feedback

REFERENCE

Title	Author; Publication; Edition; Year
1. Paper craft: Design and art with paper	R Klanten, S Ehmann, H Baltzer, S Moreno
2. Plastic as an art form	T. R. Newman, Chilton Book Co.; 1 st edn., 1966
3. Material Science	V. Raghvan Thelmar, Phi Learning, 5 th edn. 2009
4. Sculpture: tools, materials & techniques	Verhelst, Wilbert, Prentice Hall; 2 nd edn. , 1988
5. Workshop Technology – Vol. I &II	Hazra Choudhary, Asian Book, New Delhi, 1998.

Others:

Web reference: www.wikipedia.com

MACHINE TOOLS AND EQUIPMENT

L	T	P		Course Code No.: CGTPC107
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit: 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

Textile materials undergo various processes before completion of a garment. A fashion designer is required to have the knowledge of various tools and machines and their maintenance. This course deals with the machines, tools and equipment used in the garment manufacturing process and the method of using them safely. This course will also be useful to the learners for maintaining the laboratory equipment.

LEARNING OUTCOME

After completion of this course, the students will be able to

- Explain the sewing machine's concept and fundamental mechanism.
- Demonstrate how sewing machines work, as well as other garment manufacturing equipment.
- Demonstrate safety measures and precautions.

COURSE CONTENT DETAILS

UNIT NO & TITLE	CONTENT	LECTURE HOURS
UNIT I: KNOWLEDGE OF MACHINES	<ul style="list-style-type: none"> • Parts of machines and working of sewing machine, Hand-operated, Treadle operated, and Electric Motor operated. 	3
UNIT II: SEWING MACHINE	<ul style="list-style-type: none"> • Function of each part of Sewing Machine 	2
UNIT III: MACHINE MAINTAINANCE	<ul style="list-style-type: none"> • Preventive maintenance of machines • Disassembling & assembling of machines and equipment. • Cleaning and oiling of parts • Changing parts. 	3
UNIT IV: MACHINE FAULTS	<ul style="list-style-type: none"> • Common Faults of Machines and their remedies 	2
UNIT V: MEASURING & MARKING TOOLS	<ul style="list-style-type: none"> • Measuring Tools - Inch Tape, Meter scale, different types of scales used for Drafting & Marking, French curve, Dress- makers square, curved stick • Marking tools -Tracing paper, Tracing wheel, • Tailors chalk, Pencil, Pins. 	4
UNIT VI: CUTTING, SEWING & FINISHING TOOLS	<ul style="list-style-type: none"> • Cutting Tools-Different types of scissors, seam rippers. • Sewing Tool-Needle, Pin, Thimble, Bodkin. • Finishing Tool-Pointer and Creaser, Electric Iron, Steam iron, Automatic Iron, Ironing Board. 	4
UNIT VII: CLOTH ESTIMATION	<ul style="list-style-type: none"> • Cloth Estimation and Conversion Chart and Lay out. Body Measurement. 	2
UNIT VIII TIME SAVING DEVICES	<ul style="list-style-type: none"> • 1. Hemmar. 2. Tucker. 3. Quilter. 4. Ruffler. 5. Cording Foot. 6. Zig-Zag. 7. Embroidery Plate. 8. Needle Threader. 9. Cloth Guide. 10. Electric Scissor 11. Zipper. 12. Electric Cutter. 13. Tracing Wheel. 	6
UNIT IX REPAIRING OF GARMENTS	<ul style="list-style-type: none"> • Repairing-Mending, Patching, Darning, Renovating of Garments. 	2
UNIT X SAFETY MEASURES	<ul style="list-style-type: none"> • Safety Measures, Precaution to be taken while working with sewing machine and electrical equipment. 	2

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS

Title	Author; Publication; Edition; Year
1. Principles of tailoring	Dattatreya joshi
2. McCalls's Sewing book	McCalls Corporation.
3. Tailoring Manual	Reader's digest
4. Dress Making Simplified	Valerie Cock; Wiley-Blackwell; 3rd; 1991
5. Basic process and clothing construction	S Doongaji & R.Deshpande; Raaj Prakashan; 6th; 1990
6. Textiles and clothing	R. Vatsala; ICAR ; 2003
7. Sewing Machine Maintenance Manual	Usha Sewing Machine Co.
8. Sewing Machine Maintenance Manual	Singer India Ltd.

a) Others:

- Models of sewing machines
- Safety Charts
- Samples of Darning and Patching

INTRODUCTION TO TEXTILES LAB

L	T	P		Course Code No.: CGTPC109
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fibers, yarns and relevant properties affecting the ultimate performance and use of fabrics by the consumer. The subject will educate students about the various stages from fibre to fabric and familiarize them with the fabric properties to enable better design skills.

LEARNING OUTCOME

After completion of this course, the students will be able to

- Apply the methods for the basic identification of textile materials and rudimentary analysis techniques.

SUGGESTED LIST OF PRACTICAL/ACTIVITIES:

SL. NO.	ACTIVITIES
1	Fibre identification test by a) Burning b) Chemical c) Physical
2	Identify weaves. Prepare samples of different weaves with paper.
3	Prepare a catalogue of fabric samples (swatch files) consisting of different types and their characteristics.
4	Visit textile laboratory/ textile industry/ process house to familiarize with the various processes and prepare report.

NOTE: The laboratory activities must be supported by Lecture /discussion on the theoretical concepts involved.

REFERENCES

1. Identification of Textile Fibers by M. M. Houck, Elsevier Science, 2009

MATERIAL STUDIES LAB

L	T	P		Course Code No.: CGTPC111
0	0	4		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fibers, yarns and relevant properties affecting the ultimate performance and use of fabrics by the consumer. The subject will educate students about the various stages from fibre to fabric and familiarize them with the fabric properties to enable better design skills.

LEARNING OUTCOME

After completion of this course, the students will be able to

- Illustrate several material properties like ductility, surface roughness, malleability, and hardening ability.
- Implement their ideas through various application-oriented micro projects.

COURSE CONTENT DETAILS

UNIT NO & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT – I MATERIAL: PAPERS	<ul style="list-style-type: none"> • Practical workshop: Create a portfolio of paper/board samples through sourcing along with details and costs wherever possible (approx. 15 samples) • Introduction to Origami/Kirigami or similar methods • Practical workshop: Origami (2 artwork of size approx. 15cm x 15cm x 15cm) • Practical workshop: Make 2 Paper Mache utilitarian articles (approx. size 15cm x 15cm x 15cm) 	16
UNIT – II MATERIAL: YARNS	<p>Practical workshop: Braiding /Plaiting [3-strand braid, Interlace braid, Half Knot chain]</p> <p>Practical workshop: (1) Square knot / flat knot chain (2) Alternating square knots (3) Right hand / left hand vertical half hitch</p> <p>Practical workshop: (1) Josephine knot (2) Square knots with beads / rings, Square knot button / decorative bobble (3) Knotting on wire / bangle/ any other core (material exploration – minimum 3 different materials)</p> <p><i>Note: let the students create their own composition- Faculty member has to encourage their creativity. Only guidance is required.</i></p>	16
UNIT – III : MATERIAL: METAL	<p>Practical workshop: Stain different types of metal sheets using suitable methods. Size: 10 cm x 10 cm .5mm thick. Metal sheets of 3 different metals (Aluminium, brass, copper)</p> <p>Practical workshop: A small composition using the methodologies taught. (size 10cm x 10cm x 10cm) Materials: Metal sheets – Brass/Aluminium / Copper .5 mm thickness</p> <p><i>Note: let the students create their own composition- Faculty member has to encourage their creativity. Only guidance is required.</i></p> <p>Practical workshop: A small product incorporating most of the methodologies taught. Eg. Attaching wires /rods of different dimensions to metal sheets to produce a product. (size 15cm x 15cm x 15cm) Materials: Metal sheets – Brass/Aluminium / Copper to be included along with wires / rods of different dimension.</p>	28

	<i>Note: let the students create their own composition- Faculty member has to encourage their creativity. Only guidance is required.</i>	
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SUGGESTED IMPLEMENTATION STRATEGIES

- Lecture, demonstration (Faculty, Experts / craftsmen)
- Methodology based individual assignments
- Exploration and presentation
- Field visit/ industry visit with respect to each of the materials
- Review and feedback

REFERENCES

Title	Author; Publication; Edition; Year
1. Paper craft: Design and art with paper	R Klanten, S Ehmann, H Baltzer, S Moreno
2. Plastic as an art form	T. R. Newman, Chilton Book Co.; 1 st edn.,1966
3. Material Science	V. Raghvan Thelmar, Phi Learning, 5 th edn. 2009
4. Sculpture: tools, materials & Techniques	Verhelst, Wilbert, Prentice Hall; 2 nd edn. , 1988
5. Workshop Technology – Vol. I &II	Hazra Choudhary, Asian Book, New Delhi, 1998.

Others:

Web reference: www.wikipedia.com

MACHINE TOOLS AND EQUIPMENT LAB

L	T	P		Course Code No.: CGTPC113
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course is a base for all other advanced course and it deals with handling of various machines and accessories. It will enable the students to maintain the garment machinery in proper working condition.

LEARNING OUTCOME

After completion of this course, the students will be able to

- Identify various parts of different types of machinery used in apparel production and their working principles.
- Test the settings and adjustment parts of the devices.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	Disassembling and assembling of sewing machine and equipment.
2	Cleaning and oiling of machine.
3	Changing parts of machine and equipment.
4	Common faults and their remedies.
5	Using various tailoring tools and equipment.
6	Prepare layout of garments and estimate cloth required for different width offabric.
7	Practice taking body measurement of dummies.
8	Techniques of mending, darning, patching, on samples.
9	Renovation of garments.
10	Observing safety measures while working with sewing machine and electrical equipment
11	Preparation of file for parts of machines tools and equipment time saving devices mending patching, darning, and sample.

REFERENCES

Title	Author; Publication; Edition; Year
1. Tailoring Manual	Reader's digest
2. Dress Making Simplified	Valerie Cock; Wiley-Blackwell; 3rd; 1991
3. Sewing Machine Maintenance Manual	Usha Sewing Machine Co.
4. Sewing Machine Maintenance Manual	Singer India Ltd.

COMMUNICATION SKILLS IN ENGLISH

L	T	P		Course Code No.: CGTHS101
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

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:

- To develop confidence in speaking English with correct pronunciation.
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills.

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.

COURSE OUTCOMES

At the end of this course, the participants will be able to

- Demonstrate basic speaking and writing skills including proper usage of language and vocabulary
- Demonstrate the latest trends in basic verbal activities such as presentations, facing interview and other forms of oral communication.
- Develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	LECTURE HOURS
Unit I: COMMUNICATION: THEORY AND PRACTICE	<ul style="list-style-type: none"> • Basics of communication: Introduction, meaning and definition, process of communication etc. • Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication. • 7Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous). • Art of Effective communication, <ul style="list-style-type: none"> ○ Choosing words ○ Voice ○ Modulation ○ Clarity ○ Time ○ Simplification of words • Technical Communication. 	03
Unit II: SOFT SKILLS FOR PROFESSIONAL EXCELLENCE	<ul style="list-style-type: none"> • Introduction: Soft Skills and Hard Skills. • Importance of soft skills. • Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc. • Applying soft skills across cultures. • Case Studies. 	03

Unit III: READING COMPREHENSION	<ul style="list-style-type: none"> • Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts: <p>Section-1</p> <ul style="list-style-type: none"> ○ Malgudi Days: R.K. Narayan ○ The Room on Roof: Ruskin Bond ○ “The Gift of the Magi” by O. Henry ○ “Uncle Podger Hangs a Picture” Jerome K. Jerome <p>Section-2</p> <ul style="list-style-type: none"> ○ Night of the Scorpion by Nissim Ezekiel, ○ Stopping by Woods on a Snowy Evening by Robert Frost, ○ Where the Mind is Without Fear by Rabindranath Tagore, ○ Ode to Tomatoes by Pablo Neruda 	16
Unit IV: PROFESSIONAL WRITING	<ul style="list-style-type: none"> • The art of précis writing, • Letters: business and personnel, • Drafting e-mail, notices, minutes of a meeting etc. • Filling-up different forms such as banks and on-line forms for placement etc. 	06
Unit V: VOCABULARY AND GRAMMAR	<ul style="list-style-type: none"> • Vocabulary of commonly used words • Glossary of administrative terms (English and Hindi) • One-word substitution, Idioms and phrases etc. • Parts of speech, active and passive voice, tenses etc., Punctuation 	02

REFERENCES

1. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
2. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition 2018)
4. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
5. M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.
6. John Nielson. Effective Communication Skills. Xlibris, 2008.
7. Oxford Dictionary
8. Roget's Thesaurus of English Words and Phrases
9. Collin's English Dictionary

SPORTS AND YOGA

L	T	P		Course Code No.: CGTHS103
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course will enable students to understand the importance of sound health and fitness principles as they relate to better health. Students will be exposed to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, NCC, NSS, health and fitness. Students will develop an appreciation of physical activity as a lifetime pursuit and a means to better health.

COURSE OUTCOMES

On successful completion of the course the students will be able to:

- Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
- Demonstrate techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
- Demonstrate breathing exercises and healthy fitness activities
- Explain basic skills associated with yoga and physical activities including strength and flexibility, balance, and coordination.
- Perform yoga movements in various combination and forms.
- Assess current personal fitness levels.
- Identify opportunities for participation in yoga and sports activities.
- Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
- Participate in sports and yogic activities.
- Demonstrate understanding of psychological problems associated with the age and lifestyle.
- Demonstrate understanding of sound nutritional practices as related to health and physical performance
- Assess yoga activities in terms of fitness value.
- Apply injury prevention principles related to yoga and physical fitness activities.
- Apply biomechanical and physiological principles related to exercise and training.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT
UNIT – I INTRODUCTION TO PHYSICAL EDUCATION	<ul style="list-style-type: none"> • Meaning & definition of Physical Education • Aims & Objectives of Physical Education • Changing trends in Physical Education
UNIT – II OLYMPIC MOVEMENT	<ul style="list-style-type: none"> • Ancient & Modern Olympics (Summer & Winter) • Olympic Symbols, Ideals, Objectives & Values • Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhyanchand Award, Rajiv Gandhi Khel Ratna Award etc.)
UNIT – III PHYSICAL FITNESS, WELLNESS & LIFESTYLE	<ul style="list-style-type: none"> • Meaning & Importance of Physical Fitness & Wellness • Components of Physical fitness • Components of Health-related fitness • Components of wellness • Preventing Health Threats through Lifestyle Change • Concept of Positive Lifestyle

UNIT – IV FUNDAMENTALS OF ANATOMY & PHYSIOLOGY IN PHYSICAL EDUCATION, SPORTS AND YOGA	<ul style="list-style-type: none"> • Define Anatomy, Physiology & Its Importance • Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respi- ratory System, Neuro-Muscular System etc.)
UNIT – V KINESIOLOGY, BIOMECHANICS & SPORTS	<ul style="list-style-type: none"> • Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports • Newton’s Law of Motion & its application in sports. • Friction and its effects in Sports.
UNIT – VI POSTURES	<ul style="list-style-type: none"> • Meaning and Concept of Postures. • Causes of Bad Posture. • Advantages & disadvantages of weight training. • Concept & advantages of Correct Posture. • Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Ky- phosis, Bow Legs and Scoliosis. • Corrective Measures for Postural Deformities
UNIT -VII YOGA	<ul style="list-style-type: none"> • Meaning & Importance of Yoga • Elements of Yoga • Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas • Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana) • Relaxation Techniques for improving concentration - Yognidra
UNIT – VIII YOGA & LIFESTYLE	<ul style="list-style-type: none"> • Asanas as preventive measures. • Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. • Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, • Ardh Matsyendrasana. • Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana. • Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, • Pavan Muktasana, Ardh Matsyendrasana. • Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, • Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
UNIT – IX TRAINING AND PLANNING IN SPORTS	<ul style="list-style-type: none"> • Meaning of Training • Warming up and limbering down • Skill, Technique & Style • Meaning and Objectives of Planning. • Tournament – Knock-Out, League/Round Robin & Combination.
UNIT – X PSYCHOLOGY & SPORTS	<ul style="list-style-type: none"> • Definition & Importance of Psychology in Physical Edu. & Sports • Define & Differentiate Between Growth & Development • Adolescent Problems & Their Management • Emotion: Concept, Type & Controlling of emotions • Meaning, Concept & Types of Aggressions in Sports. • Psychological benefits of exercise. • Anxiety & Fear and its effects on Sports Performance. • Motivation, its type & techniques. • Understanding Stress & Coping Strategies.
UNIT – XI DOPING	<ul style="list-style-type: none"> • Meaning and Concept of Doping • Prohibited Substances & Methods • Side Effects of Prohibited Substances

UNIT – XII SPORTS MEDICINE	<ul style="list-style-type: none"> • First Aid – Definition, Aims & Objectives. • Sports injuries: Classification, Causes & Prevention. • Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries
UNIT - XIII SPORTS / GAMES	<p>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, Vol- leyball, Yoga etc.</p> <ul style="list-style-type: none"> • 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.

REFERENCES:

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

COMMUNICATION SKILLS IN ENGLISH - LAB

L	T	P		Course Code No.: CGTHS105
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students.

COURSE OUTCOMES

At the end of this course the students will be able to

- Communicate effectively with an increase in their confidence to read, write and speak English fluently.
- Demonstrate a significant increase in word power.
- Participate in a conversation like listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly
- Engage audience through preparation, organization, and effective delivery of oral presentation.
- Demonstrate non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I LISTENING SKILLS	Listening Process and Practice: Introduction to recorded lectures, poems, interviews, and speeches, listening tests	06
UNIT – II INTRODUCTION TO PHONETICS	Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.	06
UNIT – III SPEAKING SKILLS	Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.	10
UNIT – IV BUILDING VOCABULARY	Etymological Study Of Words And Construction Of Words, Phrasal Verbs, Jargon/ Register Related To Organizational Set Up, Word Exercises And Word Games To Enhance Self-Expression And Vocabulary Of Participants	08

REFERENCES:

1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press, 1956.
2. James Hartman & et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
5. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.
6. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
7. J. Sethi & et al. A Practice Course in English Pronunciation. New Delhi: Prentice Hall, 2004.
8. Pfeiffer, William Sanborn and T.V.S Padmaja. Technical Communication: A Practical Approach. 6th ed. Delhi: Pearson, 2007.

FASHION ILLUSTRATION LAB

L	T	P		Course Code No.: CGTPC102
0	0	4		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course will enable the learners to acquire the skills to use different mediums: - pencil, water color, poster color, etc. and understand the texture of fabric. They will also be able to develop types of rendering and learn to analyze variety of pictures and sketch and render them accordingly (body & garments).

LEARNING OUTCOME

After completion of this course, the students will be able to

- Refine their illustration skills by developing sketching style
- Demonstrate colour rendering in different media considering fabric texture and drapability

LIST OF ACTIVITIES / PRACTICALS:

SL. NO.	ACTIVITIES
1	Introduction to art media and its applications- different art media- pencils, erasers, colours, poster, fabric, water, pencil, oil pastels, charcoal pencils.
2	Free hand drawing and colour rendering of objects (one for each category) <ul style="list-style-type: none"> • Natural shapes and forms, landscapes. • Realistic and abstract patterns.
3	Colour preparation of colour wheel, tints, tones, shades, different colour schemes.
4	Fashion model drawing basic figure proportion (croqui, heads, ears, nose, legs, arms and hairstyles)
5	Figure drawing in S, X, T, Y poses.
6	Rendering of different textures: woven, woolen, knitted, satin, fur, leather, net, denim, Adapting period costume to contemporary use

SUGGESTED IMPLEMENTATION STRATEGIES

- Substantial uses of demonstration of sketches are to be made to make learning interesting.
- Hands on practice using different media on drawing/sketch books
- Computer assisted sketches

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS:

Title	Author; Publication; Edition; Year
1. Fashion design & illustration	Pradeep Kumar
2. Fashion Illustration	Neetu Sharma
3. Costumes & Textiles of Royal India	Patric John Ireland
4. Inside fashion design	Sharon Lee Tate
5. Advance Fashion sketch book	Bina Abling
6. Fashion Illustration	Colin Barnes / Steven Stipelman

7. Figure Drawing for Fashion I & II	Isao Yajima
8. Fashion Illustration Today	Nicholas Drake
9. Fashion Art for the Fashion Industry	Rita Gersten
10. One Hundred Drawings.	Gustav Klimt; Dover; Reprint ; 1972
11.The Art of the Renaissance	Peter Murray, Linda Murray; Thames &
	Hudson ; Reprint ; 1963
12. Costume & Fashion in Colour:1550-1760	Jack Cassin-Scott, Ruth M. Green; Blandford Press; Reprint ;1975

INTRODUCTION TO COREL DRAW AND ADOBE PHOTOSHOP LAB

L	T	P		Course Code No.: CGTPC104
0	0	6		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 90 Credit : 3			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

The CorelDraw and Adobe Photoshop course is designed to provide students with essential graphics and visual communication skills in graphics design and fashion illustration sketches. The software allows infinitely customized pattern sizes, colours, direction and creates 3D artwork.

LEARNING OUTCOMES

After completion of this course, the students will be able to

- Draw flat sketches, filling with colour / fabric prints and assemble presentation boards etc.
- Create seamless pattern swatches and custom brushes for trim and stitching
- Apply shading and other effects to fashion sketches.
- Scan the fabric and prepare it for textile designs.

COURSE CONTENT DETAILS

Theory
<p>a) CorelDraw</p> <ul style="list-style-type: none"> ▪ Introduction to CorelDraw ▪ Introduction to Vector and Raster Graphics Type. ▪ Starting CorelDraw, Introduction to Corel Draw Menu, ▪ Introduction to CorelDraw Page Setup. ▪ Introduction to various tools of CorelDraw ▪ Working with Shapes, Lines, Texts & Objects ▪ Creating rectangles, squares, Circles, Ellipses, Polygons, Starts and Spirals ▪ Selecting Fill and Outlines to any shape. ▪ Moving & Rotating Shapes freely and to Fixed angles. ▪ Drawing Curves and Straight Lines, ▪ Creating Simple and Artistic Texts. ▪ Formatting Texts by changing Font, Size and Shape of Text. ▪ Rotating texts, assigning a Fill, grouping objects. <p>b) Photoshop</p> <p>Looking at the Work Area</p> <ul style="list-style-type: none"> ▪ Using Toolbox, Using Tool, Options Bar, Using palettes. <p>Working with colour</p> <ul style="list-style-type: none"> ▪ Converting between colour modes, Customizing index, colour, tables <p>Transforming and Retouching</p> <ul style="list-style-type: none"> ▪ Changing the size of the work canvas ▪ Rotating and flipping entire images ▪ Cropping images Transforming objects in two dimensions ▪ Transforming objects in three dimensions ▪ Cloning and repairing images ▪ Retouching images ▪ Using the Liquefy command ▪ Painting ▪ Erasing, Working with brushes,

- Using the paint bucket tool
 - Filling and stroking selections and layers
 - Choosing foreground and background colours
- Saving & Exporting Images
- Saving images, Exporting images in Zoom View format (Photoshop)
 - Setting performances for saving files
- Printing (Photoshop)
- Painting images, Setting output options
 - Printing part of an image,
 - Choosing a print encoding method
 - Using colour management when printing
 - Creating colour traps
 - Painting colour separations

SUGGESTED LIST OF EXPERIMENT

1. Developing motifs using Corel Draw and Adobe Photoshop.
2. Developing weave patterns for dobby weave
3. Developing weave patterns for jacquard weave
4. Developing motifs for embroidery and cross stitch
5. Developing motifs for screen printing
6. Developing patterns for pattern-making and grading

REFERENCES

1. Respective software manuals (Adobe Photoshop, Corel draw)
2. Photoshop Retouching Techniques Eismann, Katrin, Simmon, Steve Publisher
3. Teach Yourself Access for Windows Siegel, Charles , BPB Publications, New Delhi
4. CAD for Fashion Design Rene Weiss Chase., Prentice Hall, London.

BASIC GARMENT DESIGN LAB

L	T	P		Course Code No.: CGTPC106
0	1	4		
Total Contact hrs.: Lecture:0 Tutorial:15 Practical: 60 Credit : 3			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE:

The students should have knowledge and skills in cutting, sewing pressing etc. so that they are able to appreciate design components. They should be able to design garments and accessories for different age groups, and occasions with proper selection of fabrics. After going through this subject, the student will be able to design garments appropriately to customer's satisfaction and need.

LEARNING OUTCOMES

After completion of this course, the students will be able to

- Demonstrate - the operating, cleaning and oiling of a sewing machine,
- Illustrate the parts of the garment
- Construct a miniature of the garment parts.
- Apply the suitable accessories in the miniature garment
- Prepare samples for various parts of the garment

COURSE CONTENT DETAILS

SL. NO.	CONTENT
1	Designing of any 5 garments by applying principles of garment design.
2	Designing casual and formal frocks, jump suits/dungarees, nightwear, shirts and shorts using mix and match fabrics and prints. No. of Designs = 4 Age = 2-5 years
3	Designing accessories for children - Bags - Shoes - Belts - Head gears
4	Sourcing of suitable materials. The students should do a market survey for the fabrics, colours and textures available in the market. They are required to attach suitable fabric swatches on the design sheets.
5	To study tools and equipment used in clothing /garments constructions.
6	Demonstration of machines parts of sewing machine, Threading & working defect remedies and oiling Types of Stitches
7	Practice of making of different types of opening, buttons holes fasteners, taking & hemming types of collars neck- lines, stitching of different cloths.
8	Appliances required for pressing and finishing (mill visit only)

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS:

Title	Author; Publication; Edition; Year
1. Garments design	Helen Joseph Armstrong, HarperCollins, 5th, 2009
2. Design for the Real World: Human Ecology and Social Change	Victor Papanek, Victor J. Papanek; Academy Chicago; Reprint; 1984

3. Repeat Patterns: A Manual for Designers, Artists and Architects	Peter Phillips, Gillian Bunce; Thames & Hudson; Repeat; 1993
4. Textile Designs: 200 Years of Patterns for Printed Fabrics Arranged by Motif, Colour, Period and Design	Susan Meller, Joost Elffers; Thames & Hudson; Repeat; 2002
5. Garments Finishing and Care Labeling	S.S. Satsangi; Usha Publication; 2nd; 2008

PATTERN MAKING LAB

L	T	P		Course Code No.: CGTPC108
0	1	6		
Total Contact hrs.: Lecture:0 Tutorial:15 Practical: 90 Credit : 4			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONNALE

Students should be able to develop the concept of pattern making to production purpose, to understand & realize the importance of drafting, and how it can be helpful to the industry by cost reduction and in improvement in quality.

LEARNIG OUTCOMES

After completion of this course, the students will be able to

- Carry out pattern-making and styling of garments practically.
- Demonstrate dart manipulations and the draping method of pattern making.

COURSE CONTENT DETAILS

SL.NO.	THEORY	Demonstration / Exercises
1	<ul style="list-style-type: none"> • Measurement taking – body measurement techniques • Size chart and the meaning of standard sizes • Development of basic pattern blocks-bespoke method and industrial method • Dart manipulation <ul style="list-style-type: none"> - as seams though existing suppression points (bust point) - as seams away from suppression points - as gathers or tucks - as multiple darts 	<ul style="list-style-type: none"> • The slash and spread method and pivot method • Different actual garment pictures should be asked to develop a pattern with the minimum time taken difference between: <ul style="list-style-type: none"> - Permanent patterns(draft) - Working patterns and production patterns should be made clear to the students • Working patterns with correct seam ends should be emphasized, and the importance of drill hole marks in the darts should also be emphasized • Seam allowance and its importance and how much seam allowance to be taken and how much to change according to the fabric and style • Importance of notches: balance marks and grain lines to be understood properly • How to construct a sleeve block • What are crown height and its relationship with the fit of a garment • Students should be familiar with different types of sleeves and what sleeves are appropriate for what garments.
2	<p>Theory:</p> <ul style="list-style-type: none"> • Sleeve Variation: cap sleeve; regular shirt sleeve bishop sleeve; lego mutton sleeve; puff sleeve • Cuffs and sleeve opening sleeve for a loose fit garment with particular reference to gents' shirts • Set-in collars & collar variations: band collar; peter pan collar; sailor collar; gent's shirt collar 	Related work.

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS

1. Pattern Making & Cutting - Martin and Shoven
2. Pattern Making & Cutting - Armstrong

GARMENT CONSTRUCTION LAB

L	T	P		Course Code No.: CGTPC110
0	1	4		
Total Contact hrs.: Lecture:0 Tutorial:15 Practical: 60 Credit : 3			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

The aim of this course is to familiarize the students with the skill and knowledge of proper garment construction techniques to assemble the end product.

LEARNING OUTCOMES

After completion of this course, the students will be able to

- Demonstrate sewing and construction skills using hand and machine stitches for different components of garments like seams and seam finishes, pockets, plackets, openings and fasteners as per industry requirements.

COURSE CONTENT DETAILS

Theory	Practical
Introduction to Sewing Machine: <ul style="list-style-type: none"> • Safety regulation <ul style="list-style-type: none"> - Power machine - Pressing equipment - Hand tools • Operating the power machine <ul style="list-style-type: none"> - Power and speed control - Threading minor mechanical adjustment - Stitching technique - Sewing problems and their remedies • Garment Construction: <ul style="list-style-type: none"> - Use of single needle lockstitch machine - Introduction of needles and their sizes - Thread ticket number and their construction - Relation between thread, needle and their needle plate • Basic Sewing Line Practice <ul style="list-style-type: none"> - Stitch practice on a paper sheet • Stitch practice on fabric: <ul style="list-style-type: none"> - Straight line with the guideline - Straight line without the guideline - Squared line, French curve, spiral • Types of seams <ul style="list-style-type: none"> - Plain seams / pinked seam - Stitch and pinked - Turn and stitch 	Related work

<ul style="list-style-type: none"> - Flat and fell seam - French seam, Bias Bound - Hong Kong - Overcoat / Sergeing ● Types of Plackets: (Front) <ul style="list-style-type: none"> - Regular - Top stitched with edge stitch - Top stitched with one leg of pressure foot distance - Concealed placket - Kurta placket 	
<ul style="list-style-type: none"> ● Types of sleeve placket: <ul style="list-style-type: none"> - Faced placket - Continuous - Continuous diamond placket - Diamond placket - Shoulder alignment - Mounting of sleeve: <ul style="list-style-type: none"> - One piece - Two-piece ● Types of cuff: <ul style="list-style-type: none"> - Square shape - Round shape ● Types of collar: <ul style="list-style-type: none"> - Mandarin - Convertible - Tie collar - Shawl collar - Roll collar - Revere collar and notch collar (Term garment shirt) 	Related Work

REFERENCES

Chalk and talk Demonstration, Teaching & hands-on practical

INTRODUCTION TO IT SYSTEMS

L	T	P		Course Code No.: CGTES102
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is intended to make new students comfortable with computing environment - learning basic computer skills, learning basic application software tools, Understanding Computer Hard- ware, Cyber security awareness.

COURSE OUTCOMES

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT-I	Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. General understanding of various computer hardware components – CPU, Memory, Display, Key-board, Mouse, HDD and other Peripheral Devices.	06
UNIT-II	OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.	08
UNIT-III	HTML4, CSS, making basic personal webpage.	06
UNIT-IV	Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.	10

NOTE: Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place in the Lab by practicing regularly.

REFERENCES:

- Online resources, Linux man pages, Wikipedia.
- R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
- Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
- Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
- IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
- PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

INTRODUCTION TO IT SYSTEMS LAB

L	T	P		Course Code No.: CGTES 104
0	0	4		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Systems' and become proficient in using computing environment - basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

LEARNING OUTCOME

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components inlab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times
8	Explore security features of Operating Systems and Tools, try using them and see what happens.

REFERENCES

- Online resources, Linux man pages, Wikipedia.
- R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
- Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
- Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
- IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
- PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

ENVIRONMENTAL SCIENCE (AUDIT COURSE)

L	T	P		Course Code No.: AU102
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:00 Practical: 00 Credit : 0			Total marks: 00	Theory: End Term Exam.:00 P.A: 00

RATIONALE

Management of Environmental Degradation and its control using innovative technologies is of prime importance. Technically qualified people, such as the Diploma Engineers, should not only be aware about new technologies to combat environmental degradation at their disposal but also various aspects of environment, ecology, bio-diversity, management, and legislation so that they can perform their jobs with a wider perspective and informed citizens. This course can be taken by all diploma students irrespective of their specializations.

COURSE OUTCOMES

At the end of the course student will be able to

- Explain the ecosystem and terminology
- Solve various engineering problems applying ecosystem knowledge to produce eco-friendly products.
- Explain suitable air, extent of noise pollution, and control measures and acts.
- Discuss water and soil pollution, and control measures and acts.
- Identify different renewable energy resources and efficient process of harvesting.
- Explain solid Waste Management, ISO 14000 & Environmental Management.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT-I ECOSYSTEM	<ul style="list-style-type: none"> • Structure of ecosystem, Biotic & Abiotic components • Food chain and food web • Aquatic (Lentic and Lotic) and terrestrial ecosystem Carbon, Nitrogen, Sulphur, Phosphorus cycle. • Global warming -Causes, effects, process, Green House Effect, Ozone depletion 	04
UNIT- II AIR AND, NOISE POLLUTION	<ul style="list-style-type: none"> • Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.c., Boiler) • Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator) Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.c., Boiler • Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000 	06
UNIT- III WATER AND SOIL POLLUTION	<ul style="list-style-type: none"> • Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation • Waste Water Treatment: Primary methods: sedimentation, froth 	08

	<p>floatation, Secondary methods: Activated sludge treatment, Tricking filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis).</p> <ul style="list-style-type: none"> • Causes, Effects and Preventive measures of Soil Pollution: Causes- Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste. 	
UNIT- IV RENEWABLE SOURCES OF ENERGY	<ul style="list-style-type: none"> • Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills. • Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas. • Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. • New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy. 	10

REFERENCES BOOKS:

1. S.C. Sharma & M.P. Poonia, Environmental Studies, Khanna Publishing House, New Delhi
2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
3. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and
4. Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Wiley, New York, 2000, ISBN 10: 0471144940.
6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
7. Rao, C. S., Environmental Pollution Control and Engineering, New Age International PublicaMon, 2007, ISBN: 81-224-1835-X.
8. Rao, M. N.Rao, H.v.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07451871-8.
9. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978, ISBN: 9780070354760.
10. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.
11. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6
12. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.
13. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

OPEN-SOURCE SOFTWARE AND WEBSITE ADDRESS:

- www.eco-prayer.org
- www.teriin.org
- www.cpcp.nic.in
- www.cpcp.gov.in
- www.indiaenvironmentportal.org.in
- ww.whatis.techtarget.com
- www.sustainabledevelopment.un.org
- www.conserve-energy-future.com

**FIRST YEAR COURSES
(For Architectural Assistantship)**

MATHEMATICS- I

L	T	P		Course Code No.: AABS101
2	1	0		
Total Contact hrs.: Lecture: 30 Tutorial: 15 Practical: 0 Credit :3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

COURSE OUTCOMES

By the end of the course, the students will be able to

- Apply Trigonometry for the calculation and the mathematical analysis.
- Find the effects of changing conditions on a system.
- Relate application of Complex numbers in studies of physical phenomena
- Use the concept of partial fraction decomposition.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT - I: TRIGONOMETRY	Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x	08+02
UNIT – II: DIFFERENTIAL CALCULUS	Definition of function; Concept of limits. Four standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}, \lim_{x \rightarrow 0} \frac{\sin x}{x}, \lim_{x \rightarrow a} \left(\frac{a^x - 1}{x} \right)$ <u>and</u> $\lim_{x \rightarrow a} (1 + x)^{\frac{1}{x}}$. $x^n, \sin x, \cos x, \tan x, e^x$ and $\log_a x$. Differentiation by definition of Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.	13+08

UNIT - III: ALGEBRA	<p>Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-moivre's theorem, its application.</p> <p>Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction.</p> <p>Permutations and Combinations: Value of ${}^n P_r$ and ${}^n C_r$.</p> <p>Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems.</p>	14+07
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REFERENCES:

- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
- G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
- Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
- V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vi-kas Publishing House.
- Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

APPLIED PHYSICS –I

L	T	P		Course Code No: AABS103
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit :2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

Applied Physics includes the study of a large number of diverse topics all related to materials/things that exist in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which such objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. 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.

LEARNING OUTCOME

After undergoing this subject, the student will be able to:

- Select physical quantities and their units for use in engineering solutions
- Represent physical quantities as scalar and vectors
- Apply the formulation to understand banking of roads/railway tracks and conservation of momentum principle to describe rocket propulsion, recoil of gun etc.
- Solve simple problems related to work, energy and power and their relationship.
- Describe forms of friction and methods to minimize friction between different surfaces.
- Explain various forms of energy, and energy transformations and the principle of conservation of energy.
- Relate physical properties associated with linear motion and rotational motion and apply conservation of angular momentum principle to known problems.
- Describe the phenomenon of surface tension, effects of temperature on surface tension
- Describe the viscosity of liquids, coefficient of viscosity and the various factors affecting its value.
- Explain stress and strain and Hooke's law, elastic limits, stress-strain diagram,
- Determine; (a) the modulus of elasticity, (b) the yield strength (c) the tensile strength, and (d) estimate the percent elongation.
- Illustrate the terms; heat and temperature, measure temperature in various processes on different scales (Celsius, Fahrenheit, and Kelvin etc.)
- Distinguish between conduction, convection and radiation;
- Identify different methods for reducing heat losses and mode of heat transfer between bodies at different temperatures.
- Explain specific heats

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT I DIMENSION AND MEASUREMENTS	<p>1.1 Units, Dimension</p> <ul style="list-style-type: none"> • Concept of unit of physical parameters • Fundamental and derived units – FPS, CGS and SI • SI system of units of different physical parameters • Dimension with examples of different physical parameters. <p>1.2 Measurements</p> <ul style="list-style-type: none"> • Measuring devices e.g., slide callipers, screw gauge, spherometer with concept of Vernier constant, least count and zero error. • Physical Balance 	02+01
Unit II: MECHANICS	<p>2.1 Motion along a straight line and Force</p> <ul style="list-style-type: none"> • Concept of scalar and vector quantities. Resolution of a Vector and its application to inclined plane and lawn roller (introductory idea). • Speed, velocity and linear acceleration • Equations of motion with constant acceleration (derivation not required) • Equations of motion of falling body under gravity • Simple problems on linear motion • Newton’s laws of motion, Action and reaction, tension • Force, inertia, momentum, impulse and impulsive force with practical examples • Conservation of linear momentum, its applications such as recoil of gun, rockets. <p>2.2 Rotational Motion</p> <ul style="list-style-type: none"> • Translational and rotational motions with examples • Definition of torque and angular momentum, moment of inertia and their examples • Concept of conservation of angular momentum with its applications • Simple examples such as banking of roads and bending of cyclist. 	04+02
Unit -III: GRAVITATION	<p>4.1 Newton’s laws of gravitation</p> <ul style="list-style-type: none"> • Newton’s gravitational constant G and its SI unit • Acceleration due to gravity (g) and its relation with “G”. • Variation of g with altitude and latitude (deduction not required) • Difference between mass and weight • Simple problems 	03+02

Unit IV: WORK, POWER AND ENERGY	4.1 Work, power and energy <ul style="list-style-type: none"> • Definition with their units and mathematical expressions • Relation between Horse power and Watt • Different forms of mechanical energy : PE, KE and their expressions • Conservation of energy and transformation of energy with examples • Simple problems 	03+02
Unit V: PROPERTIES OF MATTER	5.1 Properties of solid <ul style="list-style-type: none"> • Plasticity and elasticity in solids • Deformation of bodies by the action of external forces change in size and change in shape • Unit of stress – tensile stress, compressive stress and Shear stress with examples • Unit of strain – tensile strain., volumetric strain and shear strain & Hooke's law • Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. • Modulus of elasticity – Young's modulus, Bulk modulus and Modulus of rigidity, Poison's ratio and their units. Stress – Strain curve • Definition & basic concepts only, no deduction 5.2 Properties of Fluid <ul style="list-style-type: none"> • Thrust and pressure • Law of fluid pressure, Pascal's law and working principles of hydraulic press • Archimedes Principle and its applications • Specific gravity and relative density • Hydrometers and their uses • Properties of gas : Toricelli's Expt. & Simple Barometer • Simple idea of surface tension, viscosity with applications. 	06+02
Unit VI: HEAT	6.1 Heat and temperature <ul style="list-style-type: none"> • Heat and temperature • Fixed points and different scales of temperature - Fahrenheit, Celsius and Kelvin and their relationships • Simple problems • 6.2 Measurement of heat • Quantity of heat, units of heat:Joule and Calorie • Specific heat of solid, heat capacity, water equivalent • Principle of calorimeter, Measurement of specific heat • Change of state: Latent heat, evaporation & boiling, effect of pressure • Boyle's law and Charles law, Universal gas law and universal gas constant. • Idea of two specific heat capacities of gas: Cp and Cv and their relationships (deduction not required) 6.3 Thermal expansion & Transmission of heat <ul style="list-style-type: none"> • Expansion of solid – linear, superficial and cubical co-efficient of expansion & their units • Interrelationship between different 	06+03

	<ul style="list-style-type: none"> • co-efficient of expansion with examples • Different methods of transmission of heat: conduction, convection and radiation • Co-efficient of thermal expansion & its unit • Good conductors and bad conductors of heat 	
Unit VII: SOUND	<p>7.1 Simple Harmonic Motion</p> <ul style="list-style-type: none"> • Simple harmonic motion and its characteristics • Time period, frequency & amplitude of vibration • Mathematical expression of SHM • Examples of SHM: Simple Pendulum • Idea on Longitudinal & Transverse wave <p>7.2 Production and propagation of Sound</p> <ul style="list-style-type: none"> • Natural vibration, forced vibration with examples • Resonance of sound with examples • Principle of resonance to find out velocity of sound in air. • Velocity of sound, Newton's formula and Laplace correction (Idea only, no deduction) <p>7.3 Reflection of sound</p> <ul style="list-style-type: none"> • Echo, reverberation • Simple problems <p>7.4 Musical sound, noise</p> <ul style="list-style-type: none"> • Characteristics of musical sound and noise with examples • Factors affecting sound 	06+03

REFERENCES:

- Principle of Physics – Subrahmanyam & Brizal
- Intermediate Physics – S.C.Roy Chaudhury & D.B.Sinha
- Fundamentals Of Physics – David Halliday, Robert Resnick & Jeal Walka
- University Physics – Francis W. Sears, Mark W. Zemans Key & Hugh D. Young
- University Physics – Hugh D. Young & Roger H. Freedman
- A text book of Physics (Part I) – C. R. Dasgupta
- Elements of Higher Secondary Physics (Part I) D. Dutta, B. Pal & B. Chaudhuri
- Physics (Volume I) - Ajoy Chakraborty
- Applied Physics (Vol. 1) - Saxena H.C. & Singh Prabhakar
- Physics for 10+2 students (Part I) - Das, S.K, Sisodia M.L, Neher P.K., Kachhawa C.M.
- Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
- Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.
- Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
- Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
- Engineering Physics by DK Bhattacharya & PoonamTandan; Oxford University Press, New Delhi.
- Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
- e-books/e-tools / learning physics software / websites etc.

APPLIED CHEMISTRY

L	T	P		Course Code No: AABS105
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE:

There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. 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.

COURSE OUTCOMES

At the end of the course student will be able to

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
Unit I: ATOMIC STRUCTURE, CHEMICAL BONDING AND SOLUTIONS	Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration. Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H ₂ , F ₂ , HF hybridization in BeCl ₂ , BF ₃ , CH ₄ , NH ₃ , H ₂ O), coordination bond in NH ₄ ⁺ , and anomalous properties of NH ₃ , H ₂ O due to hydrogen bonding, and metallic bonding. Solution – idea of solute, solvent and solution, methods to express the concentration of solution- molarity ($M = \text{mole per liter}$), ppm, mass percentage, volume percentage and mole fraction.	06+03
Unit II: WATER	Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness. Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by EDTA method, total dissolved solids (TDS) alkalinity estimation.	06+03

	<p>iii. Water softening techniques – soda lime process, zeolite process and ion exchange process.</p> <p>iv. Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.</p> <p>Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).</p>	
Unit III: ENGINEERING MATERIALS	<p>Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (ma-trix), flux, slag, metallurgy – brief account of general principles of metallurgy.</p> <p>Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite alongwith reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.</p> <p>General chemical composition, composition based applications (elementary idea only detailsomitted):</p> <p>Port land cement and hardening, Glasses Refractory and Composite materials.</p> <p>Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.</p>	06+03
Unit IV: CHEMISTRY OF FUELS AND LUBRICANTS	<p>Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.</p> <p>Proximate analysis of coal solid fuel</p> <p>petrol and diesel - fuel rating (octane and cetane numbers),</p> <p>Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.</p> <p>Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication, physical proper- ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.</p>	08+03
Unit V: ELECTRO CHEMISTRY	<p>Electronic concept of oxidation, reduction and redox reactions.</p> <p>Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems. Industrial Application of Electrolysis –</p> <ul style="list-style-type: none"> • Electrometallurgy • Electroplating • Electrolytic refining. <p>Application of redox reactions in electrochemical cells –</p> <ul style="list-style-type: none"> • Primary cells – dry cell, • Secondary cell - commercially used lead storage battery, fuel and Solar cells. <p>Introduction to Corrosion of metals –</p> <ul style="list-style-type: none"> • definition, types of corrosion (chemical and electrochemical), H₂ liberation and O₂ absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion. <p>Internal corrosion preventive measures –</p> <ul style="list-style-type: none"> • Purification, alloying and heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors. 	06+03

REFERENCES/SUGGESTED LEARNING RESOURCES

- i. Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
- ii. Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
- iii. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
- iv. Dara, S. S. & Dr.S.S.Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, 2015.
- v. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
- vi. Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
- vii. Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
- viii. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

APPLIED PHYSICS –I LAB

L	T	P		Course Code No : AABS107
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit :1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology-based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

LEARNING OUTCOME

After undergoing this lab work, the student will be able to:

- Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometer etc.) for determining dimensions of physical quantities and make measurements with accuracy and precision.
- Determine dimensions of plane, curved and regular surfaces/bodies.
- Apply laws of forces to determine resultant force acting on a body.
- Measure co-efficient of friction between different surfaces.
- Verify Hook’s law and law of conservation of energy.
- Identify various forms of energy, energy transformations
- Demonstrate rotational motion and M.I. of a rotating body (flywheel)
- Determine linear expansion coefficient for a given material rod.
- Use Fortin’s barometers for determining pressure at a place.
Demonstrate use of thermometers to measure temperature under different conditions and different scales of temperature measurements

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS
1	To measure the volume of a wooden block by using Vernier calipers.
2	To measure the surface area of a metal washer by Vernier inside calipers
3	To measure the depth of a hole by Depth Gauge (Vernier calipers)
4	To measure the cross-section of a wire by Screw Gauge.
5	To determine radius of curvature of a convex and a concave mirror/surface using a spherometer.
6	To adjust a common balance and to determine the specific gravity of a liquid by specific gravity bottle.
7	To establish the relation between pressure and volume of a fixed mass of gas at a constant temperature using Boyle’s apparatus.
8	To determine the acceleration due to gravity (g) of a place by simple pendulum

9	To measure the velocity of sound in air by air resonance column method.
10	To measure room temperature and temperature of a hot bath using mercury thermometer and convert it into different scales.
11	To determine atmospheric pressure at a place using Fortin's barometer.

REFERENCE BOOK

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P)Ltd.,
3. Practical Physics by C. L. Arora, S. Chand Publication.
4. e-books/e-tools/ learning physics software/YouTube videos/websites etc.

APPLIED CHEMISTRY LAB

L	T	P		Course Code No : AABS109
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE:

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

COURSE OUTCOMES

At the end of the course student will be able to

- Express quantitative measurements accurately.
- Practice and adapt good measuring techniques.
- Use various apparatus for precise measurements.
- Differentiate different methods of quantitative analysis.
- Explain principles of quantitative analysis using instruments.
- Construct different electrochemical cells used in developing batteries.
- Explain methods of corrosion abetments.

DETAIL COURSE CONTENT

LIST OF PRACTICALS (Perform any 12 (twelve)).

Sl. No.	Experiments
1	Volumetric and Gravimetric analysis:
	viii. Preparation of standard solution of oxalic acid or potassium permanganate. ix. Determination of strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator. x. Standardization of KMnO ₄ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by KMnO ₄ solution. xi. Iodometric estimation of copper in the copper pyrite ore. xii. Volumetric estimation of total acid number (TAN) of given oil. xiii. Volumetric estimation of <ol style="list-style-type: none"> a. Total hardness of given water sample using standard EDTA solution. b. Alkalinity of given water sample using 0.01M sulphuric acid xiv. Proximate analysis of coal <ol style="list-style-type: none"> a. Gravimetric estimation moisture in given coal sample b. Gravimetric estimation ash in given coal sample

2	<p>Instrumental analysis</p> <ul style="list-style-type: none"> ix. Determine the conductivity of given water sample. x. Determination of the Iron content in given cement sample using colorimeter. xi. Determination of calorific value of solid or liquid fuel using bomb calorimeter. xii. Determination of viscosity of lubricating oil using Redwood viscometer. xiii. Determination of flash and fire point of lubricating oil using Able's flash point apparatus. xiv. Verification of the first law of electrolysis of copper sulfate using copper electrode. xv. Construction and measurement of emf of electrochemical cell (Daniel cell). xvi. Study of the effect of dissimilar metal combination.
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REFERENCE BOOKS

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

COMMUNICATION SKILLS IN ENGLISH

L	T	P		Course Code No.: HS101
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

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:

- To develop confidence in speaking English with correct pronunciation.
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills.

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.

COURSE OUTCOMES

At the end of this course, the participants will be able to

- Demonstrate basic speaking and writing skills including proper usage of language and vocabulary
- Demonstrate the latest trends in basic verbal activities such as presentations, facing interview and other forms of oral communication.
- Develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS)
Unit I: COMMUNICATION: THEORY AND PRACTICE	<ul style="list-style-type: none"> • Basics of communication: Introduction, meaning and definition, process of communication etc. • Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication. • 7Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous). • Art of Effective communication, • Choosing words <ul style="list-style-type: none"> ○ Voice ○ Modulation ○ Clarity ○ Time ○ Simplification of words • Technical Communication. 	03
Unit II: SOFT SKILLS FOR PROFESSIONAL EXCELLENCE	<ul style="list-style-type: none"> • Introduction: Soft Skills and Hard Skills. • Importance of soft skills. • Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc. 	03

	<ul style="list-style-type: none"> • Applying soft skills across cultures. • Case Studies. 	
Unit III: READING COMPREHENSION	<ul style="list-style-type: none"> • Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts: <p>Section-1</p> <ul style="list-style-type: none"> • Malgudi Days: R.K. Narayan • The Room on Roof: Ruskin Bond • “The Gift of the Magi” by O. Henry • “Uncle Podger Hangs a Picture” Jerome K. Jerome <p>Section-2</p> <ul style="list-style-type: none"> • Night of the Scorpion by Nissim Ezekiel, • Stopping by Woods on a Snowy Evening by Robert Frost, • Where the Mind is Without Fear by Rabindranath Tagore, • Ode to Tomatoes by Pablo Neruda 	16
Unit IV: PROFESSIONAL WRITING	<ul style="list-style-type: none"> • The art of précis writing, • Letters: business and personnel, • Drafting e-mail, notices, minutes of a meeting etc. • Filling-up different forms such as banks and on-line forms for placement etc. 	06
Unit V: VOCABULARY AND GRAMMAR	<ul style="list-style-type: none"> • Vocabulary of commonly used words • Glossary of administrative terms (English and Hindi) • One-word substitution, Idioms and phrases etc. • Parts of speech, active and passive voice, tenses etc., Punctuation 	02

REFERENCES

1. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
2. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition 2018)
4. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
5. M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.
6. John Nielson. Effective Communication Skills. Xlibris, 2008.
7. Oxford Dictionary
8. Roget's Thesaurus of English Words and Phrases
9. Collin's English Dictionary

SPORTS AND YOGA

L	T	P		Course Code No.: HS103
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course will enable students to understand the importance of sound health and fitness principles as they relate to better health. Students will be exposed to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, NCC, NSS, health and fitness. Students will develop an appreciation of physical activity as a lifetime pursuit and a means to better health.

COURSE OUTCOMES

On successful completion of the course the students will be able to:

- Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
- Demonstrate techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
- Demonstrate breathing exercises and healthy fitness activities
- Explain basic skills associated with yoga and physical activities including strength and flexibility, balance, and coordination.
- Perform yoga movements in various combination and forms.
- Assess current personal fitness levels.
- Identify opportunities for participation in yoga and sports activities.
- Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
- Participate in sports and yogic activities.
- Demonstrate understanding of psychological problems associated with the age and lifestyle.
- Demonstrate understanding of sound nutritional practices as related to health and physical performance
- Assess yoga activities in terms of fitness value.
- Apply injury prevention principles related to yoga and physical fitness activities.
- Apply biomechanical and physiological principles related to exercise and training.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT
UNIT – I INTRODUCTION TO PHYSICAL EDUCATION	<ul style="list-style-type: none"> • Meaning & definition of Physical Education • Aims & Objectives of Physical Education • Changing trends in Physical Education
UNIT – II OLYMPIC MOVEMENT	<ul style="list-style-type: none"> • Ancient & Modern Olympics (Summer & Winter) • Olympic Symbols, Ideals, Objectives & Values • Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)
UNIT – III PHYSICAL FITNESS, WELLNESS & LIFESTYLE	<ul style="list-style-type: none"> • Meaning & Importance of Physical Fitness & Wellness • Components of Physical fitness • Components of Health-related fitness • Components of wellness

	<ul style="list-style-type: none"> • Preventing Health Threats through Lifestyle Change • Concept of Positive Lifestyle
UNIT – IV FUNDAMENTALS OF ANATOMY & PHYSIOLOGY IN PHYSICAL EDUCATION, SPORTS AND YOGA	<ul style="list-style-type: none"> • Define Anatomy, Physiology & Its Importance • Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respi- ratory System, Neuro-Muscular System etc.)
UNIT – V KINESIOLOGY, BIOMECHANICS & SPORTS	<ul style="list-style-type: none"> • Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports • Newton’s Law of Motion & its application in sports. • Friction and its effects in Sports.
UNIT – VI POSTURES	<ul style="list-style-type: none"> • Meaning and Concept of Postures. • Causes of Bad Posture. • Advantages & disadvantages of weight training. • Concept & advantages of Correct Posture. • Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Ky- phosis, Bow Legs and Scoliosis. • Corrective Measures for Postural Deformities
UNIT -VII YOGA	<ul style="list-style-type: none"> • Meaning & Importance of Yoga • Elements of Yoga • Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas • Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana) • Relaxation Techniques for improving concentration - Yognidra
UNIT – VIII YOGA & LIFESTYLE	<ul style="list-style-type: none"> • Asanas as preventive measures. • Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. • Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, • Ardh Matsyendrasana. • Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana. • Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, • Pavan Muktasana, Ardh Matsyendrasana. • Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, • Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
UNIT – IX TRAINING AND PLANNING IN SPORTS	<ul style="list-style-type: none"> • Meaning of Training • Warming up and limbering down • Skill, Technique & Style • Meaning and Objectives of Planning. • Tournament – Knock-Out, League/Round Robin & Combination.
UNIT – X PSYCHOLOGY & SPORTS	<ul style="list-style-type: none"> • Definition & Importance of Psychology in Physical Edu. & Sports • Define & Differentiate Between Growth & Development • Adolescent Problems & Their Management • Emotion: Concept, Type & Controlling of emotions • Meaning, Concept & Types of Aggressions in Sports. • Psychological benefits of exercise. • Anxiety & Fear and its effects on Sports Performance. • Motivation, its type & techniques.

	<ul style="list-style-type: none"> • Understanding Stress & Coping Strategies.
UNIT – XI DOPING	<ul style="list-style-type: none"> • Meaning and Concept of Doping • Prohibited Substances & Methods • Side Effects of Prohibited Substances
UNIT – XII SPORTS MEDICINE	<ul style="list-style-type: none"> • First Aid – Definition, Aims & Objectives. • Sports injuries: Classification, Causes & Prevention. • Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries
UNIT - XIII SPORTS / GAMES	<p>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, Vol- leyball, Yoga etc.</p> <ul style="list-style-type: none"> • 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.

REFERENCES:

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

COMMUNICATION SKILLS IN ENGLISH LAB

L	T	P		Course Code No.: HS105
0	0	2		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students.

COURSE OUTCOMES

At the end of this course the students will be able to

- Communicate effectively with an increase in their confidence to read, write and speak English fluently.
- Demonstrate a significant increase in word power.
- Participate in a conversation like listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly
- Engage audience through preparation, organization, and effective delivery of oral presentation.
- Demonstrate non-verbal communication such as proper use of body language and gestures.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I LISTENING SKILLS	Listening Process and Practice: Introduction to recorded lectures, poems, interviews, and speeches, listening tests	06
UNIT – II INTRODUCTION TO PHONETICS	Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.	06
UNIT – III SPEAKING SKILLS	Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.	10
UNIT – IV BUILDING VOCABULARY	Etymological Study of Words And Construction of Words, Phrasal Verbs, Jargon/ Register Related to Organizational Set Up, Word Exercises and Word Games to enhance Self-Expression and Vocabulary of Participants	08

REFERENCES:

1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press, 1956.

2. James Hartman & et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.
5. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.
6. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
7. J. Sethi & et al. A Practice Course in English Pronunciation. New Delhi: Prentice Hall, 2004.
8. Pfeiffer, William Sanborn and T.V.S Padmaja. Technical Communication: A Practical Approach. 6th ed. Delhi: Pearson, 2007.

DESCRIPTIVE GEOMETRY – I

L	T	P		Course Code No.: AAPC101
0	0	4		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:0 P.A: 100

RATIONALE

The course is designed to impart knowledge in interpreting and drawing two-dimensional plane and three-dimensional solids in different positions with respect to different axial planes. This subject gives the fundamental knowledge to visualize and draw any three-dimensional object.

COURSE OUTCOMES

At the end of this course the students will be able to

- Apply various methods of representation, made by the study of descriptive geometry I
- Demonstrate skills for understanding two dimensional and three-dimensional spaces

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT – I FUNDAMENTALS OF DESCRIPTIVE GEOMETRY AND CONSTRUCTION OF GEOMETRICAL SHAPES	<ul style="list-style-type: none"> • State and explain dimensioning, scale • State and explain construction of lines, circles, regular polygons, tangents to circles, ellipse & parabola • Explain and draw Involute • Explain and draw Helix. 	8
UNIT – II ORTHOGRAPHIC PROJECTIONS OF LINE, PLANES, GEOMETRICAL SOLIDS	<ul style="list-style-type: none"> • Explain and draw projections of lines in different positions with respect to horizontal and vertical planes. • Explain and draw Projections of planes in different positions with respect to horizontal & vertical planes. • Explain and draw Projections of geometrical solids – cube, cuboid, prism, pyramid, cone, cylinder and sphere • Explain and draw axis perpendicular to a plane • Explain and draw axis parallel to a plane and both planes • Explain and draw axis inclined to one plane and parallel to other • Explain and draw axis inclined to both planes. 	16
UNIT – III ORTHOGRAPHIC PROJECTIONS OF SOLID SECTIONS	<ul style="list-style-type: none"> • Projections of solids cut by inclined plane & vertical plane. <ul style="list-style-type: none"> ○ Explain and draw Sections of cube ○ Explain and draw Sections of prism ○ Explain and draw Sections of pyramid ○ Explain and draw Sections of cone and 	12

	<p style="text-align: center;">cylinder</p> <ul style="list-style-type: none"> • Explain and draw true shape of sections of the above solids 	
UNIT – IV INTERPENETRATING OF GEOMETRICAL SOLIDS	<ul style="list-style-type: none"> • Explain and draw Projections of different solid interpenetrating each other like cylinder penetrating a cone. • Show Two-dimensional presentation of the three-dimensional solids. 	12
UNIT – V SURFACE DEVELOPMENT	<ul style="list-style-type: none"> • Show how to develop the surface of simple solids (Cube, regular, polyhedral, cylinder etc.) • Show how to develop the surface of simple solids cut by sectional planes. 	12

REFERENCE BOOKS AND STANDARDS

1. Bhatt, N.D. and Panchal, V.M., “Engineering Drawing – Plane and Solid Geometry”, Charotar Pub. House.
2. Ching, F.D.K., “Architectural Graphics”, John Wiley
3. Ciriello, M., “Architectural Design Graphics”, McGraw-Hill.

BASIC DESIGN - I

L	T	P		Course Code No.: AAPC103
0	0	4		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:0 P.A: 100

RATIONALE

Aim of this course is to introduce the basic principles of design and architecture, and space articulation.

COURSE OUTCOMES

At the end of this course the students will be able to

- Explain basic principles of design
- Demonstrate two dimensional and three dimensional compositions based on elements & principles of design

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT – I ELEMENTS OF DESIGN & PRINCIPLES OF DESIGN	<ul style="list-style-type: none"> • Elements of design – line, plane, form, texture & colour • Principles of design – armony, balance, rhythmsymmetry, proportion,scale, contrast. 	12
UNIT – II TWO DIMENSIONAL COMPOSITIONS	<ul style="list-style-type: none"> • Two dimensional compositions based on elements & principles of design 	24
UNIT – III THREE DIMENSIONAL COMPOSITIONS	<ul style="list-style-type: none"> • Three dimensional compositions based on above-mentioned two-dimensional compositions. 	24

REFERENCE BOOKS AND STANDARDS

1. Design Fundamentals, Robert Scott.
2. Form, Space and Order, F.D.K. Ching.
3. Introduction to Architecture, J. C. Snyder and A. J. Catanese.
4. Space, Time and Architecture, Gidieon.
5. Introduction to Architecture[Paperback] –by Francis D. K. Ching (Author), James F. Eckler (Author)
6. Design Drawing [Paperback] - Francis D.K. Ching (Author)

ARCHITECTURAL DELINEATION

L	T	P		Course Code No.: AAPC105
0	0	4		
Total Contact hrs.: Lecture:0 Tutorial:0 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:0 P.A: 100

RATIONALE

Three dimensional drawings, sketches and freehand illustrations are direct and intuitive design communication methods. Designers do not need to be highly skilled artist to succeed at communicating ideas through delineation, but skills in delineation, which include many formal and informal 3-d techniques, are necessary for designers to develop and apply. Delineation also serves as a design research tool and a visual progress report for projects.

COURSE OUTCOMES

At the end of this course the students will be able to

- Use Delineation techniques
- Visualize their ideas to build prior to the commitment of significant time on finished drawings.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT – I FREEHAND SKETCHES OF GEOMETRICAL FORMS	<ul style="list-style-type: none"> • Basic solid composition in single line pencil drawing • Basic solid composition in pencil drawing with shading 	8
UNIT – II SKETCHES OF NATURAL LANDSCAPE	<ul style="list-style-type: none"> • Freehand sketches of trees, sky, water body etc. • Graphic sketches of trees, sky, water body etc. 	12
UNIT – III SKETCHES OF HUMAN FIGURE	<ul style="list-style-type: none"> • Freehand sketches • Graphic sketches 	8
UNIT - IV SKETCHES OF BUILT ENVIRONMENT	<ul style="list-style-type: none"> • Outdoor sketches with buildings, vehicles, street furniture. • Indoor sketches with furniture, accessories, doors, windows. 	20
UNIT – V SCALE DRAWING	<ul style="list-style-type: none"> • Architectural lettering in ordinary, compressed and expanded style. • Scale drawing of simple objects, furniture. 	12

REFERENCE BOOKS AND STANDARDS

Drawing: A Creative Process [Import] [Paperback] - Francis D. K. Ching (Author)

MATHEMATICS – II

L	T	P		Course Code No.: AABS102
2	0	0		
Total Contact hrs.: Lecture:45 Tutorial:15 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The purpose of teaching Engineering Mathematics-II to diploma students is to enable them to understand advance uses of mathematics and solving engineering problems. Continuity and sequence is necessary for logical Development of subject. The topic includes Determinants and Matrices, Integral Calculus, Coordinate geometry and Vector Algebra. This course will be helpful for the learners those who like to go for higher studies.

COURSE OUTCOMES

By the end of the course the students will be able to

- Apply the knowledge of Determinants and Matrices with an understanding of importance of that for solving problems.
- Demonstrate capability of encoding the inherent geometry of the original shape.
- Explain cumulative effect of the original quantity or equation is the Integration
- Relate coordinate geometry with algebra and geometry through graphs of lines and curves.
- Differentiate between a resultant and a concurrent force to model simple physical problems in the form of a differential equation with analyze and interpretation of the solutions.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I: DETERMINANTS AND MATRICES	Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.	08
UNIT - II: INTEGRAL CALCULUS	Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulae $\int_0^{\frac{\pi}{2}} \sin^n x dx$, $\int_0^{\frac{\pi}{2}} \cos^n x dx$ and $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$ for solving problems Where m and n are positive integers. Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes . ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems).	15

UNIT - III: CO-ORDINATE GEOMETRY	Equation of straight line in various standard forms (without proof), inter section of two straightlines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula. General equation of a circle and its characteristics. To find the equation of a circle, given: I. Centre and radius, II. Three points lying on it and III. Coordinates of end points of a diameter; Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directories or vertices are given.	10
UNIT - IV: VECTOR ALGEBRA	Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.	06
UNIT-V: DIFFERENTIAL EQUATIONS	Solution of first order and first degree differential equation by variable separation method (simple problems). MATLAB – Simple Introduction	06

REFERENCES:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
3. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
4. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

APPLIED PHYSICS –II

L	T	P		Course Code No.: AABS104
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. 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.

LEARNING OUTCOME:

After undergoing this subject, the student will be able to;

- Solve simple problems on waves and wave motion, periodic and simple harmonic motions.
- Establish wave parameters: frequency, amplitude, wavelength, and velocity
- Explain ultrasonic waves and engineering, medical and industrial applications of Ultrasonic
- Apply acoustics principles to various types of buildings for best sound effect
- Establish the location of the images formed by mirrors and thin converging lens,
- Describe refractive index of a liquid or a solid and conditions for total internal reflection
- Solve simple problems on capacitors in simple circuits
- Illustrate the differentiate between insulators, conductors and semiconductors, and potential, potential difference, electromotive force
- Explain measurement of the circuit parameters: electric current, potential difference, resistance.
- Calculate the equivalent resistance of a variety of resistor combinations, the energy consumed by an appliance
- Describe the effect on a current-carrying conductor when placed in a magnetic field
- Explain the operation of appliances like moving coil galvanometer, simple DC motors.
- Apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits.
- Demonstrate the use of semiconductors in various technical gadgets like mobile phones, computers, LED, photocells, solar lights etc.
- Illustrate the conditions for light amplification in various LASER and laser-based instruments and optical devices
- Discuss the potential of optical fiber in fields of medicine and communication.
- Express importance of nanoscience and nanotechnology and impact of nanotechnology to the society

	<ul style="list-style-type: none"> • Electrostatic induction and conduction • Conductors and non-conductors • Surface density of charge, The lightning conductor • Coulomb's law between electric charges • Field intensity and electric potential • Electric permittivity • Lines of force in electrostatic field 	
UNIT - IV: CURRENT ELECTRICITY	<p>4.1 Electric current:</p> <ul style="list-style-type: none"> • Cell: Primary & Secondary • Flow of charge – electric current and its unit • Electric motive force (EMF) • Ohm's law • Resistance and its unit, specific resistance • Resistance in series and parallel • Factors affecting resistance • Wheatstone bridge circuit • Relation for balanced Wheatstone bridge (No deduction) • Meter bridge, P.O. Box • Simple problems <p>4.2 Heating Effects of Current:</p> <ul style="list-style-type: none"> • Joule's law • Electrical work, energy and power with units • Simple problems. <p>4.3 Magnetic Effect of Electric Current:</p> <ul style="list-style-type: none"> • Magnetic effect of electric current, Bio-Savart law • Fleming's left hand rule • Application of Magnetic effect of electric current – Galvanometer (concept only) • Electromagnetic Induction: Faraday's law, Fleming right hand rule , Basic concept of A.C. generator. 	10+06
UNIT - V: MODERN PHYSICS	<p>5.1 Photo-electric effect:</p> <ul style="list-style-type: none"> • Photo-electron, Work function, photo electric effect • Photo cell • Einstein photo electric equation • Stopping potential, Threshold Frequency • Principle of solar photo-voltaic cell and its uses. <p>5.2 Semiconductor:</p> <ul style="list-style-type: none"> • Energy band in solids (Idea) • Distinction between conductor, insulators & semi-conductors in terms of energy band diagram, • Intrinsic and extrinsic (P-type; N-type) semiconductor, • P – N junction diode, depletion region, potential barrier. • Forward and reverse biasing; Forward and reverse bias characteristic curve. • Application of P – N junction diode 	06+04

REFERENCES:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
5. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
6. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
7. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University PressIndia Pvt. Ltd, New Delhi.
8. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd.
NewDelhi.
Nanotechnology: Importance and Applications, M.H. Fulekar, IK International Publishing House Pvt. Ltd, New Delhi.
9. e-books/e-tools/ learning physics software/websites etc.

APPLIED PHYSICS II LAB

L	T	P		Course Code No.: AABS106
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit: 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

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.

LEARNING OUTCOMES

On completion of this course, the student will be able to;

- Verify optical laws; reflection, refraction from plane interfaces and surfaces.
- Apply knowledge of optics to determine focal length and magnifying power of optical lenses.
- Use electrical components and meters to verify Ohm's law for flow of current.
- Quantify resistances for series and parallel combination of resistances.
- Demonstrate measurement of unknown resistance of a wire.

SUGGESTED LIST OF EXPERIMENTS / PRACTICALS

SL. NO.	EXPERIMENTS
1	To determine refractive index of the material of glass slab by pin method.
2	To determine the focal length of a concave mirror by u , v method
3	To determine the focal length of the convex lens by u , v method
4	To plot magnetic lines of force of a bar magnet with North Pole pointing north and to locate the neutral points & measure the magnetic length
5	To plot magnetic lines of force of a bar magnet with South Pole pointing north and to locate the neutral points & measure the magnetic length.
6	To verify Ohm's law by ammeter and Voltmeter method with — Series connection of resistances; Parallel connection of resistances.
7	To measure the unknown resistance / resistivity of the material of a wire by meterBridge
8	To measure the unknown resistance of the material of a wire by P. O. box.

REFERENCE

- Principle of Physics – Subrahmanyam & Brizal
- Intermediate Physics – S.C.Roy Chaudhury & D.B.Sinha
- Fundamentals of Physics – David Halliday, Robert Resnick & Jeal Walka
- University Physics – Francis W. Sears, Mark W. Zemans Key & Hugh D. Young
- University Physics – Hugh D. Young & Roger H. Freedman
- A text book of Physics (Part II) – C. R. Dasgupta
- Elements of Higher Secondary Physics (Part II) - D. Dutta, B. Pal & B. Chaudhuri
- Physics (Volume II) - Ajoy Chakraborty
- Applied Physics (Vol. II) –H.C. Saxena & Singh Prabhakar
- Physics for 10+2 students (Part II) - Das, S.K, Sisodia M.L, Neher P.K.,Kachhawa C.M
- Optical Fibre and Laser: Principles and Applications –Anuradha De, 2nd Edition, New Age International Publications.

INTRODUCTION TO IT SYSTEMS

L	T	P		Course Code No.: ES102
2	0	0		
Total Contact hrs.: Lecture:30 Tutorial:0 Practical: 0 Credit : 2			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

This course is intended to make new students comfortable with computing environment - learning basic computer skills, learning basic application software tools, Understanding Computer Hard- ware, Cyber security awareness.

COURSE OUTCOMES

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

COURSE CONTENT DETAILS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT-I	Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. General understanding of various computer hardware components – CPU, Memory, Display, Key-board, Mouse, HDD and other Peripheral Devices.	06
UNIT-II	OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.	08
UNIT-III	HTML4, CSS, making basic personal webpage.	06
UNIT-IV	Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.	10

NOTE: Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place in the Lab by practicing regularly.

REFERENCES:

1. Online resources, Linux man pages, Wikipedia.
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
5. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
6. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

ENGINEERING MECHANICS

L	T	P		Course Code No.: ES106
2	1	0		
Total Contact hrs.: Lecture:30 Tutorial:15 Practical: 0 Credit : 3			Total marks: 100	Theory: End Term Exam.:60 P.A: 40

RATIONALE

The subject of Engineering mechanics deals with the static and dynamic behaviour of rigid bodies under the action of forces. This course will develop basic concepts and working principles of mechanics applied to engineering problems dealing mainly with statics and dynamics of materials under the action of mechanical forces.

COURSE OUTCOMES

After completing this course, student will be able to:

- Obtain resultant of various forces
- Calculate support reactions through conditions of equilibrium for various structures
- Explain role of friction in equilibrium problems
- Explain fundamental laws of machines and their applications to various engineering problems

DETAILS COURSE CONTENTS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT – I BASICS OF MECHANICS AND FORCE SYSTEM	Basics of mechanics and force system Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow’s notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon’s Theorem. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.	04+02
UNIT– II EQUILIBRIUM	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium Lami’s Theorem – statement and explanation, Application for various engineering problems. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple), Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load. Beam reaction graphically for simply supported beam subjected to vertical point loads only.	06+03
UNIT– III FRICTION	Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between coefficient of friction and angle of friction. Equilibrium of bodies on level surface subjected to force	06+03

	parallel and inclined to plane. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only. First Year Curriculum Structure Common to All Branches	
UNIT– IV CENTROID AND CENTRE OF GRAVITY	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle) Centroid of composite figures composed of not more than three geometrical figures Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre of Gravity of composite solids composed of not more than two simple solids.	08+04
UNIT – V SIMPLE LIFTING MACHINE	Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston’s differential pulley block, geared pulley block.	06+03

REFERENCES:

1. D. S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R. S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R. K., A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

INTRODUCTION TO IT SYSTEMS LAB

L	T	P		Course Code No.: ES108
0	0	4		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Systems' and become proficient in using computing environment - basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

LEARNING OUTCOME

At the end of the course student will be able to

- install OS, assemble a PC
- configure OS, assemble a PC
- connect it to external devices,
- write documents,
- create worksheets,
- prepare presentations,
- protect information and computers from basic abuses/ attacks.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components inlab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times
8	Explore security features of Operating Systems and Tools, try using them and see what happens.

REFERENCES:

1. Online resources, Linux man pages, Wikipedia.
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
5. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
6. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

ENGINEERING MECHANICS LAB

L	T	P		Course Code No.: ES112
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 30 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

In most of the engineering applications of all disciplines the material bodies are subjected to various forces and to understand the behaviour of such bodies, knowledge and use of engineering mechanics is essential.

LEARNING OUTCOME

After completing this course, student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Select the relevant simple lifting machine(s) for given purposes.

LIST OF PRACTICALS

SL. NO.	EXPERIMENTS / ACTIVITIES FOR PRACTICE
1	To study various equipment related to Engineering Mechanics.
2	To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3	To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4	Derive Law of machine using Worm and worm wheel.
5	Derive Law of machine using Single purchase crab.
6	Derive Law of machine using double purchase crab.
7	Derive Law of machine using Weston's differential or wormed geared pulley block.
8	Determine resultant of concurrent force system applying Law of Polygon of forces using force table.
9	Determine resultant of concurrent force system graphically.
10	Determine resultant of parallel force system graphically.
11	Verify Lami's theorem.

12	Determine coefficient of friction for motion on horizontal and inclined plane.
13	Determine centroid of geometrical plane figures.

REFERENCES:

1. Bedi D. S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R. S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R. K., A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S., S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
6. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L. G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

DESCRIPTIVE GEOMETRY – II

L	T	P		Course Code No.: AAPC102
0	0	2		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 60 Credit : 1			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

This course is designed to introduce the second slip in perceiving 3 –D objects and thereby expressing it in terms of three-dimensional drawings. Geometrical construction technique to represent 3 –D objects is the objective of this subject. A thorough grasp of this subject is vital to conceive and present any architectural form.

LEARNING OUTCOMES

On completion of the course on Descriptive Geometry-II, student will be able to

- Draw projections of a line irrespective of its position either in HP or VP.
- Draw projections of plan.
- Draw projections of solids.
- Draw projections of Pyramids and Solid cones.
- Draw Isometric view of a given plan and elevation.

Students will be able to draw the three-dimensional presentation of building and geometrical solids from two dimensional drawings like plans and elevations.

DETAILS COURSE CONTENTS

UNIT NO. & TITLE	CONTENT
UNIT - I	1.0 Explain and show how to draw the Isometric view of the followings 1.1 Geometrical forms like prism, pyramid, cone, cylinder, and sphere – 2 sheets 1.2 Complex forms involving any two geometrical forms – 2
UNIT - 2	2.0 Explain and show how to draw axonometric view of the followings 2.1 Group of solids – 2 sheets 2.2 Interior layout of a residential room – 1 sheet
UNIT - 3	3.0 Explain and show how to draw Perspective view 3.1 Concept & definition of – Ground plane / Picture plane / Station point / Horizon plane / Central plane / Ground line / Horizon line / Axis of vision / Centre of vision / Vanishing point. 3.2 Methods of Perspective projection – one point / two point 3.3 One point perspective projection of simple geometrical forms as in 1.1 3.4 One point perspective projection of complex forms as in 1.2 3.5 Two point perspective projection of simple geometrical forms as in 1.1 3.6 Two point perspective projection of complex forms as on 1.2

SUGGESTED LEARNING RESOURCES

Reference Books and Standards:

1. Bhatt, N.D. and Panchal, V.M., “Engineering Drawing – Plane and Solid Geometry”, Charotar Pub. House.
2. Carpo, M., “Perspective, Projections and Design: Technologies of Architectural Representation”,
Routledge.
3. Ching, F.D.K., “Architectural Graphics”, John Wiley
4. Ciriello, M., “Architectural Design Graphics”, McGraw-Hill.

BASIC DESIGN-II

L	T	P		Course Code No.: AAPC104
0	0	4		
Total Contact hrs.: Lecture:00 Tutorial:00 Practical: 60 Credit : 2			Total marks: 100	Practical: End Term Exam.:40 P.A: 60

RATIONALE

To explore further from understanding the fundamental principles and elements of design to the development of skill in solving composite problem which includes different functions, circulation and construction system related to building design. This course enables the students to present through freehand sketches, drawings and models.

LEARNING OUTCOME

After completing this course, student will be able to:

- Explain how the perception changes with the change of colour, background.
- Demonstrate skill on freehand sketch, colouring and model making with the creative use of different materials.

DETAILS COURSE CONTENTS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT - I	1.0 Colour theory 1.1 Properties of colour- Hue, value, chrome 1.2 Colour Wheel- Primary colour, secondary colour, and tertiary colour complementary colour - definitions. 1.3 Colour schemes : o Related (monochromatic, analogous) o Contrasting (complementary, split complementary, triad, tetrad) 1.4 Colour rendering of 2D & 3D compositions done in Basic Design I - 4 Sheets	16
UNIT - 2	2.0 Study and Analysis of general principles of Architectural design (Teacher will supply a small single-storied residential building plan with furniture layout). 2.1 Study and analysis of functional requirements & area requirement. 2.2 Study and analysis of furniture dimension, layout, toilet & kitchen fittings & fixtures. 2.3 Study and analysis of circulation, interrelation of functional spaces preparation of bubble diagram. - 2 sheets	16

UNIT – 3	<p>3.0 Design and drawing of a simple building, like small residence, milk booth, guard room.</p> <p>3.1 Formulation of requirement of spaces. 3.2 Area allotment 3.3 Preparation of bubble diagram. 3.4 Preparation of presentation drawing</p> <p style="padding-left: 40px;">i) Plan ii) Elevations iii) Sectional elevations through steps to plinth level, door, window - 4 sheets</p>	28
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SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS AND STANDARDS:

- Design Fundamentals, Robert Scott.
- Form, Space and Order, F.D.K. Ching.
- Introduction to Architecture, J. C. Snyder and A. J. Catanese.
- Space, Time and Architecture, Gidieon.
- Introduction to Architecture [Paperback] –by Francis D. K. Ching (Author), James F. Eckler (Author)
- Design Drawing [Paperback] - Francis D.K. Ching (Author)

BUILDING MATERIAL

L	T	P		Course Code No.: AAPC106
3	0	0		
Total Contact hrs.: Lecture:45 Tutorial:00 Practical: 00 Credit: 3			Total marks: 100	Theory: 100 End Term Exam.:60 P.A: 40

RATIONALE

This course is designed to give basic inputs about the engineering and building materials, which is essential and pre requisite for any architecture students.

LEARNING OUTCOME

After completing this course, student will be able to:

- Explain different aspects of stone as a building material.
- Identify the brick as a building material and its many applications in engineering works.
- Use cement for different construction activities.
- Find the merits of concrete and R.C.C. in engineering, application particularly construction work.
- Explain the application of timber for engineering purposes.
- Apply the knowledge of paints, varnishes and distemper for the intended purposes.
- Judge the difference between ferrous/non-ferrous metals in their day-to-day application as building material.
- State the advantages and applicability of plastic as a building material.
- Solve the needs of construction industry by applying glass as a material

DETAILS COURSE CONTENTS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
UNIT - I	1.0 Stone 1.1 Classify various stones 1.2 State and explain the properties of good quality building stone 1.3 Describe the methods of quarrying 1.4 State the uses of building stone.	5
UNIT - 2	2.0 Clay Product-Brick 2.1 State the Ingredients of mud 2.2 Describe the method of manufacture of bricks	4

	<p>2.3 Explain the classification of bricks</p> <p>2.4 State the properties of good quality of bricks</p> <p>2.5 State the uses of bricks.</p>	
UNIT - 3	<p>3.0 Other Clay Products</p> <p>3.1 Burnt clay hollow brick</p> <p>3.2 Clay tiles</p> <p>3.3 Terracotta, Porcelain, Earthenware</p>	3
UNIT - 4	<p>4.0 Timber</p> <p>4.1 Classification of trees-exogenous & endogenous structure of timber</p> <p>4.2 Characteristics of good timber - names of commonly used timber</p> <p>4.3 State the defects of timber</p> <p>4.4 Describe the method of seasoning timber</p> <p>4.5 State the use of woods for different engineering purpose</p>	5
UNIT - 5	<p>5.0 Other Timber Products</p> <p>5.1 Veneer, Plywood, Laminated board, Block board, Fibre board, Particle board.</p>	4
UNIT - 6	<p>6.0 Paints, Varnishes, Distemper</p> <p>6.1 Describe briefly about the composition of paints, varnishes & distemper</p> <p>6.2 State the qualities of good paint, varnishes & distemper</p> <p>6.3 State the uses of Paints, Varnishes, and Distemper.</p>	4
UNIT - 7	<p>7.0 Ferrous & non-ferrous metals</p> <p>7.1. State various types of ferrous and nonferrous metals</p> <p>7.2. State the properties of good ferrous/non-ferrous metals</p> <p>7.3 State their use in engineering applications</p>	4
UNIT - 8	<p>8.0 Plastics</p> <p>8.0 State various types of plastic</p> <p>8.1 State the uses and advantage of plastic.</p>	3
UNIT - 9	<p>9.0 Glass</p> <p>9.1 State various types of glass</p> <p>9.2 State and explain the properties of glass</p> <p>9.3 State their use as building material.</p>	3

UNIT – 10	10.0 Cement 10.1 State the Ingredients of cement. 10.2 Describe the method of manufacture of cement 10.3 State the types of cement 10.4 Explain the properties of good cement 10.5 State the uses of cement.	5
UNIT - 11	11.0 Concrete and R.C.C. 11.1 State the components of concrete 11.2 Describe the method of manufacture and types of concrete 11.3 Describe the characteristics of concrete 11.4 State the uses of Concrete and R.C.C. 11.5 Draw the sketches of R.C.C. and their uses 11.5.1 Distinguish between plain concrete and R.C.C. 11.5.2 State the advantages of R.C.C.	5

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS AND STANDARDS:

- Engineering Materials by S C Rangwala
- Building materials by Kulakarni
- Building Materials by Duggal S. K.
- Building Material & Construction by S.P. Arora& S. P. Bindra
- Building materials & components by C B R I
- National Building code by N.B.C
- SP20 Explanatory handbook on Masonry code

MODEL MAKING AND WORKSHOP

L	T	P		Course Code No.: AAPC108
1	0	2		
Total Contact hrs.: Lecture:15 Tutorial:00 Practical: 30 Credit: 2			Total marks: 100	Practical: End Term Exam.:00 P.A: 100

RATIONALE

This workshop is required to learn the art of making building models out of different materials like ivory sheets, mount boards, acrylic sheets, thermocol, balsa wood etc.

LEARNING OUTCOMES

After completing this course, student will be able to:

- make models of small Geometrical objects.
- develop expertise in preparing the Miniature/Study Model

DETAILS COURSE CONTENTS

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (Hrs.)
UNIT - I	Preparation of Geometrical solids and Theme based composition using different materials like, Ivory, mount board, balsa wood, acrylic sheets etc.	4L+4P
UNIT - 2	Preparation of base board and landscaping elements and roads	3L+4P
UNIT - 3	Preparation of a complete building model.	8L+ 22P

NOTE: Demonstrate how to prepare geometrical solids/ Form oriented objects and their composition. From different types of materials like ivory sheets, balsa wood, acrylic, or any other suitable materials Model 1,2,3(Three nos. of model.)

SUGGESTED LEARNING RESOURCES

REFERENCE BOOKS AND STANDARDS:

- Criss. B. M. (2011). Designing with models: A Studio guide to Architectural Process Models.3 rd Ed. Hoboken :John Wiley & Sons.
- Werner, M. (2011). Model Making. New York : Princeton Architectu