Kashi Institute of Technology, Varanasi
(An Autonomous Institute Approved by AICTE)

Evaluation Scheme & Syllabus

For

Diploma, First Year
(Civil Engineering)

(Effective from Session: 2024-25)

Diploma First Year, Semester-I
(Civil Engineering)

S.N	Course Category	Course Code	Course Title	Type	Periods			FA	SA	Total	Credit
					L	T	P				
1	HS	DHS101	COMMUNICATION SKILL-I	T	2	0	0	70	30	100	2
2	BS	DBS102	APPLIED MATHEMATICS-I	T	3	1	0	70	30	100	4
3	BS	DBS104	APPLIED CHEMISTRY	T	2	1	0	70	30	100	3
4	PC	DCEPC101	CONSTRUCTION MATERIALS	T	3	0	0	70	30	100	3
5	ES	DES121	ENGINEERING DRAWING – I	P	0	0	8	70	30	100	2
6	ES	DES122	WORKSHOP PRACTICE – I	P	0	0	8	70	30	100	2
7	HS	DHS123	COMMUNICATION SKILL-I LAB	p	0	0	2	70	30	100	1
8	BS	DBS125	APPLIED CHEMISTRY LAB	P	0	0	2	70	30	100	1
9	PC	DCEPC128	CONSTRUCTION MATERIALS LAB	P	0	0	2	70	30	100	1
10	CCA	DCCA111	CO-CURRICULAR ACTIVITIES	-	-	-	-	-	-	100	0.5
11	GP	DGP112	GENERAL PROFICIENCY	-	-	-	-	-	-	100	0.5
Total				-	10	2	22	630	270	1100	20

Diploma First Year, Semester-II
(Civil Engineering)

S.N	Course Category	Course Code	Course Title	Type	Period			FA	SA	Total	Credit
					L	T	P				
1	BS	DBS201	APPLIED MATHEMATICS – II	T	3	1	0	70	30	100	4
2	BS	DBS202	APPIED PHYSICS	T	2	1	0	70	30	100	3
3	ES	DES204	APPLIED MECHANICS	T	3	0	0	70	30	100	3
4	ES	DES206	FUNDAMENTAL OF MECHANICAL AND ELECTRICAL ENGINEERING	T	3	0	0	70	30	100	3
5	ES	DES221	FUNDAMENTAL OF MECHANICAL AND ELECTRICAL ENGINEERING LAB	P	0	0	2	70	30	100	1
6	ES	DES230	COMPUTER AIDED DRAWING (CAD)	P	0	0	8	70	30	100	2
7	BS	DBS223	APPIED PHYSICS LAB	P	0	0	2	70	30	100	1
8	ES	DES225	APPLIED MECHANICS LAB	P	0	0	2	70	30	100	1
9	CS	DCS226	INTRODUCTION TO IT SYSTEM LAB	P	0	0	2	70	30	100	1
10	CCA	DCCA211	CO-CURRICULAR ACTIVITIES	-	-	-	-	-	-	100	0.5
11	GP	DGP212	GENERAL PROFICIENCY	-	-	-	-	-	-	100	0.5
Total				-	11	2	16	630	270	1100	20

FA: Formative Assessment, **SA**: Summative Assessment, **L**: Lecture, **T**- Tutorial, **P:** Practical

Abbreviation Used:

HS: Humanities, Social Science
ES: Engineering Science
BS: Basic Science
CS: Computer Science
PC: Program Course

DETAILED SYLLABI
DIPLOMA 1St Year

- **Civil Engineering**

(Effective from Session: 2024-25)

(Common to all Diploma Courses)					
Semester : I			**Course Category Code : HS**		
Course Code:	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DHS101	**Communication Skills -I**	**2**	**0**	**0**	**2**
Prerequisite	**After completion of the course students are able to -**				**Bloom's Level**
Course Outcome	**CO 1**	*Introduce, converse, show interest and respond.*			K1,K3
	CO 2	*Improve decisions through practical exercises, cases.*			K3
	CO 3	*Improve Reading skills*			K3,K5
	CO 4	*Present, write effectively and give feedback.*			K2,K3
	CO 5	*Improve his communication related to industry based.*			K2,K3
UNIT - I	**BASICS OF COMMUNICATION FOR CAREER DEVELOPMENT**				**Contact Hours: 8**
Meaning of Communication, Role and Scope of Communication, Barriers of Communication, Types of Communication, Process of Communication, Role of Communication in Corporate field.					**CO 1**
UNIT – II	**APPLICATION OF GRAMMER**				**Contact Hours: 8**
Verb, Tense, Active & Passive voice , Direct & Indirect speech					**CO 2**
UNIT – III	**READING SKILLS**				**Contact Hours: 8**
Unseen passage for comprehension (one word substitution, prefixes, suffixes, antonyms, synonyms etc. based upon the passage to be covered under this topic)					**CO 3**
UNIT – IV	**WRITING SKILLS**				**Contact Hours: 8**
Email writing, Letter/Report writing, CV/Resume creation, paragraph writing, notice writing.					**CO 4**
UNIT – V	**INTERVIEW SKILLS & SELF ANALYSIS**				**Contact Hours : 8**
Giving self Introduction, Telephonic Interviews, Etiquettes to follow during an interview session , Swat analysis.					**CO 5**
Lecture Hour 40					**TOTAL 40**

Reference Books:

1. How to Win Friends and Influence People by Dale Carnegie Simon and Schuster, 1936.

2. Advance English Grammar by D.S. Paul

3. Business Communication by M. Raman, Oxford University Press.

4. Word Power Made by Easy by Norman Lewis

5. 30 days to Better English by Norman Lewis

6. Learn English Through Hindi

Semester : I		Course Category Code : HS		

		Period/Week			Credit
Course Code	**Course**	**L**	**T**	**P**	**C**
DHS123	**Communication Skills –I Lab**	**0**	**0**	**2**	**1**

Prerequisite	*At the end of this course, the students will be able to:*	
Course Outcome	**CO1**	Offer suggestions for improving listening skills
	CO2	Changes in students as a result of participation in a communication activity
	CO3	Improve personality, Enhance self awareness, Increase Self confidence
	CO4	*Apply leadership principles to real-world scenarios and Enhance ability to lead teams and manage change.*
	CO5	Self analysis and self Evaluation

List of Practicals

❖ Listening and Speaking Exercises	CO1
❖ Self and peer introduction	
❖ Newspaper Reading	CO2
❖ Just a minute session – Extempore	
❖ Greeting and starting a conversation	CO3
❖ Discuss about likes and dislikes	
❖ Group Discussion	C04
❖ Mock Interviews Practice	
❖ Short story telling (Moral and Brief Summary)	C05
❖ Enrichment of English Vocabulary	

(Common to all Diploma Courses)						
Semester : I				**Course Category Code : BS**		
Course Code	**Course**		**Period / Week**			**Credit**
		L	**T**	**P**		**C**
DBS102	**Applied Mathematics I**	**3**	**1**	**0**		**4**
Prerequisite	*At the end of this course, the students will be able to:*					**Bloom's Level**
Course Outcome	**CO1**	*Understand the concept of Arithmetic mean and Geometric mean and linear equation.*				K_2
	CO2	*Apply dot & cross product of vectors to find the solution of engineering problems and Use complex numbers in various engineering problems.*				K3,
	CO3	*Understand the concept of Relation between sides and angles of a triangle*				K2
	CO4	*Apply differential calculus and higher order to solve engineering problems.*				K3
	CO5	*Find velocity, acceleration, errors and approximation in engineering problems with application of derivatives.*				K3,K4
UNIT – I	**Algebra-I**					**Contact Hours : 12**
Arithmetic Mean: nth term, sum, Mean Geometric Mean: nth term, sum, Mean. Determinants: Elementary properties of determinants of order 2 and 3, system of linear equations and solution, Cramer`s Rule.						**CO1**
UNIT – II	**Algebra-II**					**Contact Hours : 12**
Vector Algebra: Dot and cross product, Scalar and vector triplet product. Complex Numbers: Representation, Modulus and Amplitude. De-Moivre theorem application in solving algebraic equations.						**CO2**
UNIT – III	**Trigonometry**					**Contact Hours : 08**
Relation between sides and angles of a triangle: Statement of various formula showing relationship between sides and angles of a triangle.						**CO3**
UNIT – IV	**Differential Calculus-I**					**Contact Hours : 15**
Functions, limits, continuity, elementary methods of finding limit (right and left) Method of finding derivatives, functions of a function, Logarithmic Differentiation.						**CO4**
UNIT – V	**Differential Calculus-II**					**Contact Hours : 08**
Higher order derivatives Derivatives of Special Functions (Exponential, Logarithmic, and Inverse circular functions).						**CO5**
Lecture Hours : 40			**Tutorials Hours :15**			**Total : 55**

Reference Books:

1. *Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi*
2. *Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,*
3. *Applied Mathematics-I by Chauhan and Chauhan, Krishna Publications, Meerut.*

Text Book

1. *Applied Mathematics-I (A) by Kailash Sinha and Varun Kumar; Aarti Publication, Meerut*

(Common for Civil & Electrical Engineering)					
Semester : I				**Course Category Code : BS**	
Course Code	**Course**		**Period / Week**		**Credit**
		L	**T**	**P**	**C**
DBS104	**Applied Chemistry**	**2**	**1**	**0**	**3**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Describe the three subatomic particles in an atom. Explain the differences between protons, neutrons, and electrons. Recap the characteristics of elements in the Periodic table. Differentiate between polar and non polar covalent*			K1,K2
	CO2	*Developing the basic idea about lubricant and also help us to understand the different sources of water.*			K2,K3,K_5
	CO3	*Student will be able to define water. Explain the role of water for human and plants. Discuss and explain water cycle.*			K_2
	CO4	*Identify the primary oxidation and reduction reaction for corrosion. Differentiate between general corrosion and localized corrosion .*			K2,K4
	CO5	*Understand how the thermodynamic of organic reaction define the direction and kinetics define the rate at which they proceed. Provides important information regarding Molecular weight, Glass transition temperature &Crystallization of Polymers.*			K1,K2,K6
UNIT – I	**Atomic structure, Periodic Table and Chemical Bonding**				**Contact Hours : 13**
	1. Fundamental particles- mass and charges of electrons, protons and neutrons. 2. Bohr's model of atom and limitations. 3. Atomic number, atomic mass number isotopes and isobars. 4. Definition of orbit and orbitals, shapes of s and p orbitals only, 5. Aufbau's principle, Hund's rules. Electronic configuration of elements with atomic number (Z) = 20 only. 6. Chemical bonding – General introduction about ionic bond & covalent bonds				**CO1**
UNIT – II	**Fuels and Lubricants**				**Contact Hours : 16.5**
	2.1 .Definition & Classification of fuels, characteristics of good fuel. 2.2 Calorific value-higher calorific value, lower calorific value, determination of calorific value of solid or liquid fuel using Bomb calorimeter and numerical examples. a. Coal - types of coal and proximate analysis of coal. b. Gaseous fuels – chemical composition, and applications of natural gas (CNG), LPG, c. Lubricants: Definition properties and industrial applications				**CO2**
UNIT – III	**Water**				**Contact Hours : 13**
1. – Hard water, types of hardness, causes of hardness, units of hardness – mg per liter (mgL^{-1}) and part per million (ppm) and simple numerical, 2. Disadvantages caused by the use of hard water in domestic and boiler feed water. Primming and foaming and caustic embrittlement in boilers.					**CO3**

3. Removal of hardness - Permutit process		
UNIT – IV	**Corrosion and its Control**	**Contact Hours : 13**

1. Definition of corrosion. Redox Reaction.
2. Theories of
     1. Dry (chemical) corrosion- Pilling Bedworth rule
     2. Wet corrosion in acidic atmosphere by hydrogen evolution mechanism
3. Corrosion control:
     1. Metal coatings – Zn (Sherardizing), Electroplating
     2. Organic coatings - use of paints, varnishes.
		CO4

UNIT – V	**Organic compound, Polymers and Plastics periods**	**Contact Hours : 09**
1. Definition of polymer, monomer and degree of polymerization 2. Brief introduction to addition and condensation polymers with suitable examples (PE, PVC, Teflon, Nylon -66 and Bakelite) 3. Thermo plastics and thermo setting plastics.		**CO5**
Lecture Hours : 38	**Tutorials Hours :10**	**Total : 52**

Reference Books:

1 **Pradeep's New Course Chemistry for class XII (Vol I and II)**

2 Modern's ABC of Chemistry Class - 12 (Part 1 & 2)

3 Concise Inorganic Chemistry

4 Modern Approach to Chemical Calculations

(Common for Civil & Electrical Engineering)					
Semester : I			**Course Category Code : BS**		
Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DBS125	**APPLIED CHEMISTRY LAB**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:*				
Course Outcome	**CO1**	*Total hardness of water can be estimated by titrating a sample of water with EDTA salt solution in presence of NH4Cl – NH4OH*			
	CO2	*The alkalinity of water can be determined by titrating the water sample with Sulphuric acid of known values of pH, volume and concentration.*			
	CO3	*Proximate analysis determines fixed carbon, volatile matter, moisture, and ash content, while ultimate analysis identifies the carbon, hydrogen, nitrogen, sulphur, and oxygen composition of solid fuels.*			
	CO4	*The permanent hardness of water can be removed by O' Hener's Method.*			
	CO5	*We can easily determined the flash and fire point of given lubricant oil by using Able's flash point apparatus..*			
List of experiment					
CO1	Estimation of total hardness of water using standard EDTA solution				
CO2	Estimation of total alkalinity of given water sample by titrating it against standard sulfuric acid solution				
CO3	Proximate analysis of solid fuel)				
CO4	Estimation of temporary hardness of water sample by O' Hener's Method				
CO5	Determination of flash and fire point of given lubricating oil using Able's flash point apparatus				

(For Civil Engineering)					
Semester: I			**Course Category Code: PC**		
Course Code	**Course**		**Period / Week**		**Credit**
			L	**T**	**P**	**C**
DCEPC101	**CONSTRUCTION MATERIALS**		3	0	0	3
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Classify rocks and identify particular type of stones.*			K_2, K_4
	CO2	*Classify different types of bricks.*			K_2, K_3, K_5
	CO3	*Perform laboratory tests of cement to determine properties of cement.*			K_4
	CO4	*Identify types of defects of timber*			K_2, K_4
	CO5	*Select paints/varnishes for various types of surfaces Identify and use different types of metals/alloys*			K_2
UNIT – I	**Building Stones**				**Contact Hours:08**
Classification of Rocks: Geological classification: Igneous, sedimentary and metamorphic rocks Chemical classification; Calcareous, argillaceous and siliceous rocks Physical classification: UN stratified, stratified and foliated rocks Requirements of good building stones Identification of common building stone, Various uses of stones in construction					**CO1**
UNIT – II	**Bricks**				**Contact Hours: 08**
Introduction to bricks, Raw materials for brick manufacturing and properties of good brick making earth, Manufacturing of bricks, Preparation of clay (manual/mechanically), Moulding: hand moulding and machine moulding brick table; drying of bricks, burning of bricks, types of kilns (Bull's Trench Kiln and Hoffman's Kiln), process of burning, size and weight of standard brick; traditional brick, refractory brick, Classification and specifications of bricks as per BIS: 1077, Testing of common building bricks as per BIS: 3495, Compressive strength, water absorption – hot and cold-water test, efflorescence, Dimensional tolerance, soundness					**CO2**
UNIT – III	**Cement**				**Contact Hours: 08**
Introduction, raw materials, flow diagram of manufacturing of cement, Various types of Cements, their uses and testing: Ordinary Portland cement, rapid hardening cement, low heat cement, white and colored cement, Portland pozzolana cement Properties of cement.					**CO3**
UNIT – IV	**Timber**				**Contact Hours: 08**
Identification and uses of different types of timber: Teak, Deodar, Shisham, Sal, Mango, Kail, Chir, Fir, Hollock, Champ, Market forms of converted timber as per BIS Code, Structure of Timber, Seasoning of timber: Purpose, methods of seasoning as per BIS Code, Properties of timber and specifications of structural timber, Defects in timber, decay in timber, Preservation of timber and methods of treatment as per BIS					**CO4**
UNIT – V	**Miscellaneous Materials**				**Contact Hours: 08**
Introduction, purpose and use of paints, Types, ingredients, properties and uses of oil paints, water paints and cement paints, Ferrous metals: Composition, properties and uses of cast iron, mild steel, HYSD steel, high tension steel as per BIS, Aluminum & Stainless Steel, Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes					**CO5**
Lecture Hours : 30		**Tutorials Hours :10**			**Total : 40**
Reference Books:					
1. *Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.* 2. *SC Rangawala," Construction Materials", Charotar Publishers*					

3. Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
4. Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
5. TTTI, Chandigarh "Civil Engineering Materials:" New Delhi Tata McGraw Hill Publication
6. Gurcharan Singh; "Engineering materials", Delhi Standard Publishers Distributors
7. Alam Singh, "Construction Materials"

	(For Civil Engineering)				
Semester : I			Course Category Code : PC		
Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DCEPC128	**Construction Materials LAB**	0	0	2	1
Prerequisite	*At the end of this course, the students will be able to:*				
Course Outcome	**CO1**	Classify rocks and identify particular type of stones			
	CO2	*Classify different types of bricks.*			
	CO3	*Perform laboratory tests of brick to determine properties of brick.*			
	CO4	*Identify types of defects of timber*			

List of experiment

CO1	To identify the stones used in building works by visual examination.
CO2	To determine the crushing strength of bricks.
CO3	To determine the water absorption and efflorescence of bricks.
CO4	To identify various types of timbers such as: Teak, Sal, Chir, Shisham, Deodar, Kail & Hollock by visual examination only

		(Common to all Diploma Courses)				
Semester: I				Course Category Code:ES		
Course Code	**Course**		Period / Week			**Credit**
			L	**T**	**P**	**C**
DES121	**Engineering Drawing – I**		0	0	8	2
Prerequisite	*At the end of this course, the students will be able to:*					**Bloom's Level**
Course Outcome	**CO1**	*Study & identify the different types engineering drawing instruments and different grades of pencil used in drafting and drafting of free hand lettering.*				K_1,K_2,K_4
	CO2	*Study & sketching of different types of dimensioning methods and scaling.*				K_2,K_3
	CO3	*Study & sketching of orthographic and isometric projection with the help of mini drafter.*				K_2,K_3,K_4,K_5
	CO4	*Study & sketching of sectioning techniques used in engineering field and an over view of Common Symbols and Conventions used in civil & electrical engineering.*				K_2,K_3
	CO5	*Introduction to AutoCAD and operational instructions of various commands in AutoCAD and making of at least 3sheets of various solid sections (cube, cuboids, cone, sphere etc.) using AutoCAD.*				K_3,K_5,K_6
UNIT – I	**Introduction of Engineering Drawing**					**No. of sheets:03**
Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards. Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments. Free hand lettering (Alphabet and numerals) upper case (Capital Letter), single stroke, vertical and inclined at 75-degree, series of 5mm of free hand lettering of height 25 mm in the ratio of 7:4.						**CO1**
UNIT – II	**Dimensioning Technique& Scales**					**No. of sheets: 03**
Necessity of dimensioning, method and principles of dimensioning, dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, Scales –their needs and importance, type of scales, definition of R.F. and length of scale, drawing of plain and diagonal scales.						**CO2**
UNIT – III	**Orthographic & Isometric Projection**					**No. of sheets: 10**
Theory of orthographic projections, Projection of Points in different quadrant, Projection of Straight Line parallel, perpendicular & inclined to any one of the reference planes, Projection of Plane – Different lamina like rectangular, triangular and circle, parallel and perpendicular to the plane, orthographic projection of different objects, fundamentals of isometric projections, isometric views of combination of regular solids like cylinder, cone, cube and prism. To make projections, Top view, Front view and Side view of various types of Solids.						**CO3**

UNIT – IV	Symbols used in engineering	No. of sheets: 02
Civil Engineering sanitary fitting symbols, Electrical fitting symbols for domestic interior installations.		CO4
*UNIT – V	Introduction to CAD software	No. of sheets: 02
Basic introduction of CAD software (AutoCAD) and operational instructions of various commands in AutoCAD. At least two sheets on AutoCAD of cube, cone, pyramid, sphere and combination of above solids.		CO5
*Auto CAD drawing will be evaluated internally by Formative Assessment marks and not by Summative Assessment paper.		
Total no of sheets making: 20		
Reference Books:		

Reference Books:

1. *A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi*
2. *Engineering Drawing by PS Gill; SK Kataria& Sons, New Delhi*
3. *Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House Pvt. Ltd., Anand*
4. *Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar*
5. *Engineering Drawing I by DK Goel, GBD Publication.*

(Common to all Diploma Courses)						
Semester: I				**Course Category Code: ES**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DES122	**WORKSHOPPRACTICE–I**		**0**	**0**	**8**	**2**
Prerequisite	*At the end of this course, the students will be able to:*					**Bloom's Level**
Course Outcome	**CO1**	*Classify rocks and identify particular type of stones.*				K_1,K_2,K_4
	CO2	*Classify different types of bricks and BLOCKS.*				K_2,K_3,K_5
	CO3	*Perform laboratory tests of cement to determine properties of cement.*				K_3,K_4,K_5
	CO4	*Identify types of defects of timber*				$K_5,K_3,$
	CO5	*Select paints/varnishes for various types of surfacesIdentify and use different types of metals/alloys*				$K_3,,K_6$

UNIT – I	**CARPENTRY SHOP**	**Contact Hours: 08**
General Shop Talk, Name and use of raw materials used in carpentry shop: wood & alternative materials, Names, uses, care and maintenance of hand tools such as different types of Saws-Clamp, Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools and materials used in carpentry shop by segregating as cutting tools, supporting tools, holding tools ,measuring tools etc., Specification of tools used in carpentry shop., Different types of Timbers, their properties, uses &defects., Seasoning of wood, Practice , Practices for Basic Carpentry Work, Sawing practice using different types of saws, Assembling jackplane—Planning practice including sharpening of jack plane cutter, Chiseling practice using different types of chisels including sharpening of chisel, Makingofdifferenttypesofwoodenpinandfixingmethods.Markingmeasuringandinspectionofjobs. Job Practice Job1 Marking, sawing, planning and chiseling and their practice Job II Half Lap Joint(cross, LorT or T–anyone) Job III Mortise and Tenon joint (T-Joint) Job IV Dove tail Joint (Lapor Bridle Joint) DemonstrationofjobshowinguseofRipSaw,BowsawandTe nonsaw,methodofsharpeningvarious saws.		**CO1**

UNIT – II	**PAINTING AND POLISHING SHOP**	**Contact Hours: 08**
Introduction of paints, varnishes, Reason for surface preparation, Advantages of Painting, other method of surface coating. Electroplating etc Job Practice		
Job 1: To prepare a wooden surface for painting apply primer on one side and to paint the same side. To prepare french polish for wooden surface and polish the other side.		**CO2**
Job II: To prepare metal surface for painting, apply primer and paint the same. Job III: To prepare a metal surface for spray painting, first spray primer and paint the same by spray painting gun and compressor system.		

UNIT – III	**ELECTRICALSHOP**	**Contact Hours: 08**
Study, demonstration and identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, fuses, cleats, clamps and allied items, tools and accessories. Study of electrical safety measures and protective devices. JobI Identification of phase, Neutral and Earth wires for connection to domestic electrical appliances and their connections to three pin plugs. Job II Carrying out house wiring circuits using fuse, switches, sockets, ceiling rose etc. in batten		**CO3**

or P.V.C. casing-caping.
Study of common electrical appliances such as auto electric iron, electric kettle, ceiling/table fan, desert cooler etc.
Introduction to the construction of lead acid battery and its working.
Job III
Installation of battery and connecting two or three batteries in series and parallel.
Introduction to battery charger and its functioning.
Job IV
Charging a battery and testing with hydrometer and cell tester

UNIT – IV	WELDINGSHOP	Contact Hours: 08
Introduction and importance of welding as compared to other material joining processes. Specifications and type of welding machines, classification and coding of electrodes, welding parameters, welding joints and welding positions. Materials to be welded, safety precautions. Job Practice Job I Practice of striking arc (Minimum 4 beads on 100 mm long M.S. flat). Job II Practice of depositing beads on plate at different current levels. (Minimum 4 beads on M.S. plate at four setting of current level). Job III Preparation of lap joint using arc welding process. Job IV Preparation of T-joint using gas welding or arc welding		CO4

UNIT – V	PLUMBING SHOP	Contact Hours: 08
Use of personal protective equipment's, safety precautions while working and cleaning of shop. Introduction and demonstration of tools, equipment and machines used in plumbing shop. Introduction of various pipes and pipe fittings of elbow, nipple, socket, union etc. Job Practice Job 1: Preparation of job using elbow, bend and nipple Job II: Preparation of job using Union, Tap, Plug and Socket. Job III: Threading practice on pipe with die		CO5

Lecture Hours : 30	Tutorials Hours :10	Total : 40

Reference Books:

6. *E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.*
7. *Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.*
8. *P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson Education.*
9. *Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg, 2018.*

(Common to all Diploma Courses)						
Semester : II				**Course Category Code : BS**		
Course Code	**Course**		**Period / Week**			**Credit**
		L	**T**	**P**		**C**
DBS201	**APPLIED MATHEMATICS-II**	3	1	0		4
Prerequisite	*At the end of this course, the students will be able to:*					**Bloom's Level**
Course Outcome	**CO1**	*Calculate simple integration by methods of integration.*				K_2, K_5
	CO2	*Evaluate the area under curves, surface by using definite integrals.*				K_1, K_5
	CO3	*Solve the engineering problems with numerical methods .*				K_3, K_5
	CO4	*Explain the function of the system components including Processor, Motherboard and Input-output devices.*				K_1, K_4
	CO5	*Understand the geometric shapes used in engineering problems by co-ordinate geometry.*				K_3, K_4, K_5

UNIT – I	**Integral Calculus - I**	**Contact Hours : 16**
(i) Methods of Indefinite Integration : (ii) Integration by substitution. (iii) Integration by rational functions. (iv) Integration by partial function. (v) Integration by parts.		**CO1**
UNIT – II	**Integral Calculus - II**	**Contact Hours : 12**
Meaning and properties of definite integrals, Evaluation of definite integrals. Simposns 1/3rd and Simposns3/8th rule and Trapezoidal Rule : their application in simple cases.		**CO2**
UNIT – III	**Numerical solutions**	**Contact Hours : 08**
Numerical solutions of algebraic equations; Bisections method, Regula Falsi method, Newton-Raphson's method (without proof), Numerical solutions of simultaneous equations; Gauss elimination method (without proof).		**CO3**
UNIT – IV	**Co-ordinate Geometry (2 Dimension)**	**Contact Hours : 08**
Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.		**CO4**
UNIT – V	**Co-ordinate Geometry (3 Dimension)**	**Contact Hours : 08**
Straight lines and planes in space. Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line (without proof).		**CO5**

Lecture Hours : 39		**Tutorials Hours :13**	**Total : 52**

Reference Books:

1. *Applied Mathematics-II by Ajay Kumar ,Jai Prakash Nath Publication Merrut.*
2. *Applied Mathematics-II by H.R. Luthera, Bharat Bharati Publication Merrut*
3. *Applied Mathematics-II by Kailash Sinha , BBP Publication,Merrut*

(Common to all Diploma Courses)						
Semester : II				**Course Category Code : BS**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DBS202	**Applied Physics**		**2**	**1**	**0**	**3**
Prerequisite	*At the end of this course, the students will be able to:*					**Bloom's Level**
Course Outcome	**CO1**	*Understanding the concept of measurement of physical quantity and units*				K_2
	CO2	*State and explain Newton's first law of motion,* *Identify the give example of (types of) forces,* *Compare and contrast speed, velocity and acceleration.*				$K_1, K4, K_2,$
	CO3	*Understand the concept of work and how to calculate the work done by force.* *Understand the concept of the net work done on an object and how that relates to a change in speed of the object.* *Understand the concept of power .*				K_2, K_3
	CO4	*In this unit on matter, students learn to differentiate physical and chemical changes in matter. They also learn that matter is made up of small particles called atoms and molecules.*				K_2, K_4
	CO5	*Ability to understand the basic concepts of thermodynamics such as temperature, pressure, system, properties, process, state, cycle and equilibrium.*				$K_2,, K_5$
UNIT – I	**Unit and Dimensions**					**Contact Hours : 09**
1.1 Need of Measurement in engineering and science, unit of a physical quantities - fundamental and derived units, systems of units (FPS, CGS and SI units) 1.2 Dimensions and dimensional formulae of physical quantities. 1.3 Principle of homogeneity of dimensions 1.4 Limitation of dimensional analysis 1.5 Accuracy and precision of instruments, rules for representing significant figures in calculation.						**CO1**
UNIT – II	**Force and Motion**					**Contact Hours : 09**
2.1 Scalar and vector quantities – examples, representation of vector, types of vectors 2.2 Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product. 2.3 Resolution of Vectors. 2.4 Force, Momentum, Statement and Derivation of Conservation of linear momentum, Its applications such as recoil of gun. 2.5 Circular motion (Uniform and Non-uniform), definition of angular displacement, Angular velocity, angular acceleration, frequency, time period. 2.6 Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical) 2.7 Central force, Expression and Applications of Centripetal and centrifugal forces.						**CO2**
UNIT – III	**Work, Power and Energy**					**Contact Hours : 11**
3.1 Work: and its units, examples of zero work, positive work and negative work, Conservative and non-conservative force. 3.2 Friction: modern concept, types, laws of limiting friction, Coefficient of friction 3.3 Work done in moving an object on horizontal and inclined plane for rough and plane surfaces with its applications 3.4 Energy and its units: Kinetic energy and potential energy with examples and their derivation, work energy theorem. 3.6 Power and its units, calculation of power in numerical problems.						**CO3**

UNIT – IV	Properties of Matter	Contact Hours : 09
4.1 Elasticity: definition of stress and strain, different types of modulii of elasticity, Hooke's law, significance of stress strain curve. 4.2 Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute Pressure. 4.3 Surface tension: concept, its units, angle of contact. 4.4 Viscosity and coefficient of viscosity: Terminal velocity, Stokes's law and effect of temperature on viscosity, application in hydraulic systems. 4.5 Concept of fluid motion, stream line and turbulent flow, Equation of continuity, Bernoulli's Theorem and their applications.		CO4

UNIT – V	Heat and Thermodynamic	Contact Hours : 09
5.1 Difference between heat and temperature. 5.2 Modes of transfer of heat (Conduction, convection and radiation with examples). 5.3 Different scales of temperature and their relationship. 5.4 Isothermal and Adibatic process. 5.5 Zeroth, First and second law of thermodynamics, Heat engine (concept Only), Carnot cycle.		CO5

Lecture Hours : 38	Tutorials Hours :10	Total : 52

Reference Books:
1   Text Book of Physics for Class XI (Part-I, Part-II); N.C.E.R.T., Delhi 2   Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi 3   Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi 4   Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi 5   Engineering Physics by DK Bhhatacharya & Poonam Tandan; Oxford University Press, New Delhi

(Common to all Diploma Courses)					
Semester : II			**Course Category Code : BS**		
Course Code	**Course**		**Period / Week**		**Credit**
			L	**T**	**P**	**C**
DBS223	**APPLIED PHYSICS LAB**		**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:*					
Course Outcome	**CO1**	*Students are able to calculate the radius of thick wire and can also measure the value of g in their lab.*				
	CO2	*Able to determine the atmospheric pressure and various component of force.*				
	CO3	*To understand the concept of conservation of energy and able to calculate the moment of inertia of a flywheel.*				
	CO4	*Able to calculate the viscosity of different type of material.*				
	CO5	*Able to find the value of force constant of spring.*				
List of experiment						
CO1	**1-**To find radius of wire and its volume and the maximum permissible error in these quantities by using both vernier calipers and screw gauge. 2.To find the value of acceleration due to gravity on the surface of earth by using a simple pendulum					
CO2	3To determine the atmospheric pressure at a place using Fortin's Barometer 4To verify parallelogram law of forces					
CO3	5To study conservation of energy of a ball or cylinder rolling down an inclined plane 6 To find the Moment of Inertia of a flywheel about its axis of rotation					
CO4	7To determine the viscosity of glycerin by Stoke's method					
CO5	8 To determine force constant of spring using Hooks law					

(Common to Mechanical & Civil Engineering)					
Semester : II			**Course Category Code : ES**		
Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DES204	**Applied Mechanics**	**3**	**0**	**0**	**3**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	Interpret various types of units and their conversion from one to another.			K_2
	CO2	Analyze different types of forces acting on a body and draw free body diagrams.			K_4
	CO3	Study &Calculation of moments			K_3
	CO4	Calculate the co-efficient of friction for different types of surfaces.			K_3
	CO5	Determine the centroid /centre of gravity of plain and composite laminar and solid bodies.			K_3

UNIT – I	**Introduction**	**Contact Hours : 06**
Concept of engineering mechanics definition of mechanics, statics, dynamics, Definition of Applied Mechanics Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another for density, force, pressure, work, power, velocity, acceleration Concept of rigid body,. Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines.		**CO1**

UNIT – II	**Laws of forces**	**Contact Hours : 10**
Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces, resolving a force into two rectangular components Lami's theorem (concept only) Type of Load, supports, Beams- analysis for simply supported, cantilever beams [Simple problems on above topics]		**CO 2**

UNIT – III	**Concept of moment**	**Contact Hours : 06**
Moment of a force and units of moment Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support) Parallel forces (like and unlike parallel force), Concept of couple, its properties and effects [Simple problems on the above topics]		**CO 3**

UNIT – IV	**Friction**	**Contact Hours : 06**
Definition and concept of friction, types of friction, force of friction Laws of static friction, coefficient of friction, angle of friction, angle of repose, cone of friction. Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane. Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force.		**CO 4**

UNIT – V	Centre of Gravity	Contact Hours : 08
Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies Determination of centroid of plain and composite lamina using moment method only, centroid of bodies with removed portion Determination of center of gravity of solid bodies – cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed.		CO 5

Lecture Hours : 36	Tutorials Hours :00	Total : 36

Reference Books:

1. A Text Book of Applied Mechanics by S Ramamurtham,Dhanpat Rai Publishing Co. Ltd.

2. A Text Book of Engineering Mechanics (Applied Mechanics) by RK Khurmi; S Chand and Co. Ltd., New Delhi.

3. A Text Book of Applied Mechanics by RK Rajput; Laxmi Publications, New Delhi..

4. Text Book of Applied Mechanics by Birinder Singh, Kaption Publishing House, New Delhi.

5. Test Book of Applied Mechanics by AK Upadhya, SK Kataria& Sons, New Delhi

(Common to Mechanical & Civil Engineering)				
Semester : II			**Course Category Code : ES**	

(Common to Mechanical & Civil Engineering)				

| **Semester : II** ||| **Course Category Code : ES** ||

Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DES225	**APPLIED MECHANICS LAB**	0	0	2	1

Prerequisite	*At the end of this course, the students will be able to:*		

Course Outcome	**CO 1**	Analyze different types of forces acting on a body	
	CO 2	Analyze reaction at the supports of a simply supported beam.	
	CO 3	Determine velocity ratio, mechanical advantage and efficiency of simple machines	
	CO 4	Determine the centroid/centre of gravity of plain and composite laminar and solid bodies.	
	CO 5	Determine velocity ratio, mechanical advantage and efficiency of simple machines	

List of experiment	
1	Verification of the polygon law of forces using gravesend apparatus.
2	To verify the reaction at the supports of a simply supported beam.
3	To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
4	a. To find out center of gravity of regular lamina. b. To find out center of gravity of irregular lamina.
5	To find the mechanical advantage, velocity ratio and efficiency of a screw jack.

(For Civil Engineering)					
Semester : II				**Course Category Code : ES**	
Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DES206	**FUNDAMENTAL OF MECHANICAL AND ELECTRICAL ENGINEERING**	**3**	**0**	**0**	**3**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO 1**	*Apply Thermodynamics Laws.* *Use of various energy sources.*			K_3
	CO 2	*Have an idea of loading on machine components* *Application of different types of bearings* *Principle of different lubrication systems*			K_3 , K_6
	CO 3	Determine voltage-current relationship in a DC circuit under specific physical conditions			K_1, K_3
	CO 4	*Verify Kirchhoff's Current and Voltage Laws in a dc circuit.* *Verify DC circuits (Thevenin and Norton Theorem)*			K_6
	CO 5	*Measure power and power factor in a single phase R-L-C Circuit and calculation of active and reactive powers in the circuit.*			K_3

UNIT – I	**Introduction**	**Contact Hours:08**
1. Thermal Engineering Sources of Energy Definition, Concept of thermodynamic system and surroundings, Closed system, Open system, Isolated system, Thermodynamics definition of work.Zeroth law of thermodynamics Basic ideas, conventional and nonconventional forms- Thermal, Hydel, Tidal, wind, Solar, Biomass and Nuclear and their uses.		**CO 1**

UNIT – II	**Machine Components**	**Contact Hours:10**

Brief idea of loading on machine components.
    (i)   Pins, Cottor and Knuckle Joints.
    (ii)   Keys, Key ways and spline on the shaft
    (iii)   Bearings-Plane, Roller bearing, Journal bearing, thrust bearing,Special type bearings and their applications.
    (iv)   Clutches and Springs
           Compression, Tension, Helical springs,Torsion springs, Leaf and Laminated springs. Their use and material.
    (v)   Lubrication
           Different lubrication system for lubricating the components of machines
		CO 2

UNIT – III	**Overview of DC Circuits**	**Contact Hours:10**
Definition of basic terms, such as current, EMF, Potential Difference (PD); Ohm's Law and its limitations; Factors affecting resistors and capacitors; simple problems on series and parallel combinations of resistors with their wattage considerations. Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits. Star – Delta connections and their conversion.		**CO 3**

UNIT – IV	**DC Circuit Theorems**	**Contact Hours:08**

Thevenin's theorem, Norton's theorem, application of network theorems in solving D.C. circuit problems.		**CO 4**
UNIT – V	**AC Fundamentals**	**Contact Hours:10**
Concept of alternating quantities Difference between ac and dc Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value, form factor and peak factor. Representation of sinusoidal quantities by phasor diagrams. Equation of sinusoidal wave form for an alternating quantity and its derivation Effect of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.		**CO 5**
Lecture Hours: 46		**Total Hours: 46**

Reference Books:

1. Textbook of Concrete Technology 2nd Edition, by Kulkarni, PD Ghosh TK and Phull, YR; New Age International(P) Ltd, Publishers, New Delhi

2. Materials of Construction by Ghosh; Tata McGraw Hill Publishing Co. Ltd., New Delhi

3. Civil Engineering Materials by TTTI, Chandigarh; Tata McGraw Hill Publishing Co. Ltd., New Delhi

4. Concrete Technology by J.Jha and Sinha; Khanna Publishers, Delhi

5. Basic Electrical Engineering by Asfaque Husain, Jain Book Depot, New Delhi

6. Basic Electrical Engineering by JB Gupta; SK Kataria and Sons, New Delhi.

 7.Basic Electrical Engineering by PS Dhogal, Tata McGraw-Hill Education Pvt Ltd., New Delhi.

	(For Civil Engineering)				
	Semester : II		**Course Category Code : ES**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
DES221	**FUNDAMENTAL OF MECHANICAL AND ELECTRICAL ENGINEERING LAB**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:*				
Course Outcome	**CO1**	*Identify different types of Pins and Cotter.*			
	CO2	*Have an idea of loading on machine components*			
	CO3	*Application of different types of bearings*			
	CO4	*Verify Kirchhoff's Current and Voltage Laws in a dc circuit.* *Verify DC circuits (Thevenin and Norton Theorem)*			
	CO5	*Measure power and power factor in a single phase R-L-C Circuit and calculation of active and reactive powers in the circuit.*			

LIST OF PRACTICALS

1. Study and Sketch of Pins and Cottor	**CO1**
2. Study and Sketch of Keys and Key ways	**CO2**
3. Study and sketch of Couplings and Clutches	**CO3**
4. Verification of Kirchhoff's Current and Voltage Laws in a dc circuit 5. Verification of dc circuits: a. Thevenin's theorem, b. Norton's theorem	**CO4**
6. Measurement of power and power factor in a single phase R-.L-.C. circuit and calculation of active and reactive powers in the circuit.	**CO5**

(For Civil Engineering)		
Semester : II		**Course Category Code : ES**

Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
DES230	**COMPUTER AIDED DRAWING**	**0**	**0**	**8**	**2**

Prerequisite	**At the end of this course, the students will be able to:**	
Course Outcome	**CO1**	*Know the advantages of using CAD in comparison with conventional method.*
	CO2	*Draw and interpret CAD drawings using drawing, editing and viewing in CAD software.*
	CO3	*Create 2D plans of building*
	CO4	*. Create 3 D views from given 2D plans*
	CO5	*A diploma holder is expected to prepare and interpret CAD Drawings.*

List of experiment	
CO1	**1-** Concept of AutoCAD, Tool bars in CAD software, coordinate system, snap, grid, and ortho mode (Absolute, Relative and Polar), setting of units and layout. **2-** Drawing commands – point, line, arc, circle, ellipse, Editing commands – scale, erase, copy, stretch, lengthen and explode.
CO2	**3-** Dimensioning and placing text in drawing area **4-** Sectioning and hatching , Inquiry for different parameters of drawing entity
CO3	**5** - Create layers within a drawing, Introduction to any part modeling software (ProE, Solid works, AutoCAD, Unigraphic , Catia etc.) Introduction to Sketcher: Sketch Entities, Sketch Tools, Blocks, Dimensioning **6-** Specifying Geometrical Dimensioning & tolerance (GD&T) parameters in drawing
CO4	**7-** 2-D Plan of a 2-Room Building, Isometric Drawing by CAD using any part modeling Software (3D) (one sheet)
CO5	**8-** Isometric Drawing by CAD using any part modeling Software (3D) (one sheet), Drawings of following on computer: - Cone - Cylinder - Cube - Spring - Isometric view of objects, Part Modeling Tool, Creating reference planes , Creating Extrude features Creating Revolve Creating Swept features , Creating Loft features , Creating Reference - points, axis, coordinates , Creating curves ,Creating Fillet features , Inserting Hole types , Creating Chamfer ,Creating Shell ,Creating Rib , Environment& Utilities - Working with views and manipulating views.

(For Civil Engineering)					
Semester : II			**Course Category Code : CS**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
DCS226	**Introduction to IT System Lab**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:*				
Course Outcome	**CO 1**	*Identify Computer Hardware Components, Network Components and Peripherals.*			
	CO 2	*Explain the role of an Operating System.*			
	CO 3	*Install System and Application Software.*			
	CO 4	*Explain the function of the system components including Processor, Motherboard and Input-output devices.*			
	CO 5	*Use Word Processing Software to prepare document*			

Introduction to IT System Lab	
1. Familiarization with Computer System and its peripheral devices 2. Familiarization with Operating System	**CO 1**
3. Practice of internal and external commands of DOS 4. Creation and Management (Rename, delete, search of file and folders)	**CO 2**
5. Installing and uninstalling of new software using control panel. 6. Installation of Operating Systems	**CO 3**
7 Changing System Date and Time. 8. User Account creation and its feature on Windows Operating System	**CO 4**
9. Internet browsing using browsers. 10. Using of Search Engine to get information from internet	**CO 5**