MODEL CURRICULUM

FOR

POST SSC PROGRAMME

IN

DIPLOMA IN CIVIL ENGINEERING 2011

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

7th Floor, Chandralok Building, Janpath

New Delhi – 110 001

Foreword

It is with great pleasure and honour that I write a forward for the Model scheme of instruction and syllabi for the Post SSC Engineering Diploma programmes prepared by the All India Board of Technician Education with **Prof. Ashok A. Ghatol** as its Chairman and other members. All India Council for Technical Education has the onerous responsibility for uniform development and qualitative growth of the Technical Education system and preparation of syllabi to maintain uniform standards throughout the county. In pursuance to clause 10 (2) of the AICTE Act 1987 AICTE has the objective of bringing about uniformity in the curriculum of Engineering. In that direction, the efforts of the All India Board of Technician Education has been quite commendable and praiseworthy. A painstaking effort was made by the Chairman, members of the Board and various working groups composed of experts from leading institutions in framing of the Instruction and Syllabi. The Board was ably assisted by the official of the Academics Bureau in successfully organizing the meetings making available necessary documents and follow up action on the minutes of the meetings.

Chairman

All India Council for Technical Education

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME: ELECTRONICS/MECHANICAL/CIVIL/COMPUTER/ELECTRICAL/CHEMICAL ENGG. GROUPS

COURSE CODE : EJ/EN/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/CD/EDEI/ CV/MH/FE/IU/MI

DURATION OF COURSE : 6 SEMESTERS

SEMESTER: FIRST **SCHEME : C**

BRANCH: Common for all branches **YEAR:I** **SEMISTER:I**

SR.NO.	SUBJECT	PERIODS			EVALUATION SCHEME						Credits
	THEORY	L	TU	PR	SESSIONSAL EXAM			ESE	PR #	TW @	
					TA	CT	Total				
1	Basic Physics	2	-	2	10	20	30	70	50	-	3
2	Basic Chemistry	2	-	2	10	20	30	70	50	-	3
3	Basic Mathematics	4	1	-	10	20	30	70	-	-	5
4	English	2	-	2	10	20	30	70	-	25	3
5	Engineering Graphics	2	-	4	-	-	-	-	-	50	4
6	Computer Fundamentals	1	-	4	-	-	-	-	50	25	3
7	Basic Workshop Practice (Group wise)	-	-	3	-	-	-	-	50	25	2
	Total	**13**	**1**	**17**	**40**	**80**	**120**	**280**	**200**	**125**	**23**

STUDENT CONTACT HOURS PER WEEK: **31 HRS**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

- External Assessment @ - Internal Assessment ESE - End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA - Teachers Assessment, L - Lecture, TU - Tutorial, PR - Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks : 725

Minimum passing under any head is 40%, i.e. 40% passing for Sessional, ESE, Oral, and TW Separately.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : ELECTRONICS/MECHANICAL/CIVIL/COMPUTER/ELECTRICAL/ CHEMICAL ENGG. GROUPS		
Course code: EJ/EN/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/ CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/CD/EDEI/ CV/MH/FE/IU/MI	**Semester : FIRST**	
Duration : 6 SEMESTERS	**Maximum Marks :**	
Teaching Scheme C	**Examination Scheme**	
Theory : 13 hrs/week	Mid Semester Exam:	Marks
Tutorial: 1 hrs/week	Assignment & Quiz:	Marks
Practical : 17 hrs/week	End Semester Exam:	Marks
Credit :- Nil		
Aim :- Nil		
Objective :-		
Pre-Requisite :- Nil		
Contents:- Nil		Hrs/week
Text Books:- Nil		
Reference books :- Nil		
Suggested List of Laboratory Experiments :- Nil		
Suggested List of Assignments/Tutorial :- Nil		

Name of the Course : **All Branches of Diploma in Engineering/ Technology. (Basic Physics)**			
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ ME/PG/PT/AE/CE/CS/CR/IF/EE/EP/CH/CT/PS/ CD/ED/EI/CV/MH/FE/IU		**Semester : First**	
Duration : 6 semester		**Maximum Marks : 150**	
Teaching Scheme C		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam:	30 Marks
Tutorial: - hrs/week		Assignment & Quiz:	70 Marks
Practical : 2 hrs/week		End Semester Exam:	50 Marks
Credit :- 3			

Aim :-

S.No	
1.	• To provide the basic concepts to resolve many engineering and technological problems.
2.	• To use various techniques for Measurement, Calculation, Control and Analysis of Engineering problems
3.	• To support in the enhancement of the methodologies adopted in the field of Engineering and technology.

Objective :-

S.No	Student will be able to:
1.	• Measure given dimensions by using appropriate instruments accurately. • Select proper measuring instrument on the basis of range, least count & precision required for measurement. • Select proper material for intended purpose by studying properties of materials.
2.	• Identify good & bad conductors of heat. • Analyze relation among pressure, volume and temperature of gas & to interpret the results • Identify the effect of interference between light waves.
3.	• Identify properties of laser light and photo electric effect for engineering applications. • Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

Pre-Requisite :-

S.No	
1.	• Students should have the knowledge of states of matter and their existence at different pressure and temperature.
2.	• Students should know the interaction of radiation (light) with matter.

Contents (Theory)			Hrs/week	Marks
Unit -1 **UNITS AND**	**1.1**	Need of Measurement in engineering and science, unit of a physical quantity, requirements of standard	**03**	**06**

MEASUREMENTS	unit, systems of units-CGS,MKS and SI, classification of physical quantities-Fundamental and Derived with their units **1.2** Accuracy, Precision of instruments, Errors in measurement, Estimation of errors-Absolute error, Relative error and percentage error, significant figures. (Simple Problems) **1.3** Basic Measuring instruments-Vernier Caliper, Micrometer screw gauge, inner & outer caliper thermometer, spherometer, ammeter, voltmeter with their least count, range, accuracy and precision. Standard reference surfaces used in engineering measurements- surface plate, angle plate, V- block, Engineer's square.		
Unit -2 **GENERAL PROPERTIES OF MATTER**	**2.1 Elasticity :** Deforming force, Restoring force, Elastic and plastic body, Stress and strain with their types, Hooke's law, Stress strain diagram, Young's modulus, Bulk modulus, Modulus of rigidity and relation between them(no derivation), (simple problems). (Simple problems) Stress strain diagrams of H.T. Steel, Cast iron, Aluminium and Concrete, Ultimate and breaking stress, Factor of safety. **2.2 Surface Tension:** Forces—cohesive and adhesive, , angle of contact, shape of liquid surface in a capillary tube, capillary action with examples, relation between surface tension , capillary rise and radius of capillary (no derivation)(simple problem),effect of impurity and temperature on surface tension. **2.3 Viscosity :** Velocity gradient, Newton's law of viscosity, coefficient of viscosity ,streamline and turbulent flow, critical velocity, Reynold's number,(simple problems), Stokes law and terminal velocity(no derivation) ,buoyant (up thrust) force, effect of temperature & adulteration on viscosity of liquid.	**03** **02** **02**	**06** **04** **04**
Unit – 3 **HEAT**	**3.1 Transmission of heat and expansion of solids** Three modes of transmission of heat-conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity (simple problems), expansion of solids-linear, aerial and cubical and relation between them. **3.2 Gas laws and specific heats of gases** Boyle's law, Charle's law, Gay Lussac's law, absolute	**02** **04**	**06** **08**

	temperature, Kelvin scale of temperature, general gas equation(no derivation)(simple problems),molar or universal gas constant, universal gas equation, standard or normal temperature and pressure (N.T.P.), specific heat of gases, relation between two specific heat (simple problems), thermodynamic variables, first law of thermodynamics (statement & equation only), isothermal, isobaric, isochoric & adiabatic processes (difference among these processes and equations of state) (simple problems).		
Unit – 4 **LIGHT**	**4.1 Properties of light** Reflection and, refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction) **4.2 Wave theory of light & Interference** Newton's corpuscles theory of light, Huygen's wave theory, wave front, Types of wave front-spherical, cylindrical and plane Huygen's principle of propagation of wave front, Principle of superposition of waves, Interference of light, constructive and destructive interference, Young's experiment. Analytical treatment of interference, conditions for stationary interference pattern. **4.3 Laser** Light amplification by stimulated emission of radiation, properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, He-Ne laser- construction & working, recording and reconstructing of hologram by using He-Ne laser.	**03** **04** **04**	**06** **08** **08**
Unit – 5 **MODERN PHYSICS**	**5.1 Photo electricity** Plank's hypothesis, properties of photons, photo electric effect, laws and characteristics of photoelectric effect, Einstein's photoelectric equation,(simple problems), construction and working of photoelectric cell, applications of photoelectric cell **5.2 X-rays** Production of X-rays, types of X-ray spectra-continuous and characteristics, X-ray wavelength (simple problems), properties of X-rays, applications of X-rays-engineering, medicine and scientific research work.	**03** **03**	**08** **06**
	Total	**33**	**70**

Practical :-

S.No	**Skills to be developed**
1.	**1) Intellectual skills-** ▪ Proper selection of measuring instruments on the basis of range, least

	count, precision and accuracy required for measurement. ▪ Analyze properties of matter & their use for the selection of material. ▪ To verify the principles, laws, using given instruments under different conditions. ▪ To read and interpret the graph. ▪ To interpret the results from observations and calculations. ▪ To use these results for parallel problems.
2.	**2) Motor skills-** ▪ Proper handling of instruments. ▪ Measuring physical quantities accurately. ▪ To observe the phenomenon and to list the observations in proper tabular form. ▪ To adopt proper procedure while performing the experiment. ▪ To plot the graphs.

Text Books:- Nil

Reference books :-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
V. Rajendran	Physics-I		Tata McGraw- Hill raw-Hill publication, New Delhi
Arthur Beiser	Applied physics		Tata McGraw- Hill raw-Hill publication, New Delhi
by R.K.Gaur and S.L.Gupta	Engineering Physics		Dhanpat Rai Publication, New Delhi.
Resnick and Halliday.	Physics		--

Suggested List of Laboratory Experiments :-

S.No	Laboratory Experiments(Any ten experiments to be performed)
1	1. Use of vernier calipers for the measurement of dimensions of given object.
2	2. Use of micrometer screw gauge for the measurement of dimensions of given object
3	3. Determine the Young's modulus of material of wire using Searle's apparatus.
4	4. To observe rise in water level through capillaries of different bores.
5	5. Determine coefficient of viscosity of given oil using Stoke's Method.
6	6. Verification of Boyle's law.
7	7. Measurement of unknown temperature using thermocouple.
8	8. Determine the coefficient of linear expansion of given material of rod using Pullinger's apparatus.
9	9. To observe the divergence of laser light with respect to distance.
10	10. Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : All Branches of Diploma in Engineering and Technology (Basic Chemistry).			
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE / ME/PG/PT/AE/ CE/CS/CR/ CO/CM/IF/EE/EP/ CH /CT/PS/CD/ ED/EI/CV/MH/FE/IU		**Semester : First**	
Duration : 6 semesters		**Maximum Marks :150**	
Teaching Scheme C		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 50 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			

Aim :-

S.No	
1.	• Students should understand the analysis of materials, their composition and their characteristics which is important to design the innovative smart materials which are eco-friendly
2.	• To design new solutions and to resolve the problems related to pollution and environment.
3.	• The structure and properties of materials used in modern technology

Objective :-

S.No	
1.	• To draw the atomic structure of different elements. • To represent the formation of molecules schematically.
2.	• To describe the mechanism of electrolysis. • To identify the properties of metals & alloys related to engineering applications.
3.	• To identify the properties of non metallic materials, related to engineering applications. • To compare the effects of pollutants on environments & to suggest preventive measures & safety.

Pre-Requisite :-

S.No	
	• Students should have an idea about the materials used in the past and at present in the field of Engineering and the problems related to their uses.
1.	• Students should know the problems related to pollution and its effect in the field of engineering.
2.	• They should have an idea of formation of atoms, molecules, formation of bonds, process of ionisation, electrical conductivity through metals and electrolytes and their laws.

Contents		Hrs/ week	Marks
Unit -1	**Atomic Structure** Definition of Atom, Fundamental Particles of Atom – their Mass,	05	12

	Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape & Distinction between Orbits & Orbitals, Hund's Rule, Filling Up of the Orbitals by Aufbau's Principles (till Atomic no. 30), Pauli's exclusion principle Valency – Definition, types (Electrovalency & Covalency), Distinction, Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, $CaCl_2$, MgO, $AlCl_3$, CO_2, H_2O, Cl_2, NH_3, C_2H_4, N_2, C_2H_2.		
Unit -2	**Electrochemistry** Atom, Ion, Definition Ionisation & Electrolytic Dissociation, Arrhenius Theory of Ionisation, Significance of the Terms Involved in Electrolysis. Such as Conductors, Insulators or Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes, Current Density, Temperature, Mechanism of Electrolysis – Primary & Secondary Reactions at Cathode & Anode, Electrochemical Series for Cations & Anions, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaOH solution & fused NaCl, Faraday's first & second law of Electrolysis & Numericals, Electrochemical Cells & Batteries, Definition, Types (Primary & Secondary Cells), e.g. Construction, Working & Applications of Dry Cell / Laclanche Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & electrotyping Conductivity of Electrolyte – Ohms Law, Definition & Units of Specific Conductivity, Equivalent Conductivity, specific resistance	06	14
Unit -3	**Metals & Alloys** **Metals** Occurrence of Metals, Definition Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties, Processing of Ore, Stages of Extraction of Metals from its Ores in Detail i.e. Concentration, Reduction, refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. **Mks:10** **Alloys** Definition of Alloy, Purposes of Making alloy Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous, examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbitt Metal. **Mks: 08**	08	16
Unit -4	**Non Metallic Materials** **Plastics** Definition of Plastic, Formation of Plastic by Addition &	04	10

	Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermosoftening & Thermosetting Plastic, with Definition, Distinction & e.g., Compounding of Plastics – Resins, Fillers, Plasticizers, Accelerators, Pigments, Engineering Applications of Plastic based on their Properties. **Mks: 04** **Rubber** Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, & e.g., Distinction Between Natural & Synthetic Rubber. **Mks: 04** **Thermal Insulating Materials** Definition, Characteristics & Applications of Glass Wool, Thermocole, Asbestos, Cork. **Mks: 04**		
Unit – 5	**Environmental Effects (Awareness Level)** Introduction, Definition, Causes of Pollution, Types of Pollution, Such as Air & Water Pollution. **Mks: 04** **Air Pollution** Definition, Types of Air Pollutions their Sources & Effects, Such as Gases, Particulates, Deforestation, Radio Active Gases, Control of Air Pollution, Air Pollution Due to Internal Combustion Engine & Its Control Methods, Causes & Effects of Ozone Depletion & Green House Effects**.** **Mks: 08** **Water Pollution** Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, BOD, COD, Biomedical Waste & E – Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities. **Mks: 08**	09	18
	Total	**32**	**70**

Practical :-	
S.No	
1.	**Intellectual Skills:** 1. Analyze given solution

	2. Interpret the results
2.	**Motor Skills** : 1. Observe Chemical Reactions 2. Measure the quantities Accurately 3. Handle the apparatus carefully
3.	**List of Experiments:** **01 – 07** Qualitative Analysis of **Seven Solutions,** Containing One Basic & One Acidic Radical Listed below **Basic Radicals:** Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K^{+}, NH_4^{+}. **Acidic Radicals:** Cl^{-}, Br^{-}, I^{-}, CO_3^{-2}, SO_4^{-2}, NO_3^{-}. **06** To Determine E.C.E. of Cu by Using $CuSO_4$ Solution & Copper Electrode **07** To Determine the % of Fe in the Given Ferrous Alloy by $KMnO_4$ Method. **08** To Prepare a Chart Showing Application of Metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co. **09** To Prepare Phenol Formaldehyde Resin (Bakelite) **10** To Determine Carbon Monoxide Content in Emission from Petrol Vehicle. **11** To Determine Dissolved Oxygen in a Water Sample.

Text Books:- Nil

Reference books :-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Jain & Jain	Engineering Chemistry		Dhanpat Rai and Sons
S. S. Dara	Engineering Chemistry		S. Chand Publication
B. K. Sharma	Industrial Chemistry		Goel Publication
S. S. Dara	Environmental Chemistry & Pollution Control		S. Chand Publication

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : All Branches of Diploma in Engineering and Technology (Basic Mathematics)		
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/ CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/CD/ED/EI/CV /MH/FE/IU	**Semester : First**	
Duration :6 semesters	**Maximum Marks :100**	
Teaching Scheme C	**Examination Scheme**	
Theory : 4 hrs/week	Mid Semester Exam: Marks	30
Tutorial: 1 hrs/week	Assignment & Quiz: Marks	--
Practical : - hrs/week	End Semester Exam: Marks	70
Credit :- 5		

Aim :-

S.No	
1.	• Developing the mathematical approach for solving engineering and technological problems.
2.	• The use of knowledge and understanding of mathematics in engineering context.
3.	• The importance of geometry in real life , Structural engineering and shapes of rigid or flexible.

Objective :-

S.No	
1.	• This subject helps the students to develop logical thinking, which is useful in comprehending the principles of all other subjects.
2.	• Analytical and systematic approach towards any problem is developed through learning of this subject.
3.	• Mathematics being a versatile subject can be used at every stage of human life.

Pre-Requisite :-

S.No	
1.	Students should have an idea regarding basic laws in trigonometry, factorization, coordination geometry, determinants, vectors.

	Contents (Name of Topics)	Hrs/week	
Unit -1 Chapter No.	**ALGEBRA**	**01**	
	1.1 REVISION 1.1.1 Laws of Indices 1.1.2 Formula of factorization and expansion ((a^2-b^2), $(a+b)^2$ etc.) 1.1.3 Laws of logarithm with definition of Natural and Common logarithm.		**--**
	1.2 PARTIAL FRACTION	**04**	**07**

	Definition of polynomial fraction proper & improper fractions and definition of partial fractions. 1.2.2 To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. 1.2.3 To resolve improper fraction into partial fraction.		
	1.3 DETERMINANT AND MATRICES. **Determinant ---------- 4 Marks** Definition and expansion of determinants of order 2 and 3. 1.3.2 Cramer's rule to solve simultaneous equations in 2 and 3 unknowns. **Matrices---------- 11Marks** Definition of a matrix of order m X n and types of matrices. 1.3.4 Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. Transpose of a matrix. 1.3.6 Minor, cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method. Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.	**12**	**15**
	1.4 BINOMIAL THEOREM 1.4.1 Definition of factorial notation, definition of permutation and combinations with formula. 1.4.2 Binomial theorem for positive index. 1.4.3 General term. 1.4.4 Binomial theorem for negative index. 1.4.5 Approximate value (only formula)	**04**	**03**
Unit -2	**TRIGONOMETRY.**		
	2.1 REVISION 2.1.1 Measurement of an angle (degree and radian). Relation between degree and radian. 2.1.2 Trig ratios of 0^0, 30^0, 45^0 etc. 2.1.3 Fundamental identities.	**02**	**03**
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES (Questions based on numerical computations, which can also be done by calculators, need not be asked particularly for allied angles).	**08**	**07**
	2.3 FACTORIZATION AND DEFACTORIZATION FORMULAE	**04**	**03**
	2.4 INVERSE TRIGONOMETRIC RATIOS 2.4.1 Definition of inverse trigonometric, ratios, Principal values	**02**	**03**

	of inverse trigonometric ratios. 2.4.2 Relation between inverse trigonometric ratios.		
	2.5 PROPERTIES OF TRIANGLE 2.5.1 Sine, Cosine, Projection and tangent rules (without proof) 2.5.2 Simple problems.	**02**	**03**
Unit -3	**COORDINATE GEOMETRY**		
	3.1 POINT AND DISTANCES 3.1.1 Distance formula, Section formula, midpoint, centriod of triangle. 3.1.2 Area of triangle and condition of collinearity.	**04**	**03**
	3.2 STRAIGHT LINE 3.2.1 Slope and intercept of straight line. 3.2.2 Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. 3.2.3 Angle between two straight lines condition of parallel and perpendicular lines. Intersection of two lines. 3.2.5 Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	**06**	**09**
	3.3 CIRCLE 3.3.1 Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. 3.3.2 General equation of circle, its centre and radius.	**06**	**06**
Unit-4	**VECTORS**		
	4.1 Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) 4.2 Dot (Scalar) product with properties. 4.3 Vector (Cross) product with properties.	**04**	04
	4.4 **Applications** 4.4.1 Workdone and moment of force about a point & line	**04**	04
	TOTAL	64	**70**

Text Books:- Nil

Reference books :-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. P. Deshpande	Mathematics for polytechnic		Pune Vidyarthi Griha
S. L. Loney	Trigonometry		S. Chand Publication
H. S. Hall & S. R. Knight	Higher Algebra		Metric edition, Book Palace, New Delhi

Frc.G. Valles	College Algebra		Charotar Publication
Ayres	Matrices		Schuam series, McGraw hill
B. S. Grewal	Higher Engineering Mathematics		Khanna publications New Dehli
S. S. Sastry	Engineering Mathematics		Prentice Hall of India

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :-

S.No	**Topic on which tutorial is to be conducted**
1	Partial fractions
2	Determinants
3	Matrices
4	Solution of simultaneous equation by Matrix inversion method.
5	Binomial theorem
6	Trigonometry- fundamental identities-revision only
7	Trigonometry-allied, compound and multiple angles
8	Trigonometry-factorization and defactorization formulae.
9	Trigonometry-inverse trigonometric ratios.
10	Point and distances
11	Straight line
12	Circle.
13	Vectors
14	Vectors' applications

Note:
Maximum 5 questions are to be given in each tutorial, in which two 2 marks questions (based on basic concept and formulae with one/two step calculations) and three 4 marks questions are expected.

Name of the Course : All Branches of Diploma in Engineering and Technology (English).	
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ ME/PG/PT/AE/ CE/CS/CR/CO/CM/IF/ EE/EP/CH /CT/PS/CD/ED/EI/CV/MH/FE/I	**Semester : First**
Duration :6 semester	**Maximum Marks :125**
Teaching Scheme C	**Examination Scheme**
Theory : 2 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: --- hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 3	

Aim :-

S.No	
1.	• To increase the communication skills of a student.
2.	• Develop their ability to comprehend written and verbal English.
3.	• Improve their comprehension in English.

Objective :-

1. Comprehend the given passage
2. Answer correctly the questions on seen and unseen passages
3. Increase the vocabulary
4. Apply rules of grammar for correct writing

Pre-Requisite :-

S.No	
1.	• The perfection in speaking, reading and writing English.
2.	• Perfection in the basic grammar in English

Contents		Hrs/week	
Unit -1	**PART I: TEXT** • Vocabulary - Understanding meaning of new words from text • Comprehension – Responding to the questions from text • Identifying parts of speech	16	30
Unit -2	**PART II -Application of grammar** • Verbs • Tenses Do as directed (active /passive, Direct/indirect, affirmative/negative/assertive, question tag, remove too, use of article, preposition ,conjunctions, interjections, punctuation)	10	20
Unit — 3	**PART III - Paragraph writing** • Definition – Types of paragraphs	02	10

	• How to write a paragraph		
Unit — 4	**PART IV - Vocabulary building** • Word formation • Technical jargon • Use of synonyms /antonyms/Homonyms/paronyms • One word substitute	04	10
	Total	**32**	**70**

Text will consist of 10 articles/Lessons

The term work will consist of 6 assignments:
The assignments should be written in A4 size note books (100 pages ruled)

Practical :-

S.No	Skills to be developed for practical:
1.	**Intellectual Skills**: **1** Skills of speaking in correct English. **2** Searching information. **3** Reporting skills.
2.	**Motor Skills:** **1** Use of appropriate body language. **2** Use of mouth organs
3.	**List of Assignments:** **1** Building of Vocabulary — (3 Hours) (2 assignments) **a)** 25 words for each assignment from the glossary given in the text book at the end of each chapter **b)** Technical Jargons — (2 Hours) (1 assignment) Identify 10 technical words from the respective branches. Resource — (Encyclopedia/Subject Books) **2** Grammar (4 Hours) 2 assignments. **a)** Insert correct parts of speech in the sentences given by the teachers. (16 sentences—Two each, from the different parts of speech) **b)** Punctuate the sentences given by the teachers. (10 sentences) **3** Conversational skills: Role plays (8 hours) **a)** Students are going to perform the role on any 6 situations, by the teacher. **b)** Dialogue writing for the given situations. (2 assignments) **4** Write Paragraphs on given topics (6 hours) (2 assignments)

	a) Four types of paragraphs to be written in **two assignments** covering two types in one assignment. **5** News paper report writing (4hours) (2 assignments) **a)** Write any two events from the news paper as it is. **b)** Write any two events on the situations given by the teacher. **6** Errors in English (4 hours) (2 assignments) **a)** Find out the errors and rewrite the sentences given by the teacher. (20 sentences)

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher

Reference books :-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
David Green	Contemporary English grammar, structures and composition		Macmillan
R. C. Jain	English grammar and composition		Macmillan
Rodgers	Thesaurus		Oriental Longman
Oxford	Dictionary		Oxford University
Longman	Dictionary		Oriental Longman
Z. N. Patil et el	English for practical Purposes		Macmillan
Editor – Mukti Sanyal	English at Workplace		Macmillan

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : All Branches of Diploma in Engineering and Technology (Engineering Graphics)		
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE /ME/PG/PT/AE/ CE/CS/CR/ CO/CM/IF/EE/EP/ CH/CT/PS/CD/ED/EI/CV/MH/FE/IU	**Semester :** First	
Duration :6 semester	**Maximum Marks :50**	
Teaching Scheme C	**Examination Scheme**	
Theory : 2 hrs/week	Mid Semester Exam: -- Marks	
Tutorial: -- hrs/week	Assignment & Quiz: 50 Marks	
Practical : 4 hrs/week	End Semester Exam: -- Marks	
Credit :- 4		

Aim :-

S.No	
1.	• To develop the ideas, vision and its practical reality through engineering graphics.
2.	• Developing the approach of visualization, drafting, modeling and analysis.
3.	• To develop the concept and applicability of engineering graphics to the industry.

Objective :-

S.No	The student should be able to: -
1.	• Draw different engineering curves and know their applications.
2.	• Draw orthographic projections of different objects.
3.	• Visualize three dimensional objects and draw Isometric Projections.
4.	• Use the techniques and able to interpret the drawing in Engineering field.
5.	• Use computer aided drafting packages.

Pre-Requisite :- Nil

S.No	
1.	• Perfection in geometry and sketching.
2.	• The students should be perfect in plotting the geometrical shapes and skill of reading the geometrical designs.

	Contents	Hrs/week
Unit -1	Drawing Instruments and their uses 1.1 Letters and numbers (single stroke vertical) 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Sheet layout. 1.5 Introduction to CAD (Basic draw and modify Command). 1.6 Geometrical constructions.	05

Unit -2	Engineering curves & Loci of Points. 1.2 To draw an ellipse by 2.1.1 Directrix and focus method 2.1.2 Arcs of circle method. 2.1.3 Concentric circles method. 2.2 To draw a parabola by: 2.2.1 Directrix and focus method 2.2.2 Rectangle method 2.3 To draw a hyperbola by: 2.3.1 Directrix and focus method 2.3.2 passing through given points with reference to asymptotes 2.3.3 Transverse Axis and focus method. 2.4 To draw involutes of circle & polygon (up to hexagon) 2.5 To draw a cycloid, 22picycloids, hypocycloid 2.6 To draw Helix & spiral. 2.7 Loci of Points: 2.7.1 Loci of points with given conditions and examples related to simple mechanisms.	09
Unit – 3	Orthographic projections 3.1 Introduction to Orthographic projections. 3.2 Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only) 3.3 Dimensioning technique as per SP-46	06
Unit – 4	Isometric projection 4.1 Isometric scale 4.2 Conversion of orthographic views into isometric View/projection(Simple objects) Projection of Straight Lines and Planes. (First Angle Projection Method only)	05
Unit – 5	5.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 5.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	07
	Total	**32**

Practical :-

List of Practical	**Skills to be developed**	
	Intellectual skills	**Motor Skills**

1.Introduction to graphics - (1 Sheet) Draw the following using CAD 1.1 Rectangle with given dimensions 1.2 Circle with given dimensions and hatch 1.3 Pentagon with line command 1.4 Hexagon with given dimensions 1. Draw one figure containing circle tangent, arc and dimensioning.	2. To develop ability to solve problems on geometrical constructions.	3. To develop ability to draw the geometrical constructions by computer.
2. Engineering curves & Loci of points - (1 Sheet) i) Three different curves are to be draw using any one method. ii) Draw locus of point on any one mechanism	1) To develop ability to differentiate between conic and curves. 2) To develop ability to identify the type of locus from the nature of surface and the position of generating circle. 3) Able to interpret the given mechanisms and locus of points.	1. To develop ability to draw different types of curves.
3. Orthographic projections - (Total 2 Sheets) Two objects by first angle projection method – (1 Sheet) Redraw the same sheet using CAD – (1 Sheet)	1) Develop ability to interpret first angle projection method. 2) To interpret and able to solve problem on orthographic projection of given object.	4. Develop ability to draw orthographic projections by first angle projection method
4. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale. (simple objects) - (1 sheet) Redraw the same sheet using CAD - (1 sheet)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	1. Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
5. **Projections of line and planes.** – (1 Sheet) Two problems on Projection of lines and two problems on Projection of Planes.	1) To develop ability to differentiate between true length and apparent length. 2) To interpret the position lines and plane with reference plane.	1) Able to draw Orthographic Projections of line and planes.

List of Practice Oriented Projects: -

1) To draw layout of visited Industry, College using CAD
2) To draw orthographic projection of given machine element using CAD

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
N. D. Bhatt	Engineering Drawing		Charotar Publishing House
K. Venugopal	Engineering Drawing and Graphics+ AutoCAD		New Age Publication
R. K. Dhawan	Engineering Drawing		S. Chand Co.
P. J. Shah	Engineering Drawing		---
K. R. Mohan	Engineering Graphics		Dhanpat Rai and Publication Co.

B) Video Cassettes / CD's

1. CD's prepared by MSBTE for Engineering Drawing

C) IS Code

SP – 46. Engineering Drawing practice for schools and colleges.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : All Branches of Diploma in Engineering and Technology (Computer Fundamentals).		
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/ EE/EP/CH/ CT /PS/ CD/ED/EI/CV/MH/FE/IU		**Semester : First**
Duration :6 semester		**Maximum Marks :75**
Teaching Scheme C		**Examination Scheme**
Theory : 1 hrs/week		Mid Semester Exam: -- Marks
Tutorial: - hrs/week		Assignment & Quiz: 75 Marks
Practical : 4 hrs/week		End Semester Exam: -- Marks
Credit :- 3		

Aim :-

S.No	To develop
1.	• The awareness of computer.
2.	• The interest of use of computer in the field of engineering and technology.
3.	• The perfection in new innovations and creations in Engineering and technology.

Objective :-

S.No	Students will be able to:
1.	• Understand a computer system that has hardware and software components, which controls and makes them useful.
2.	• Understand the operating system as the interface to the computer system.
3.	• Use the basic functions of an operating system.
4.	• Set the parameter required for effective use of hardware combined with and application software's
5.	• Compare major OS like Linux and MS-Windows
6.	• Use file mangers, word processors, spreadsheets, presentation software's and Internet
7.	• Have hands on experience on operating system and different application software
8.	• Use the Internet to send mail and surf the World Wide Web.

Pre-Requisite :- Nil

S.No	
1.	• Student should know the basic parts of computer and its primary operation.

	Contents	Hrs/week
Unit -1	**Fundamentals Of Computer** Introduction Components of PC	**3**

	The system Unit Front part of system Unit Back part of system Unit CPU Memory of computer Monitor Mouse, Keyboard, Disk, Printer, Scanner, Modem, Video, Sound cards, Speakers	
Unit -2	**Introduction To Windows 2000/Xp** Working with window Desktop Components of window Menu bar option Starting window Getting familiar with desktop Moving from one window to another Reverting windows to its previous size Opening task bar buttons into a windows Creating shortcut of program Quitting windows	**3**
Unit – 3	**GUI Based Editing, Spreadsheets, Tables & Presentation** Application Using MS Office 2000 & Open Office.Org Menus Opening of menus, Toolbars: standard toolbars, formatting toolbars & closing of menus Quitting Document, Editing & designing your document Spreadsheets Working & Manipulating data with Excel Changing the layout Working with simple graphs & Presentation Working With PowerPoint and Presentation	**3**
Unit – 4	**Introduction To Internet** What is Internet Equipment Required for Internet connection Sending &receiving Emails Browsing the WWW Creating own Email Account Internet chatting	**2**
Unit – 5	**Usage of Computer System in various Domains** Computer application in Offices, books publication, data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and research work, real-time, point of sale terminals, financial transaction terminals.	**2**

Unit – 6	**Information technology for benefits of community** Impact of computer on society Social responsibilities Applications of IT Impact of IT Ethics and information technology Future with information technology	**3**
	Total Hours	**16**

Practical's	
Sr. No	**List of Practical's**
1.	Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop
2.	The Windows 2000 accessories WordPad – editing an existing document Use of Paint – drawing tools The Calculator, Clock
3.	The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation Moving or copying files, Renaming, Deleting files ,and folders
4.	Printing Installing a printer driver Setting up a printer Default and installed printers Controlling print queues Viewing installed fonts
	The clipboard and 'drag and drop' Basic clipboard concepts Linking vs. embedding
5.	Moving through a Word document menu bar and drop down menus toolbars
6.	Entering text into a Word 2000 document, selection techniques Deleting text
7.	Font formatting keyboard shortcuts
8.	* Paragraph formatting Bullets and numbering
9.	* Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers
10.	Introducing tables and columns
11.	Printing within Word 2000 Print setup Printing options Print preview
12.	* Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter
13.	Creating and using macros in a document
14.	* Creating and opening workbooks Entering data

15.	Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook
16.	Formatting and customizing data
17.	Formulas, functions and named ranges
18.	Creating, manipulating & changing the chart type
19.	Printing, Page setup, Margins Sheet printing options, Printing a worksheet
20.	***** Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation
21.	Using the AutoContent wizard ,Starting the AutoContent wizard Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number
22.	***** Creating a simple text slide Selecting a slide layout Manipulating slide information within normal and outline view Formatting and proofing text Pictures and backgrounds drawing toolbar AutoShapes Using clipart Selecting objects Grouping and un-grouping objects The format painter
23.	***** Creating and running a slide show Navigating through a slide show Slide show transitions Slide show timings Animation effects
24.	***** Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window The on-line web tutorial Using hyper links Responding to an email link on a web page
25.	Searching the Internet Searching the web via Microsoft Internet Explorer Searching the Internet using Web Crawler Searching the Internet using Yahoo Commonly used search engines
26.	Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced

27.	* Using the Address Book Adding a new contact Creating a mailing group Addressing a message Finding an e-mail address
28.	Using electronic mail Starting Outlook Express Using the Outlook Express window Changing the window layout Reading file attachment Taking action on message-deleting, forwarding, replying
29.	* Email & newsgroups Creating and sending emails Attached files Receiving emails Locating and subscribing to newsgroups Posting a message to a newsgroup
30.	Chatting on internet Understating Microsoft chat environment Chat toolbar

Note : Term work will include printout of Exercises of practicals marked with asterisks (*)

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Vikas Gupta	Comdex Computer Course Kit	First	Dreamtech
Henry Lucas	Information Technology for management	7Th	Tata McGraw Hills
B.Ram	Computer Fundamentals Architecture and Organization	Revised 3rd	New Age International Publisher

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (Basic Workshop Practice (Civil)			
Course code: CE/CT/CR		**Semester : First**	
Duration :6 semesters		**Maximum Marks : 75**	
Teaching Scheme C		**Examination Scheme**	
Theory : - hrs/week		Mid Semester Exam: -- Marks	
Tutorial: - hrs/week		Assignment & Quiz: 75 Marks	
Practical : 3 hrs/week		End Semester Exam: -- Marks	
Credit :- 2			

Aim :-	
S.No	To develop
1.	• The skill in using the different tools and machine ant their proper choice at proper time.
2.	• The skill in shaping the given material as per given design.
3.	• The innovative ideas through practice and converting it into reality.

Objective :-	
S.No	At the end of this course, the student will able to
1.	• Know basic workshop processes. • Read and interpret job drawings. • Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments wood working and sheet metal shops.
2.	• Operate, control different machines and equipments. • Select proper welding rods and fluxes. • Inspect the job for specified dimensions
3.	• Produce jobs as per specified dimensions. • Adopt safety practices while working on various machines.

Pre-Requisite :-	
S.No	
1.	• Students should know the basic shops (sections) and their appropriate use.
2.	• The Students should know Engineering graphics and skill of measurements in it.

Contents		Hrs/week
	Details of Theory Contents	
Unit -1	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	03
Unit -2	**WELDING SHOP** 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod	04

	material Size of welding rod and work piece. 4. different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	
Unit – 3	**FITTING SHOP** 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	04
Unit – 4	**PLUMBING SHOP** 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different G.I. pipes, PVC pipes, flexible pipes used in practice. 4. G. I. pipes and PVC pipes fittings and accessories, Adhesive solvents- chemical action, Piping layout.	03
Unit – 5	**SHEET METAL SHOP** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	02
	Total	**16**
Skill to be developed:		
S.No.		
	Intellectual Skills: 1. Ability to read job drawing 2. Ability to identify and select proper material, tools, equipments and machine. 3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.	
	Motor Skills: 1. Ability to set tools, work piece, and machines for desired operations. 2. Ability to complete job as per job drawing in allotted time. 3. Ability to use safety equipment and follow safety procedures during operations. 4. Ability to inspect the job for confirming desired dimensions and shape. 5. Ability to acquire hands-on experience	
Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing. 2] The workshop diary shall be maintained by each student duly signed by		

instructor of respective shop

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher
• S.K. Hajara Chaudhary	• Workshop Technology	•	• Media Promotors and Publishers,New Delhi
• B.S. Raghuwanshi	• Workshop Technology	•	• Dhanpat Rai and sons, New Delhi
• R K Jain	• Production Technology	•	• Khanna Publishers, New Delhi
• H.S.Bawa	• Workshop Technology	•	• Tata McGraw Hill Publishers, New Delhi
• Kent's	• Mechanical Engineering Hand book	•	• John Wiley and Sons, New York
• Electronics Trade & technology			• Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021

- **Video Cassettes/ CDS**
  Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

Reference books :- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher

Suggested List of Laboratory Experiments :-

S.No	Details Of Practical Contents
1	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
2	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of

	broken parts with welding. • One simple job involving butt and lap joint.
3	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
4	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
5	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing , soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.
Suggested List of Assignments/Tutorial :- Nil	

Name of the Course : Electrical Engineering/ Electrical Power System (**Basic Workshop Practice (Electrical))**		
Course code: EE/EP		**Semester : First**
Duration :6 semesters		**Maximum Marks : 75**
Teaching Scheme C		**Examination Scheme**
Theory : - hrs/week		Mid Semester Exam: -- Marks
Tutorial: - hrs/week		Assignment & Quiz: 75 Marks
Practical : 3 hrs/week		End Semester Exam: -- Marks
Credit :- 2		

Aim :-	
S.No	To develop
1.	• The skill in using the different tools and machine ant their proper choice at proper time.
2.	• The skill in shaping the given material as per given design.
3.	• The innovative ideas through practice and converting it into reality.

Objective :-	
S.No	The student will be able to
1.	• Use the knowledge of sheet metal working and welding for preparing panels, switch boxes etc.
2.	• Use various drills for electrical wiring and installation
3.	• Make joints for various types of wirings such as casing capping, Batten wiring and mounting of accessories

Pre-Requisite :-	
S.No	
1.	• Students should know the basic shops (sections) and their appropriate use.
2.	• The Students should know Engineering graphics and skill of measurements in it.

	Contents	Hrs/week
Unit -1	**WELDING SHOP** : 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. Different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	
Unit -2	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories.	

	3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	
Unit - 3	**TURNING SHOP** 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Working Principle of Drilling machine, Tapping dies its use. 4. Drilling and Tapping 5. Turning: Plain, taper 6. Threading and Knurling 7. Safety precautions and safety equipments.	
Unit – 4	**PLUMBING SHOP** 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different types of PVC pipes, flexible pipes used in practice. 4. PVC pipes fittings and accessories, Adhesive solvents- chemical action, 5. Piping layout.	
	Total	
Practical:	Skills to be developed	
	1. Intellectual Skills: a) Ability to read job drawings. b) Ability to identify and select proper material, tools and equipments and machines. c) Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.	
	2. Motor Skills : a) Ability to set tools, work piece, and machines for desired operations. b) Ability to complete job as per job drawing in allotted time. c) Ability to use safety equipment and follow safety procedures during operations. d) Ability to inspect the job for confirming desired dimensions and shape. e) Ability to acquire hands-on experience.	
Sr. No	**DETAILS OF PRACTICAL CONTENTS**	

01	**WELDING SHOP** • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type), Kitchan Trolley, Centering Plate, supporting frames **Note:**1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.
02	**PLUMBING SHOP** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for PVC pipe. Preparing actual drawing and bill of material.
03	**SHEET METAL SHOP** • One composite job of Water-draining Channel, display boards, Panel Board, Switch Box, Glass Paneling items etc. Note:1]One job of standard size(Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.
04	**TURNING SHOP** Note:1] One job related to Plane and Taper turning, threading and knurling 2] One job related to Drilling and tapping 3] Batch size should be selected depending on volume of work. 4] Job allotted should comprise of 6-8 hours of actual working 5] Student shall calculate the cost of material and labor cost for their job from the drawing.
05	**Demonstration of power tools and practice of utility items.** • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Tools for Cutting and drilling,

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher

Reference books :-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.K. Hajara Chaudhary	Workshop Technology		Media Promotors and Publishers,New Delhi
B.S. Raghuwanshi	Workshop Technology		Dhanpat Rai and Sons, New Delhi
R K Jain	Production Technology		Khanna Publishers, New

			Delhi
H.S.Bawa	Workshop Technology		Tata McGraw Hill Publishers,New Delhi
-	Kent's Mechanical Engineering Hand book		John Wiley and Sons, New York
Video Cassettes / CDS • Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal.			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : Mechanical Engineering (Basic Workshop Practice (Mechanical & Chemical Group))	
Course code: ME/AE/PG/PT/CH/PS	**Semester :** First
Duration :6 semesters	**Maximum Marks : 75**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 75 Marks
Practical : 3 hrs/week	End Semester Exam: -- Marks
Credit :- 2	

Rationale: Mechanical and Chemical diploma technician is expected to know basic workshop practice like Wood working, Sheet metal. The students are required to identify, operate and control various machines. The students are required to select and use various tools and equipments related to Wood working and sheet metal processes.

Aim :-

S.No	
1.	• The skill in using the different tools and machine ant their proper choice at proper time.
2.	• The skill in shaping the given material as per given design.
3.	• The innovative ideas through practice and converting it into reality.

Objective :-

S.No	The student will able to
1.	• Know basic workshop processes. • Read and interpret job drawing. • Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
2.	• Operate, control different machines and equipments. • Inspect the job for specified dimensions
3.	• Produce jobs as per specified dimensions. • Adopt safety practices while working on various machines

Pre-Requisite :-

S.No	
1.	• Students should know the basic shops (sections) and their appropriate use.
2.	• The Students should know Engineering graphics and skill of measurements in it.

	Contents (Details Of Theory Contents)	Hrs/week
Unit -1	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	

Unit -2	**WELDING SHOP** : 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	
Unit - 3	**FITTING SHOP**: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	
Unit – 4	**PLUMBING SHOP**: 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different G.I. pipes, PVC pipes, flexible pipes used in practice. 4. G. I. pipes and PVC pipes fittings and accessories, Adhesive solvents-chemical action, Piping layout.	
Unit – 5	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	
	Total	
Skill to be developed:		
	Intellectual Skills: 1. Ability to read job drawing 2. Ability to identify and select proper material, tools, equipments and machine. 3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.	
	Motor Skills: 1. Ability to set tools, work piece, and machines for desired operations. 2. Ability to complete job as per job drawing in allotted time.	

	3. Ability to use safety equipment and follow safety procedures during operations. 4. Ability to inspect the job for confirming desired dimensions and shape. 5. Ability to acquire hands-on experience.

Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

Sr.No.	Details Of Practical Contents
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
02	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint.
03	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools. • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
04	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
05	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.K. Hajara Chaudhary-	Workshop Technology		-Media Promoters and Publishers, New Delhi

B.S. Raghuwanshi-	Workshop Technology-		Dhanpat Rai and sons, New Delhi
R K Jain-	Production Technology-		Khanna Publishers, New Delhi
H.S.Bawa- -	Workshop Technology		Tata McGraw Hill Publishers,New Delhi
Kent's	Mechanical Engineering Hand book-		John Wiley and Sons, New York

Video Cassettes/ CDS

- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021
- Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Electronics Engineering Group (Basic Workshop Practice (Electronics Group))			
Course code: ET/EJ/EN/EX/IE/IS/IC/DE/MU/EV		**Semester : First**	
Duration :6 semesters		**Maximum Marks : 75**	
Teaching Scheme C		**Examination Scheme**	
Theory : - hrs/week		Mid Semester Exam: -- Marks	
Tutorial: - hrs/week		Assignment & Quiz: 75 Marks	
Practical : 3 hrs/week		End Semester Exam: -- Marks	
Credit :- 2			

Aim :-

S.No	
1.	• The skill in using the different tools and machine ant their proper choice at proper time.
2.	• The skill in shaping the given material as per given design.
3.	• The innovative ideas through practice and converting it into reality.

Rational:-

S.No	
	Electronics diploma technician is expected to know basic workshop practice like Wood working, Sheet metal and Fitting. The students are required to identify, operate and control various machines. The students are required to select and use various tools and equipments related to Wood working and sheet metal processes

Objective :-

S.No	
1.	• Read and interpret the drawing.
2.	• Draw sketch for given job.
3.	• Use manufacturers Catalog to prepare estimation of material required.
4.	• Use specification tables.
5.	• Decide Sequence of procedure.

Pre-Requisite :-

S.No	
1.	• Students should know the basic shops (sections) and their appropriate use.
2.	• The Students should know Engineering graphics and skill of measurements in it.

	Contents (Topic)	Hrs/week
Unit -1	**CARPENTRY SHOP** 1. Introduction.	

	2. Various types of woods. 3. Different types of tools, machines and accessories.	
Unit -2	**FITTING SHOP**: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	
Unit – 3	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	
	Total	

Skills to be developed:

Intellectual Skills:

1. Ability to read job drawing.
2. Ability to identify and select proper material, tools, equipments and machine.

Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

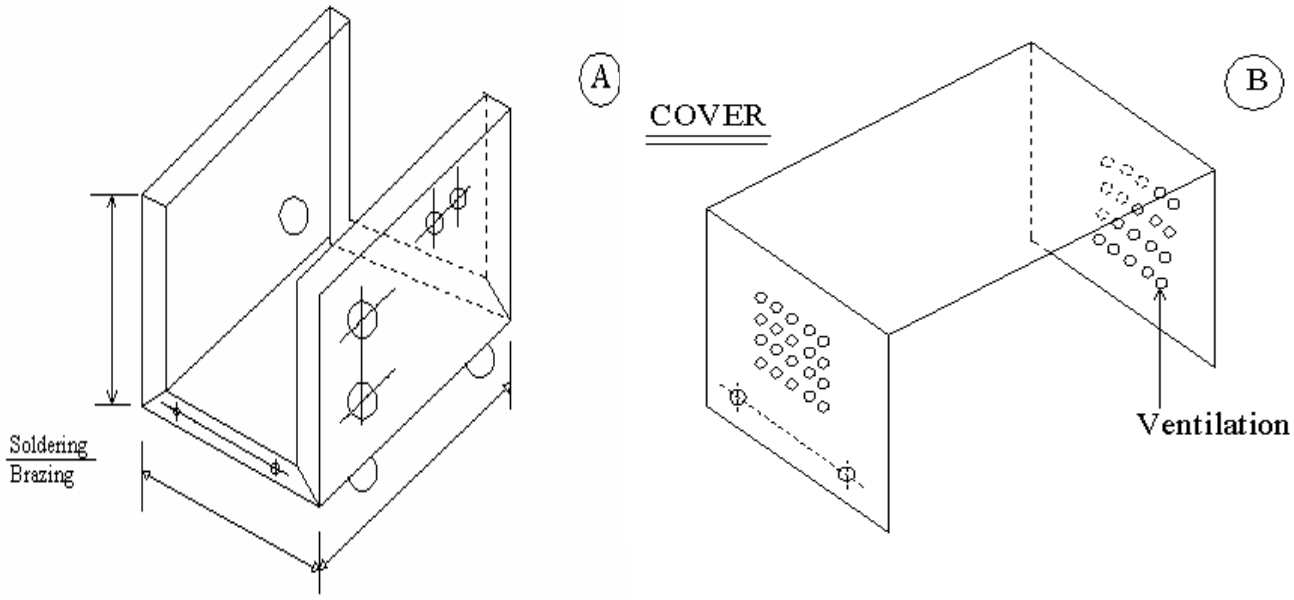
Note: Details of on example job for each shop is given below:

Sr.No.	Details Of Practical Contents
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like planning, marking, chiseling, grooving, turning of wood etc. • One simple job of preparing switch board or any other similar job
02	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools

	• Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of filing, drilling, tapping, cutting etc. Such as Transistor Heat Sink or any other similar job
03	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing , soldering and riveting. • One simple job involving sheet metal operations and soldering and 44iveting. Such as Battery Eliminator Box or any other similar job

S..SHEET METAL WORK : BATTERY ELIMINATOR BOX

CHASSIS



MATERIAL : C R C A sheet 22/24 SWG

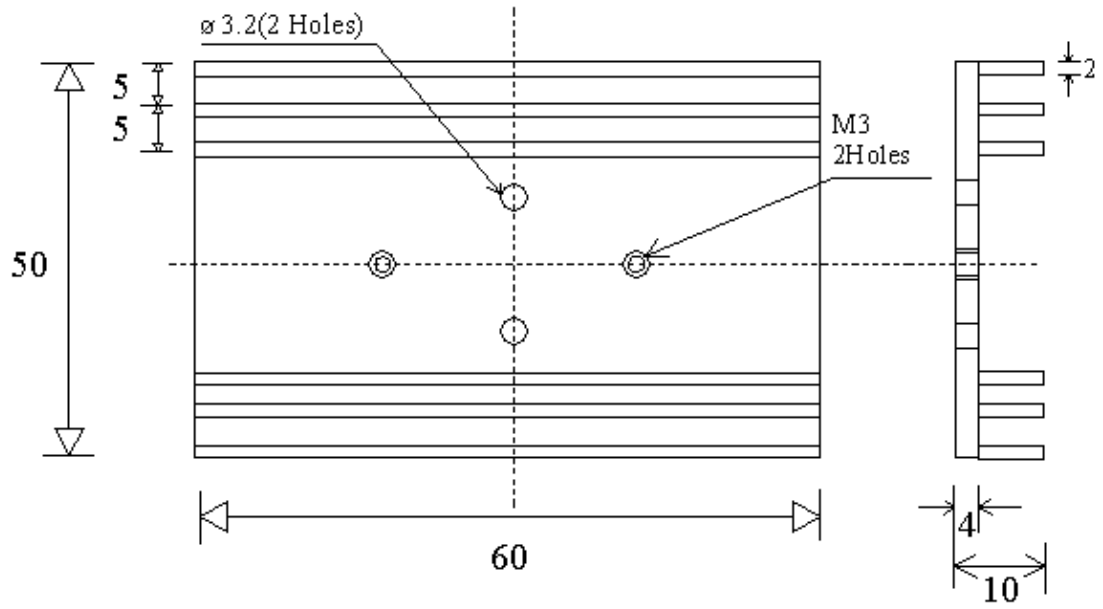
*** TOOLS & EQUIPMENT:**

1) Steel Rule
2) Try square
3) Scriber
4) Spring Divider / Center Punch
5) Files
6) Shearing Machine / ship

SEQUENCE OF OPERATIONS :

1) Development
2) Marking
3) Checking
4) Cutting
5) Debuting
6) Corner cutting

7) Drilling Machine	7) Drilling
8) Mallet	8) Punching
9) Hammer	9) Bending
10) Chisels	10) Topping
11) Hollow or solid punch	11) Numbering
12) Hand Drill M/c	12) Finishing
13) Drills in various sizes	13) Soldering / Brazing
14) Taps M3 & tap wrench	
15) Bending M/c	
16) Bench vice	
17) Use various stakes	
18) Number Punch	
19) Blow lamp	
20) Soldering iron	



T.. <u>Fitting Work</u>: Transistor Heat Sink

MAT : ALUMINIUM FLAT **SIZE : 50 X 65 X 10 mm**

NOTE : ALL DIMENSIONS ARE IN MM
TOLERANCE : ± 0.3 mm

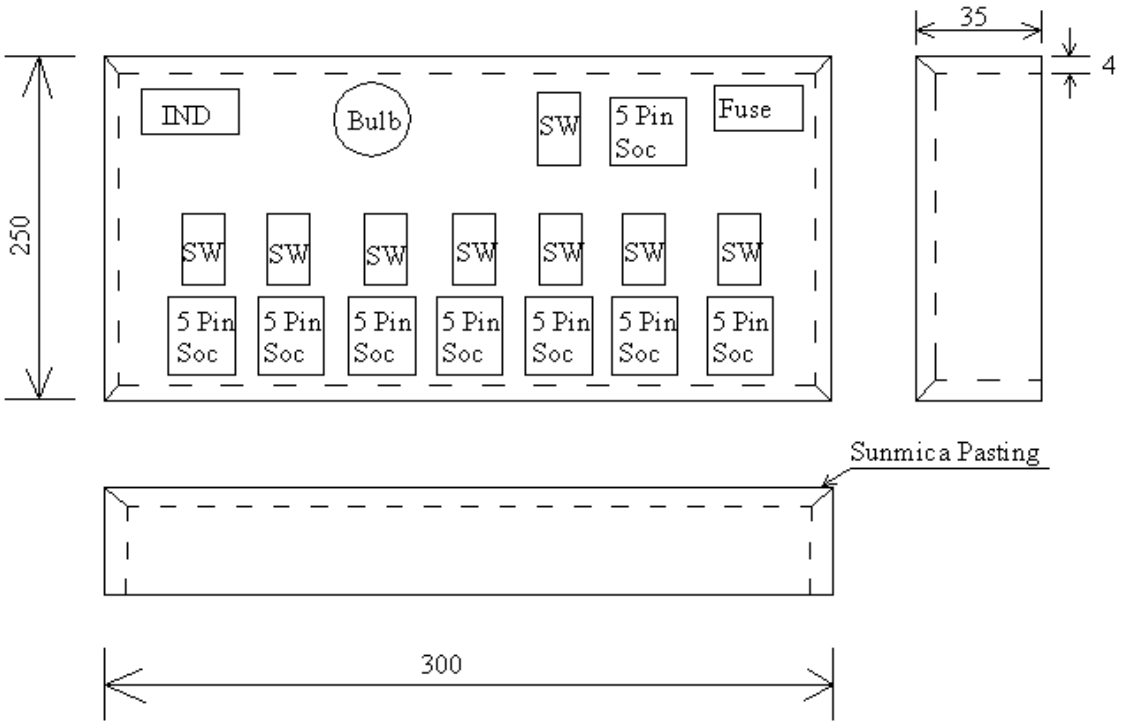
TOOLS & EQUIPMENT

1) Steel Rule / Vernier caliper
2) Try square
3) Scriber
4) Bench Vice
5) Surface plate / with magnet block
6) Files, flat, square, Niddles
7) Marking Gauge
8) Marking Block / Height Gauge
9) Hacksaw frame
10) Center Punch
11) Hammer
12) Chisels Hat
13) Table Drill Machine (Bench)
14) Drills
15) Tap & Tap wrenches
16) Number Punch

SEQUENCE OF OPERATIONS

1) Marking
2) Checking
3) Cutting
4) Square ness fitting (90')
5) Saw cutting
6) Chiseling / chipping
7) Slot filing
8) Drill Marking
9) Drilling
10) Tapping
11) Finishing
12) Numbering

U.. Carpentry Work: Switch Box



MATERIAL : TEAK WOOD AND SUNMICA, COMMERCIAL PLYWOOD

SIZE : 1) 40 X 260 X 10 mm 02 Nos.
2) 40 X 310 X 10 mm 02 Nos.
3) Sun-mica – 250 X 300 mm X 0.5 mm 01 Nos.
4) Plywood – 250 X 300 mm X 5 mm 01 Nos.
5) Fevicol
6) French Polish

TOOLS & EQUIPMENT

1) Steel Rule
2) Try square
3) Marking Gauge
4) Jack Plane
5) Hand Saw
6) Carpentry Vice

SEQUENCE OF OPERATIONS

1) Measuring
2) Planning
3) Marking
4) Cutting
5) Chiseling
6) Corner joint with nail

7) Wooden Mallet / Hammer similar 8) Firmer Chisel 9) Jig Saw Machine 10) Marfa file 11) Numbering	7) Sun mica Pasting (Fevicolor adhesive) 8) Marking for slot cutting 9) Jig Saw cutting 10) Numbering 11) Polishing

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.K. Hajara Chaudhary	Workshop Technology		Media Promotors and Publishers,New Delhi
B.S. Raghuwanshi	Workshop Technology		Dhanpat Rai and Sons, New Delhi
R K Jain	Production Technology		Khanna Publishers, New Delhi
H.S.Bawa	Workshop Technology		Tata McGraw Hill Publishers,New Delhi
--	Kent's Mechanical Engineering Hand book		John Wiley and Sons, New York

Video Cassettes/ CDS
Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Computer Engineering Group (Basic Workshop Practice (Computer))	
Course code: CO/CM/CD/IF	**Semester : First**
Duration :6 semesters	**Maximum Marks : 75**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 75 Marks
Practical : 3 hrs/week	End Semester Exam: -- Marks
Credit :- 2	

Aim :-

S.No	
1.	• The skill in using the different tools and machine ant their proper choice at proper time.
2.	• The skill in shaping the given material as per given design.
3.	• The innovative ideas through practice and converting it into reality.

Objective :-

S.No	After studying this subject, the student will be able to –
1.	• Understand basic components of computers. • Connect peripheral devices. • Clean various devices like Keyboard, mouse, printers, motherboard.
2.	• Park and eject the papers over the printer. • Write Data on the CD. • Scan documents and images.
3.	• Understand front panel and back panel connections. • Connection of Pen drives and DVD's

Pre-Requisite :-

S.No	
1.	• Students should know the basic shops (sections) and their appropriate use.
2.	• The Students should know Engineering graphics and skill of measurements in it.

Contents: Theory (Topic/Subtopic)		Hrs/week
Unit -1	**Introduction to Various External Peripheral Devices** 1.1 Different types of keyboards 1.2 Different types of Mouse 1.3 Different types of Scanners 1.4 Different types of Modems 1.5 Different types of printers 1.6 CD writers, speakers, CD read /write drive 1.7 Microphones, LCD projectors, Pen drives, DVD drive 1.8 Different types of Monitors	

Unit -2	**Introduction to Various Internal Devices** 2.1 Different makes of hard disks 2.2 Different types of network Interface cards 2.3 Different types of cables such as data cables, printer cables ,network cables ,power cables etc. 2.4 Different types of floppy disk 2.5 Motherboard connection 2.6 Graphics Card connection 2.7 Network Interface card connection	
Unit – 3	**Physical Connections of different peripheral Devices** 3.1 Connection of Mouse to different ports 3.2 Connection of keyboards to different ports 3.3 Connection of Monitors 3.4 Connection of Printers 3.5 Different switch settings of printers 3.6 Printer's self test 3.7 Jumper settings of hard disks 3.8 Attaching FDD,HDD and CD drives 3.9 Attaching Pen Drives and DVDs 3.10 Attaching Scanners	
	Total	

ASSIGNMENTS:

1. Observe all the peripheral devices available in the lab. Describe them in detail.
2. Demonstration of system configuration using CMOS setup.
3. Study of different ports such as serial, parallel, PS/2,NIC ports.
4. Assignment on how to write data on CDs
5. Observe different printer settings on different types of printers available in your lab. Write down the function of each switch.
6. Demonstration of printer's self test.
7. Assignment on connection of speakers and microphones.
8. Assignment on different types of cables in your lab.
9. Assignment on cleaning procedures of Mouse, Keyboard and motherboard.
10. Assignment on how to connect scanner and scan document and pictures on the scanner available in your lab.
11. Assignment on making jumper settings on hard disk.
12. Assignment on different types of cards such as graphics card, LAN card, multimedia cards etc.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Mr. David Stone & Alfred Poor	Troubleshooting Your PC		Prentice Hall India
David Groth	A+ Complete		BPB Publication
Balasubramaniam	Computer Installation and servicing		Tata McGraw Hill

Manuals	Reference Manuals of PC troubleshooting and maintenance		--
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME: MECHANICAL ENGINEERING

COURSE CODE : ME/PG/AE/PS/MH/FE/MI

DURATION OF COURSE : 6 SEMESTERS

SEMESTER: SECOND **SCHEME : C**

Sr.No.	SUBJECT	PERIODS			EVALUATION SCHEME							Credits
	THEORY	L	TU	P	SESSIONSAL EXAM			ESE	PR @	Oral #	TW @	
					TA	CT	Total					
1	Communication Skills	1	1	2	10	20	30	70	-	25	25	3
2	Engineering Mathematics	3	1	-	10	20	30	70	-	-	-	3
3	Applied Science (Mechanical & Plastic)	3	-	4	10	20	30	70	50	-	-	5
4	Engineering Mechanics	3	-	2	10	20	30	70	-	-	25	4
5	Workshop Drawing	1	-	4	10	20	30	70	-	-	50	3
6	Workshop Practice	-	-	4	-	-	-	-	-	-	50	2
7	Development of Life – I	1	-	2	-	-	-	-	-	25	25	3
8	Professional Practices-II	-		2					-		50	1
	Total	**12**	**2**	**20**	**50**	**100**	**150**	**350**	**50**	**50**	**225**	**24**

STUDENT CONTACT HOURS PER WEEK: **34 HRS**

HTEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

, External Assessment @ , Internal Assessment ESE – End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA – Teachers Assessment, L – Lecture, TU – Tutorial, P – Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks : 675

Minimum passing for sessional marks is 40%, and for theory subject 40%.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : All Branches of Diploma in Engineering & Technology (**Communication Skills**)			
Course code: CE/CR/CS/ME/EE/EP/EJ/EN/ET/EX/DE/IE/IS/IC/EV/MU/CO/CM/IF/CV/MH/FE/IU/CD/ED /EI		**Semester :** Second	
Duration :6 semester		**Maximum Marks : 150**	
Teaching Scheme C		**Examination Scheme**	
Theory : 1 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: 1 hrs/week		Assignment & Quiz: 50 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			

Aim :-

S.No	To develop
1.	The confidence in communication.
2.	The vocabulary.
3.	The way of expression in appropriate manner.

Objective :-

S.No	The Students will be able to:
1.	Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.
2.	Give a positive feedback in various situations, to use appropriate body language & to avoid barriers for effective communication.
3.	Write the various types of letters, reports and office drafting with the appropriate format.

Pre-Requisite :-

S.No	
1.	English grammar should be perfect.
2.	The thinking process to express the views must be fast.
3.	Perfect expression through body language

Contents (Theory)		Hrs/ week	Marks
	Name of the Topic		
Unit -1	**Introduction to communication:** 1.1 Definition , communication cycle/ process, 1.2 The elements of communication : sender- message – channel- Receiver –Feedback & Context. 1.3 Definition of communication process. 1.4 Stages in the process : defining the context, knowing	**02**	**08**

	the audience, designing the message, encoding , selecting proper channels, transmitting, receiving, decoding and giving feedback.		
Unit -2	**Types of communication** Formal- Informal, Verbal- Nonverbal, Vertical- horizontal- diagonal	**02**	**08**
Unit – 3	**Principals of effective communication :** 3.1 Definition of effective communication 3.2 Communication barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback.	**02**	**08**
Unit – 4	**Non verbal- graphic communication**: 4.1 Non- verbal codes: A- Kinesecs , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F –Chronemics , G –Artifacts **Marks: 08** 4.2 Aspects of body language **Marks: 06** 4.3 Interpreting visuals & illustrating with visuals like tables, charts & graphs. **Marks: 08**	**04**	**18**
Unit – 5	**Formal written skills :** 5.1 Office Drafting: Circular, Notice , and Memo. **Marks: 06** 5.2 Job Application with resume. **Marks: 08** 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. **Marks: 06** 5.4 Report writing: Accident report, fall in production, Progress / Investigative. **Marks: 08** 5.5 Defining & describing objects & giving Instructions. **Marks: 04**	**06**	**28**
	Total	**16**	**70**

Assignments:

1. Communication Cycle (With The Help Of Diagram)
2. Communication Situations (List Of 5 Communication situations stating the type of communication
3. Barriers That Hinder A Particular Communication Situation. (State the type of barrier, and how to overcome them).

4. Developing A Story Or A Paragraph For The Given Topic Sentence.(in a group of 5 – 6 students)
5. Describing Various Equipments.
6. Identifying The Various Sentences With Their Type Of Writing. (e.g. Scientific, legal, colloquial etc.)
7. Business Letters
8. Letters Of Suggestion
9. Comparative Time Table Of 2 Students
10. Description Of Two Different Persons.(seeing the picture)
11. Letter To The Librarian, Principal
12. Report Writing.

NOTE: The above assignments are suggested to be completed in the prescribed work-book.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Krushna Mohan, Meera Banerji	Developing Communication Skills		Macmillan
Joyeeta Bhattacharya	Communication Skills		Reliable Series
Jayakaran	Every ones guide to effective writing		Apple publishing

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : All Branches of Diploma in Engineering and Technology (Engineering Mathematics)	
Course code: CE/ME/IE/EJ/DE/ET/EX/EE/EP/MU/EV/IS/CO/ CM/IF /PG/PT/AE/CV/MH/FE/CD/ED/EI	**Semester : Second**
Duration : 6 Semesters	**Maximum Marks :100**
Teaching Scheme: C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: 1 hrs/week	Assignment & Quiz: -- Marks
Practical : - hrs/week	End Semester Exam: 70 Marks
Credit: 3	

Aim :-

S.No	
1.	Developing the mathematical approach for solving engineering and technological problems.
2.	The use of knowledge and understanding of mathematics in engineering context.
3.	The selection of method of manipulation at appropriate place and time.

Objective :-

S.No	The student will be able to
1.	Acquire knowledge of Mathematical terms, concepts, principles and different methods. Develop the ability to apply mathematical methods to solve technical problems, to execute management, plans with precision. Acquire sufficient mathematical techniques necessary for daily and practical problems.

Pre-Requisite :-

S.No	
1.	Awareness of rate determination in any changing states.
2.	The variation of any physical evidence from minimum to maximum.
3.	Awareness in trigonometry.

	Contents (Theory)	Hrs/week	Marks
Note: 1. Chapters 1 to 3 are common for all branches. 2. Chapter 4-For Civil, Electrical, Mechanical and Electronics groups 3. Chapter 5-For Computer Engineering Group.			
Unit -1	**Function and Limit** **1.1 Function** 1.1.1 Definitions of variable, constant, intervals such as open, closed, semi-open etc. 1.1.2 Definition of Function, value of a function and types of functions,	**04**	**06**

	Simple Examples. **1.2 Limits** 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	**08**	**12**
Unit -2	**Derivatives** **2.1** Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule) 2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.	**12**	**18**
Unit – 3	**Statistics And Probability** **3.1 Statistics** 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. **3.2 Probability** 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	**10** **04**	**12** **06**
NOTE: Chapter 4 is for Civil, Electrical, Electronics and Mechanical Groups			
Unit – 4	**4.1 Applications Of Derivative** 4.1.1 Geometrical meaning of Derivative, Equation of tangent and Normal 4.1.2 Rates and Motion 4.1.3 Maxima and minima 4.1.4 Radius of Curvature **4.2 Complex number** 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number(Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem (without proof) and simple problems. Euler's form of Circular functions, hyperbolic functions and relations between circular &hyperbolic functions	**06** **04**	**08** **08**
Note: Chapter 5 is for Computer Engineering Group Only			
05	**5.1 Numerical Solution of Algebraic Equations**	**06**	**08**

	5.1.1 Bisection method, Regula-Falsi method and Newton-Raphson method **5.2 Numerical Solution of Simultaneous Equations** 5.2.1 Gauss elimination method 5.2.2 Iterative methods-Gauss Seidal and Jacobi's method	**04**	**08**
	Total	**48**	**70**

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.P. Deshpande	Mathematics for Polytechnic		Pune Vidyarthi Griha Prakashan, Pune.
Robert T Smith	Calculus :Single Variable		Tata McGraw Hill
Dass H. K.	Advanced Engineering Mathematics		S. Chand Publication, New Delhi
S.C Gupta and Kapoor	Fundamentals of Mathematical Statistics		S. Chand Publications New Delhi.
B.S Grewal	Higher Engineering Mathematics		Khanna Publication, New Delhi
P. N. Wartikar	Applied mathematics		Pune Vidyarthi Griha Prakashan, Pune.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Tutorial

Note:

Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems to be solved.

Tutorial No.	Topic on which tutorial is to be conducted
1	Function
2	Limits
3	Derivative
4	Derivative
5	Derivative
6	Statistics
7	Statistics
8	Statistics
9	Probability
10	Probability
11	Application of derivative/numerical Solution of algebraic equations
12	Application of derivative/numerical Solution of algebraic equations
13	Complex Numbers/Numerical Solution of Simultaneous Equations

14	Complex Numbers/Numerical Solution of Simultaneous Equations

Name of the Course : Civil, Mechanical and Electrical Group (Engineering Mechanics)			
Course code: CE/CS/CR/ME/PT/PG/AE/EE/EP/MH/FE/CV		**Semester : Second**	
Duration :6 semesters		**Maximum Marks :125**	
Teaching Scheme C		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: -- hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 4			

Aim :-

S.No	
1.	To study and realize the action of force and its effect.
2.	To study and determine the extent of statics, kinematics and dynamics.
3.	

Objective :-

S.No	The students will able to:
1.	Resolve the forces.
2.	Find the resultant of given force system.
3.	Find the reactions of beam.
4.	Find the center of gravity of composite solids.
5.	Find M.A., V.R., Efficiency and establish law of machine

Pre-Requisite :-

S.No	Students should know
1.	basic laws of force and motion.
2.	The vector and its laws
3.	Trigonometry
4.	Mathematical manipulation process.

Contents (Theory**)**		Hrs/week	Marks
Unit -1	**Force** a. **Fundamentals: -** Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units. b. **Force**: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by	**12**	**15**

	Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility. c. **Resolution of a force:** Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components. d. **Moment of a force: -** Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and it's use, couple – definition, S.I. unit, measurement of a couple, properties of couple. e. **Force system: -** Definition, classification of force system according to plane and line of action f. **Composition of Forces**: - Definition, Resultant force, methods of composition of forces, I – Analytical method – (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution), II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.		
Unit -2	**Equilibrium:** 2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. 2.2 Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems. 2.3 Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. 2.4 Beams – Definition, Types of beams (cantilever, simply	**10**	**15**

	supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged , roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.		
Unit – 3	**Friction:** 3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 3.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down. 3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane. 3.4 Ladder friction, Wedge and block.	**08**	**15**
Unit – 4	**Centroid and Centre Of Gravity:** 4.1 **Centroid:** Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure. 4.2 **Center of gravity:** Definition, center of gravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.	**08**	**10**
Unit – 5	**Simple Machines:** 1) Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load. 5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. 5.3 Study of simple machines : Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack,	**10**	**15**

	pulleys : First, second and third system of pulleys, gear train, hoist mechanism.		
	Total	**48**	**70**

Contents (Practical)

Skills to be developed:

1 Intellectual Skill:	A. Calculate the forces on given structure B. Interpret the results
2 Motor Skills:	A. Handle the equipment carefully B. Draw graph

The term work consist of any five experiments from Group A,B and graphical solution in Group C

Group A:

2) Verify law of polygon of forces
3) Verify law of moments
4) Verification of Lami's theorem
5) Forces in members of a jib crane.
6) Comparison of coefficient of friction of various pair of surfaces and
7) determination of angle of repose
8) Equilibrium of parallel forces – simply supported beam reactions.
9) Experimental location of center of gravity of plane plate of uniform thickness.

Group B: To find MA, VR, Efficiency, Ideal Effort, Effort lost in friction for various loads and establish law of machine and calculate maximum efficiency.

Also check the reversibility of a machine (Any five):

1) Differential axle and wheel
2) Weston's differential pulley block
3) Geared pulley block
4) Single purchase crab
5) Double purchase crab
6) Worm and worm wheel
7) Two sheave and three sheave pulley block
8) Screw jack.

Group C: A 2 Size drawing sheets containing graphical solutions for –

1) Concurrent force system : Two problems
2) Parallel force system : Two problems
3) Reactions of a beam : Two problems

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Beer – Johnson	Engineering Mechanics		Tata McGraw Hill, Delhi
Basu	Engineering Mechanics		Tata McGraw Hill, Delhi
Joseph F. Shelley	Vector Mechanics for Engineers Vol. I & II		Tata McGraw Hill, Delhi

Reference books :- Nil
Suggested List of Laboratory Experiments :- Nil
Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Mechanical Engineering Group (Engineering Drawing)	
Course code: ME/PG/PT/AE/MH/FE	**Semester :** Second
Duration :6 semesters	**Maximum Marks :150**
Teaching Scheme C	**Examination Scheme**
Theory : 1 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 4 hrs/week	End Semester Exam: 70 Marks
Credit :- 3	

Aim :-

S.No	
1.	To develop the ideas, vision and its practical evidence through engineering graphics.
2.	Developing the approach of visualization, drafting, modeling and analysis.
3.	To develop the concept and applicability of engineering graphics to the industry.

Objective :-

S.No	The students shall be able to:
1.	Understand the basic concepts of engineering drawing.
2.	Visualize the objects.
3.	Draw different views in different positions of objects.
4.	Draw the different views of machine elements.

Pre-Requisite :-

S.No	
1.	Perfection in geometry and sketching.
2.	The students should be perfect in plotting the geometrical shapes and skill of reading the geometrical designs.

Contents (Theory)		Hrs/week	
Note: The teachers should use some of the practical hours for teaching basic Theory during practical's as required.			
Unit -1	**Sectional Views.** 1.1 Types of sections 1.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	**03**	**10**
Unit -2	**Missing Views.** 2.1 Draw missing view from the given Orthographic views - simple components (First Angle Projection Method only)	**01**	**05**
Unit – 3	**Isometric Projection** 3.1 Conversion of Orthographic Views into Isometric view/projection (Including rectangular, cylindrical objects, representation of slots on	**03**	**15**

	sloping as well as plane surfaces)		
Unit – 4	**Projections of Solids.** 4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.	**02**	**10**
Unit – 5	**Sections of Solids.** 5.1 Solids: -Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube. 5.2 Cone, Pyramid and Tetrahedron resting on their base on Horizontal Plane. 5.3 Prism, Cylinder: -a)Axis parallel to both the reference plane b) Resting on their base on HP. 5.4 Section plane inclined to one reference plane and perpendicular to other.	**03**	**10**
Unit – 6	**Developments of Surfaces.** Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	**02**	**10**
Unit – 7	**Free Hand Sketches** 7.1 Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts, keys and couplings.	**02**	**10**
	Total	**16**	**70**

Practical

List of Practical	**Skills to be Developed**	
	Intellectual skill	**Motor Skill**
1.Sectional View - (Total 2 Sheets) Two objects by First Angle Projection Method – (1 Sheet) Redraw the same sheet using CAD - (1 Sheet)	1)To interpret sectional views of given object.	Develop ability to draw sectional views Using computer.
2. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale - (1 sheet) Draw **one** sheet having two problems in each sheet using CAD – (Plot any one)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
S. Missing Views Two problems by first angle projection method - (1 Sheet)	1) To interpret the missing view from given orthographic views.	1) To develop ability to draw missing view from given orthographic views.
S. Projection of solids Two problems on two different	1) To interpret the different positions of solids with	1) To draw projections of different solids when axis is

solids, one by axis of solid inclined to HP and parallel to VP and another problem by axis of solid inclined to VP and parallel to HP. – (1 Sheet)	reference planes. 2) To develop ability to differentiate between true length of axis and apparent length of axis. 3) To develop ability to differentiate between true shape and apparent shape of solids.	inclined or perpendicular to one of the reference plane.
S. Section of solids Two problems on different solids. One problem, section plane inclined to HP and perpendicular to VP and in another problem, section plane inclined to VP and Perpendicular to HP. - (1 Sheet)	1) To differentiate between true shape and apparent shape of section. 2) To interpret the positions of section plane with reference planes.	1) To develop ability to draw sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes. 2) Ability to draw true shape of section.
S. Development of surfaces Any two problems on development of surfaces of different objects. - (1 Sheet)	**S.** Able to interpret the development of surfaces of different solids.	**S.** Ability to draw the development of surfaces of different objects in different shapes.
S. Free Hand Sketches Any six figures on different topics. - (1 Sheet)	**S.** To differentiate between scale drawing and free hand drawing. 2) To differentiate between various parts of machine like nuts, bolts, screws, different threads, couplings etc.	1) Develop ability to draw orthographic views of different machine elements.

List of Practice Oriented Projects:

To find out the total sheet metal required for a given object.

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher
N. D. Bhatt	Engineering Drawing		Charotkar Publishing House
R. K. Dhawan	Engineering Drawing		S. Chand Co.
P. J. Shah	Engineering Drawing		--
N. D. Bhatt	Machine Drawing		Charotkar Publishing House

K. Venugopal	Engineering Drawing and Graphics + AutoCAD		New Age Publication
K. R. Mohan	Engineering Graphics		Dhanpat Rai and Publication Co.
R. K. Dhawan	Machine Drawing		S. Chand Co.
Video Cassettes / CD's **IS Codes:** SP – 46. Engineering Drawing practice for schools and colleges.			
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : **Mechanical Engineering Group (Professional Practices-II)**			
Course code: ME/PG/PT/AE/ MH/FE		**Semester : Second**	
Duration :6 semester		**Maximum Marks :50**	
Teaching Scheme C		**Examination Scheme**	
Theory : - hrs/week		Mid Semester Exam: - Marks	
Tutorial: - hrs/week		Assignment & Quiz: 50 Marks	
Practical : 2 hrs/week		End Semester Exam: - Marks	
Credit :- 1			

Aim :-

S.No	
1.	To develop the awareness, skill and knowledge.
2.	To develop the moral towards application and vision towards observation .
3.	To develop the research attitude through visits, observation and interaction.

Objective :-

S.No	The Student will be able to:
1.	Acquire information from different sources. Prepare notes for given topic.
2.	Present given topic in a seminar. Interact with peers to share thoughts.
3.	Prepare a report on industrial visit, expert lecture.

Pre-Requisite :-

S.No	
1.	Student should be informed regarding his curriculum.

Contents:- Nil	Hrs/week

Text Books:- Nil

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Sr. No.	Activities	Hours

01	**Industrial Visits:** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to **any two** of the following : i) Nearby Petrol Pump.(fuel, oil, product specifications) ii) Automobile Service Station (Observation of Components / aggregates) iii) Engineering Workshop(Layout, Machines) iv) Dairy Plant / Water Treatment Plant	**10**
02	Lectures by Professional / Industrial Expert / Student Seminars based on information search to be organized from any THREE of the following areas : i) Pollution control. ii) Non destructive testing. iii) Acoustics. iv) Illumination / Lighting system. v) Fire Fighting / Safety Precautions and First aids. vi) Computer Networking and Security. vii) Topics related to Social Awareness such as – Traffic Control System, Career opportunities, Communication in Industry, Yoga Meditation, Aids awareness and health awareness.	**06**
03	Group Discussion : **The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are -** i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to mechanical engineering field.	**08**
04	Student Activities: The students in a group of 3 to 4 will perform **any one** of the following activities (others similar activities may be considered Activity : i) Collect and study IS code for Engineering Drawing.. ii) Collecting information from Market: Nomenclatures and specifications of engineering materials. iii) Specifications of Lubricants. iv) Draw orthographic projections of a given simple machine element using and CAD software	**08**
	Total	**32**

Name of the Course : All Branches of Diploma in Engineering and Technology (Development of Life Skills- I)			
Course code: CE/ME/IE/EJ/DE/ET/EX/EE/EP/CO/IF/IS/ CO/CM/IF/CV/MH/FE/IU/CD/ED/EI		**Semester :** SECOND	
Duration : 6 Semesters		**Maximum Marks :50**	
Teaching Scheme : C		**Examination Scheme**	
Theory : 1 hrs/week		Mid Semester Exam: - Marks	
Tutorial: - hrs/week		Assignment & Quiz: 50 Marks	
Practical : 2 hrs/week		End Semester Exam: - Marks	
Credit: 3			

Aim :-

S.No	
1.	To develop the personal and social approach.
2.	Development and building of life skill.

Objective :-

S.No	The students will be able to:
1.	Develop reading skills
2.	Use techniques of acquisition of information from various sources
3.	Draw the notes from the text for better learning.
4.	Apply the techniques of enhancing the memory power.
5.	Develop assertive skills.
6	Prepare report on industrial visit.
7.	Apply techniques of effective time management.
8	Set the goal for personal development.
9.	Enhance creativity skills.
10	Develop good habits to overcome stress.
11.	Face problems with confidence

Pre-Requisite :-

S.No	
1.	Best vocabulary.
2.	Presentation and expression through body language.

	Contents (Theory)	Hrs/week
Unit -1	Importance of DLS, Introduction to subject, importance in present context ,application	**01**
Unit -2	**Information Search**	**02**

	Information source –Primary, secondary, tertiary Print and non – print, documentary, Electronic Information center, Library , exhibition, Government Departments. Internet Information search – Process of searching, collection of data –questionnaire , taking Interview , observation method.	
Unit – 3	**Written communication** METHOD OF NOTE TAKING Report writing –Concept, types and format.	**01**
Unit – 4	**Self Analysis** Understanding self— Attitude, aptitude, assertiveness, self esteem, Confidence buildings. Concept of motivation.	**02**
Unit – 5	**Self Development** Stress Management –Concept, causes, effects , remedies to Avoid / minimize stress. Health Management – Importance, dietary guidelines and exercises. Time management- Importance, Process of time planning, Urgent Vs importance, Factors leading to time loss and ways to handle it ,Tips for effective time management. EMOTION-CONCEPT, TYPES, CONTROLLING, EMOTIONAL INTELLIGENCE. CREATIVITY-CONCEPT, FACTORS ENHANCING CREATIVITY. GOAL SETTING – CONCEPT, SETTING SMART GOAL.	**07**
Unit – 6	**Study habits** Ways to enhance memory and concentration. Developing reading skill. Organisation of knowledge, Model and methods of learning.	**03**
	Total	**16**

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Marshall Cooks	Adams Time management		Viva Books
E.H. Mc Grath , S.J.	Basic Managerial Skills for All		Pretice Hall of India, Pvt Ltd
Allen Pease	Body Language		Sudha Publications Pvt. Ltd.
Lowe and Phil	Creativity and problem solving		Kogan Page (I) P Ltd
Adair, J	Decision making & Problem Solving		Orient Longman
Bishop , Sue	Develop Your Assertiveness		Kogan Page India
Marion E Haynes	Make Every Minute		Kogan page India

	Count		
Pearson Education Asia	Organizational Behavior		Tata McGraw Hill
Michael Hatton (Canada – India Project)	Presentation Skills		ISTE New Delhi
--	Stress Management Through Yoga and Meditation		Sterling Publisher Pvt Ltd .
Richard Hale ,Peter Whilom	Target setting and Goal Achievement		Kogan page India
Chakravarty, Ajanta	Time management		Rupa and Company
Harding ham .A	Working in Teams		Orient Longman

Internet Assistance:

1) http://www.mindtools.com
2) http://www.stress.org
3) http://www.ethics.com
4) http://www.coopcomm.org/workbook.htm
5) http://www.mapfornonprofits.org/
6) http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7) http://eqi.org/
8) http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9) http://www.mapnp.org/library/ethics/ethxgde.htm
10) http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11) http://members.aol.com/nonverbal2/diction1.htm
12) http://www.thomasarmstron.com/multiple_intelligences.htm
13) http://snow.utoronto.ca/Learn2/modules.html
14) http://www.quickmba.com/strategy/swot/

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :-

S.No	The Term Work Will Consist Of Following Assignments.
1	Library search:- Visit your Institute's Library and enlist the books available on the topic given by your teacher. Prepare a bibliography consisting name of the author, title of the book, publication and place of publication.
2	Enlist the magazines, periodicals and journals being available in your library. Select any one of them and write down its content. **Choose a topic for presentation.**
3	Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.
4	Visit to any one place like historical/office/farms/development sites etc. and gather information through observation, print resources and interviewing the

	people.
5	Prepare your individual time table for a week – (b) List down your daily activities. (c) Decide priorities to be given according to the urgency and importance of the activities. (d) Find out your time wasters and mention the corrective measures.
6	Keep a diary for your individual indicating- planning of time, daily transactions, collection of good thoughts, important data, etc
7	Find out the causes of your stress that leads tension or frustration .Provide the ways to Avoid them or to reduce them.
8	Undergo the demonstration on yoga and meditation and practice it. Write your own views, feeling and experiences on it.
NOTE:- THESE ARE THE **SUGGESTED ASSIGNMENT** FOR GUIDE LINES TO THE SUBJECT TEACHER. HOWEVER THE SUBJECT TEACHERS CAN SELECT, DESIGN ANY ASSIGNMENT RELEVANT TO THE TOPIC, KEEPING IN MIND THE OBJECTIVES OF THIS SUBJECT.	

Name of the Course : Mechanical Engineering Group (Workshop Practice)	
Course code: ME/PT/AE/MH/FE	**Semester :** Second
Duration :6 semesters	**Maximum Marks :50**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 4 hrs/week	End Semester Exam: -- Marks
Credit :- 2	

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
--	--	04	--	--	--	--	--	50@	50

Rationale:

Mechanical diploma technician is expected to know basic workshop practice like, Gas Welding gas cutting. Fitting, Drilling, Tapping, plumbing and hot working processes. The students are required to identify operate and control various machines. The students are required to select and use various tools and equipments for welding, fitting, tapping drilling, plumbing and forging operations.

Aim :-

S.No	
1.	To test the manufacturing ideas and skill through practice.
2.	Development of new perspective towards manufacturing process.

Objective :-

S.No	The student will able to:
1.	• Know basic workshop processes. • Read and interpret job drawings. • Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments wood working and sheet metal shops.
2.	• Operate, control different machines and equipments. • Select proper welding rods and fluxes. • Inspect the job for specified dimensions • Produce jobs as per specified dimensions.
3.	• Adopt safety practices while working on various machines. • Measurement skills. • Fitting skills.

Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.
2] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

CONTENTS: Subject practical content as shown in the table below:

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawings.
2. Ability to identify and select proper material, tools and equipments and machines.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience

Pre-Requisite :-

S.No	
1.	Use and selection of manufacturing processes.
2.	Knowledge of tolls and machine.

Details of Practical Contents		Hrs/week
Unit -1	**CARPENTERY SHOP:** • Any one composite job from the following involving different joint, turning and planning, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. Note:1] One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	
Unit -2	**WELDING SHOP** • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type) **Note:** 1] One job of standard size (Saleable/marketable article shall be preferred)	

	2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 3	**SMITHY SHOP** • Demonstration of different forging tools and Power Hammer. • Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. • One job like hook peg, flat chisel or any hardware item. • **Note**: 1]One job of standard size (Saleable/marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 4	***PLUMBING SHOP*** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material. Note:1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	
Unit – 5	***SHEET METAL SHOP*** • One composite job from the following: Letter box, Trunk, Grain Container, Water-heater Container, Bucket, Waste Paper Basket, Cooler Tray, Water-draining Channel, etc. (including soldering and riveting) Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.	
Unit – 6	**Demonstration of power tools and practice of utility items.**	

	• Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. • Any other item as per the requirement of college/Deptt./ **(Note: Utility item are not to be assessed**	
	Total	64

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.K. Hajara Chaudhary	Workshop Technology		Media Promotors and Publishers,New Delhi
B.S. Raghuwanshi	Workshop Technology		Dhanpat Rai and Sons, New Delhi
R K Jain	Production Technology		Khanna Publishers, New Delhi
H.S.Bawa	Workshop Technology		Tata McGraw Hill Publishers,New Delhi
--	Kent's Mechanical Engineering Hand book		John Wiley and Sons, New York

Video Cassettes / CDS

- Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Mechanical Engineering Group (Applied Science (Mechanical))	
Course code: ME/PG/PT/AE/MH/FE	**Semester : Second**
Duration : 6 semester	**Maximum Marks :150**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: -- hrs/week	Assignment & Quiz: 50 Marks
Practical : 4 hrs/week	End Semester Exam: 70 Marks
Credit: 5	

Aim :-	
S.No	
1.	To provide the basic concepts to resolve many engineering and technological problems.
2.	To use various techniques for Measurement, Calculation, Control and Analysis of Engineering problems
3.	To support in the enhancement of the methodologies adopted in the field of Engineering and technology.
4	To develop the knowledge in the analysis of materials, their composition and their characteristics which is important to design the innovative smart materials which are eco-friendly.
5	To design new solutions and to resolve the problems related to pollution and environment.
6	The structure and properties of materials used in modern technology.

Objective :-	
S.No	The Student will be able to:
1.	Differentiate kinetic and kinematics and **S**olve the problems on kinematics and kinetics.
2.	Graphically represent rectilinear motion, S.H.M. and use for solving engineering problems.
3.	Use N.D.T. in quality assurance and saving of man power, machining, materials,
4.	Use principles of illumination for enhancing work efficiency
5.	Analyze variation of sound intensity with respect to distance.
6.	Identify different factors affecting acoustical planning of buildings
7.	Identify different factors affecting indoor lighting.

Pre-Requisite :-	
S.No	
1.	Students should have the knowledge of Laws of motion and force applied.
2.	Students should know the properties of sound waves and interaction of matter and radiation.
3.	Students should have an idea about the materials used in the past and at present in the field of Engineering and the problems related to their uses.
4.	Students should know the problems related to pollution and its effect in the field of engineering.
5.	They should have an idea of formation of atoms, molecules, formation of bonds, process of ionisation, electrical conductivity through metals and electrolytes and their laws.

Contents : Theory (Name of The Topic)		Hrs/week	
Unit -1 Unit -2	**1. Kinematics** **1.1 Rectilinear Motion** Equations of Motions-v=u+ a t, $s=ut+1/2at^2$, $V^2=u^2+2as$(only equation), Distance traveled by particle in n^{nt} second, Velocity Time Diagrams-uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity. **1.2 Angular Motion** Definition of angular displacement, angular velocity, angular acceleration, Relation between angular velocity and linear velocity, Three equations of circular motion (no derivation) angular distance traveled by particle in n^{nt} second (only equation), Definition of S.H.M. and S.H.M. as projection of uniform circular motion on any one diameter, Equation of S.H.M. and Graphical representation of displacement ,velocity, acceleration of particle in S.H.M. for S.H.M. starting from mean position and from extreme position. **4. Kinetics** **2.1** Definitions of momentum, impulse, impulsive force, Statements of Newton's laws of motion and with equations, Applications of laws of motion—Recoil of gun, Motion of two connected bodies by light inextensible string passing over smooth pulley, Motion of lift. **2.2 Work ,power ,Energy** Definition of work, power and energy, equations for P.E. K.E., Work energy principle, Representation of work by using graph, Work done by a torque(no derivation)	**14**	**15**
Unit -3	**3. Non –destructive testing of Materials.** **3.1 T**esting methods of materials –Destructive and Nondestructive, Advantages and Limitations of N.D.T., Names of N.D.T. Methods used in industries, Factors on Which selection of N.D.T. dependents, Study of Principle, Set up, Procedure, **3.2** Working, Advantages, limitations, Applications and Application code of following N.D.T. methods –Penetrant method, Magnetic particle method, Radiography, Ultrasonic, Thermography.	**05**	**10**
Unit -4	**Acoustics and Indoor Lighting of Buildings** **5. Acoustics** Weber and Fetcher's law, limit of intensity and loudness, echo, Reverberation and reverberation time (Sabine's formula) **,**Timbre (quality of sound), Pitch or Frequency of sound. Factors affecting Acoustical planning of auditorium–echo, reverberation, creep, focusing, standing wave, coefficient of absorption, sound insulation, noise pollution and the different ways of controlling these factors. **6. Indoor lighting** Definition of luminous intensity, intensity of illumination with their SI units, Inverse square law and Photometric equation, Bunsen's photometer— ray diagram, working and applications, Need of indoor	**05**	**10**

	lighting ,Indoor lighting schemes and Factors Affecting Indoor Lighting.		
	Total	**24**	**35**

Practical

Skills to be developed**:**

Intellectual skills:	▪ Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement. ▪ To verify the principles, laws, using given instruments under different conditions. ▪ To read and interpret the graph. ▪ To interpret the results from observations and calculations. ▪ To use these results for parallel problems.
Motor skills:	▪ Proper handling of instruments. ▪ Measuring physical quantities accurately. ▪ To observe the phenomenon and to list the observations in proper tabular form. ▪ To adopt proper procedure while performing the experiment. List of Practical:

1. To represent simple harmonic motion with the help of vertical oscillation of spring and to determine spring constant (K) (Stiffness Constant)

2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity.

3. To determine the velocity of sound by using resonance tube

4. To compare luminous intensities of two luminous bodies by using Bunsen's photometer.

7. To calculate coefficient of absorption for acoustical materials

8. To determine Joule's constant (J) by electric method

9. To determine wavelength of Sodium light by using Newton's rings

10. To Verify Ampere's rule using Oersted's Experiment and find variation of intensity of magnetic field with Current and Distance

9. To determine frequency of sound by using sonometer .

10. To calculate refractive index of material of prism using spectrometer device .

11. To determine the divergence of He-Ne laser beam.

Laboratory based Mini Projects:

11. To detect surface cracks in the working piece by using liquid penetration method (LPT).

2. To determine coefficient of thermal conductivity of good conductor by using Searle's method

12. To determine the moments of inertia (I_α and I_β) of the given irregular body and to determine the rigidity modulus of the material of the given suspension wire by setting up a torsional pendulum.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
V. Rajendran	Physics-I		Tata McGraw- Hill
Arthur Beiser	Applied physics		Tata McGraw- Hill
R.K.Gaur and S.L.Gupta	Engineering Physics		Dhanpatrai
Rensic and Halliday	Physics		--

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Part B: Applied Chemistry

Rationale:

This syllabus of chemistry for Mechanical / Production / Automobile Students is classified Under the Category of Applied Science. It is intended to teach students the appropriate use of engineering materials, their protection & lubrication processes in different working conditions of machines.

Objective :-

S.No	The Student will be able to:
1.	Suggest the appropriate use of metals, alloys & non metallic materials in engineering.
2.	Applying the Knowledge to Protect Metallic & Non Metallic Surfaces
3.	Select Lubricants for Smooth Running of Machines.

Contents : Theory (**Name of the Topic**)		Hrs/ week	**Marks**
01	**Electrochemistry** Definition of Electrolyte & Conductor, Difference between Metallic & Electrolytic Conduction, Ionisation, Degree of Ionisation & Factors Affecting Degree of Ionisation, Conductivity of Electrolytes. Definition of Electrochemical Cell, Battery, Charge, Discharge, Closed Circuit Voltage, Open Circuit Voltage, EMF, Internal Resistance, Separator, Classification of Batteries such as Primary, Secondary & Reserve with Examples. Industrial Application of Electrolysis – Metallic or Protective Factors for Selection of Method of Coating, Process of Electroplating, Electrorefining, Electrometallurgy (Applications of Electroplating), Impregnated Coating or Cementation on Base Metal Steel – Coating Metal Zn (Sheradizing),Cr (Chomozing), Al (Colorizing), Applications, Advantages & Disadvantages.	**05**	**07**

02	**Non Metallic Engineering Materials** (Plastic, Rubber, Insulators, Refractories, Composite Material, Ceramics) **1. Engineering Plastic:** Special Characteristics & Engineering Applications of Polyamides or Nylons, Polycarbonates (Like Lexan, Merlan), Polyurethanes (Like Perlon – U), Silicons, Polyacetals, Teflon, Laminated Plastic, Thermocole, Reinforced Plastic. **2. Ceramics:** Definition, Properties & Engineering Applications, Types – Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. **3. Refractories:** Definition, Properties, Applications & Uses of Fire Clay, Bricks, Silica Bricks. **4. Composite Materials:** Definition, Properties, Advantages, Applications & Examples.	**05**	**05**
03	**Metals & Alloys** **Metals** – Metallurgy of Iron, Terms Involved in Metallurgy, Indian Resources of Fe, Imp Ores, Extraction, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace, Products of Blast Furnace, their Composition, Application, Commercial Forms of Iron, (Pig Iron / Cast Iron, Wrought or Malleable Steel), their Composition, Properties & Applications, Types of Casting (Chilled Casting, Centrifugal Casting & Malleable Casting), Heat Treatment, Heat Treatment of Cast Iron & Steel. **Alloys** – Definition, Types, Ferrous Alloys – Steel, Composition, Properties & Applications of Plain Carbon Steel (Low Carbon, Medium Carbon, High Carbon & Very Hard Steel) & Alloy Steels, (Heat Resisting, Shock Resisting, Magnetic, Stainless, Tool Steel & HSS), Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. Non-Ferrous Alloys – Copper Alloy – Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications, Aluminium Alloy – Duralumin, Bearing Alloy – Babbitt Metal, Solders – Soft Solder, Brazing Alloy, Tinamann's Solder, Nickel Alloy – Monel Metal, Low Melting Alloys – Woods Metal.	**08**	**10**
04	**Corrosion** Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric, Corrosion & Immersed Corrosion or Electrochemical Corrosion, Mechanism, Protection of Metals by Purification of Metals, Alloy Formation, Cathode Protection, Controlling the External Conditions & Application of Protective Coatings i.e. Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating, Metal Clodding, Cementation or Diffusion Method, their Definition, Procedure, Uses, Advantages & Disadvantages, Examples of Non Corrosive Materials, Protection of Corrosion by the Use of Organic Coating Like Paint, Lacquer, Enamels, Emulsion Paints, Special Paints, their Properties & Uses.	**06**	**08**

	Special Paints – Heat Resistant, Cellulose Paint, Coaltar Paint, Antifouling Paint their constituents & applications.		
05	**Lubricant** Lubricant, Types, Lubrication Mechanism by Fluid Film, Baundary, Extreme Pressure, Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oilness, Volatility, Flash & Fire Point, Cloud & Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants for Various Types of Machineries.	**03**	**05**
	Total	**27**	35
Practical:	Skills to be developed:		
Intellectual Skills:	• Select proper equipment and instruments • Interpret results		
Motor Skills:	• Accuracy in measurement • Careful use of equipment		

List of Practical:

01 To determine neutralization point of weak acid and weak base by conductivity meter.

02 To determine end point of titration between dil. H_2SO_4 and $BaCl_2$ using conductivity meter.

03 To verify Faraday's second law of electrolysis.

04 To determine pH of given solution by using pH paper, universal indicator and pH meter.

05 To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution using pH meter.

06 To determine percentage of copper from brass iodometrically.

07 To find the rate of corrosion of Al strip in acidic and basic medium graphically.

08 To determine thinner content in paint.

09 To determine acid value of given lubricant.

10 To determine viscosity of given oil by using Ostwald's viscometer.

11 To determine saponification value of given lubricant.

Laboratory based mini projects

13 To compare the quality of lubricating oil available in the market by testing their physical / chemical characteristics in the laboratory and decide their scope of application.

14 To find the rate of corrosion of different metals like Al, Fe, Cu, steel etc. and decide their scope of utilization in industry for mechanical purposes.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Jain & Jain	Engineering Chemistry		Dhanpat Rai and Sons
S. S. Dara	Engineering Chemistry		S. Chand Publication
B. K. Sharma	Industrial Chemistry		Goel Publication
S. S. Dara	Environmental Chemistry & Pollution Control		S. Chand Publication

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME: CIVIL ENGINEERING GROUP

COURSE CODE : CE/CS/CR/CV

DURATION OF COURSE : 6 SEMESTERS

SEMESTER: THIRD SEMESTER **SCHEME : C**

Sr.No.	SUBJECT	PERIODS			EVALUATION SCHEME							Credits
	THEORY	L	TU	P	SESSIONSAL EXAM			ESE	PR	Oral #	TW @	
					TA	CT	Total					
1	Surveying	03	--	04	10	20	30	70	50	--	25	5
2	Building Construction	03	--	02	10	20	30	70	--	--	25	4
3	Building Drawing	01	--	03	10	20	30	70	--	--	50	3
4	Concrete Technology	03	--	02	10	20	30	70	--	50	--	4
5	Applied Mathematics (CE and ME Group)	03	1	--	10	20	30	70	--	--	--	3
6	Development of Life Skills-II	01	--	02	--	--	--	--	--	25	25	2
7	Professional Practices-III	--	--	03	--	--	--	--	--	--	50	2
	Total	**14**	**1**	**16**	**50**	**100**	**150**	**350**	**50**	**75**	**175**	**23**

STUDENT CONTACT HOURS PER WEEK: **31 HRS**

HTEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

, External Assessment @ , Internal Assessment ESE - End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA - Teachers Assessment, L - Lecture, TU - Tutorial, P - Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks : 800

Minimum passing for sessional marks is 40%, and for theory subject 40%.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : Civil Engineering Group (Applied Mathematics)	
Course code: CE/CS/CR/CV	**Semester : Third**
Duration : 6 semester	**Maximum Marks :100**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: 1 hrs/week	Assignment & Quiz: -- Marks
Practical : -- hrs/week	End Semester Exam: 70 Marks
Credit: 3	

Aim :-

S.No	
1.	Developing the mathematical approach for solving engineering and technological problems.
2.	The use of knowledge and understanding of mathematics in engineering context.
3.	The importance of geometry in real life, Structural engineering and shapes of rigid or flexible.

Objective :-

S.No	Students will be able to:
1.	• Apply Mathematical term, concept, principals, and different methods for studying engineering subjects.
2.	• Apply Mathematical methods to solve technical problems.
3.	• Execute management plans with precision.
4.	• Use Mathematical techniques necessary for daily and practical problems.

Pre-Requisite :-

S.No	
1.	Students should have an idea regarding basic laws in trigonometry, factorization, expansion, coordination geometry, Differentiation, integration, vectors etc..

Contents		Hrs/week	**Marks**
Unit -1	INTEGRATION: 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration.	10	**20**

	1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.		
	1.5 **Applications of definite integrals.** 1.5.1 Area under the curve. Area bounded by two curves, 1.5.2 Volume of revolution. 1.5.3 Centre of gravity of a rod, plane lamina. 1.5.4 Moment of Inertia of uniform rod, rectangular lamina 1.5.5 Theorems of parallel and perpendicular axes.	08	**10**
Unit -2	DIFFERENTIAL EQUATION 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 **Applications of Differential equations.** **2.3.1 Rectilinear motion (motion under constant and variable acceleration)** 2.3.2 Simple Harmonic Motion.	10	10 **08**
Unit – 3	PROBABILITY DISTRIBUTION 3.1 Binomial distribution. 3.2 Poisson's distribution. 3.3 Normal distribution 3.4 Simple examples corresponding to production process.	08	**10**
Unit – 4	NUMERICAL METHODS **4.1 Solution of algebraic equations** Bisection method. Regulafalsi method. Newton – Raphson method. **4.2 Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	06 06	06 06
	Total	48	70

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune	
Calculus: single variable	Robert T. Smith	Tata McGraw Hill	

Advanced Mathematics for Engineers and Scientist	Murray R Spiegel	Schaum outline series McGraw Hill	
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli	
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India New Dehli	
Numerical methods for Engg. 4th ed.	Chapra	Tata McGraw Hill	
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.	
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : Civil Engineering Group (Building Construction)			
Course code:		**Semester : Third**	
Duration :6 semesters		**Maximum Marks :125**	
Teaching Scheme C		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 4			

Aim :-

S.No	
1.	Developing the conceptual knowledge in building material, construction, problems and its remedies.

Objective :-

S.No	Student will be able to
1.	Identify various components of buildings and their functions.
2.	Mark layout of building on ground.
3.	Know the procedure for execution of various constructions activities.
4.	Check line, level and plumb of various construction activities.
5.	Prepare checklist of operations for supervision of various construction activities.
6.	Identify & suggest rectification the various defects in civil engineering works.

Pre-Requisite :-

S.No	
1.	Student should be able to read the building plans.
2.	Student should be able to think over the construction problems and their remedies.
3.	Student should know the basic properties of material being used in the construction of the building.

Contents : Theory (Name of the Topic)		Hrs/week	Marks
Unit -1	**BUILDING COMPONENTS AND MATERIALS** **1.1 BUILDING COMPONENTS AND TYPES OF STRUCTURE** BUILDING COMPONENTS & THEIR FUNCTION. SUBSTRUCTURE – FOUNDATION, PLINTH. SUPERSTRUCTURE – WALLS, SILL, LINTEL, DOORS & WINDOWS, FLOOR, ROOF, PARAPET, BEAMS, COLUMNS. TYPES OF STRUCTURES – LOAD BEARING STRUCTURES, FRAMED STRUCTURES, COMPOSITE STRUCTURES.	06	10
	1.2 MASONRY MATERIALS A) BUILDING STONES- CLASSIFICATION OF ROCKS, REQUIREMENT OF GOOD BUILDING STONE, DRESSING OF STONES, QUARRYING OF STONES ,ARTIFICIAL OR CAST STONES B) BRICKS– CONVENTIONAL BRICKS , STANDARD BRICKS COMPOSITION OF CLAY		

	BRICK, STRENGTH OF BRICKS, PROPORTIONS OF BURNT CLAY BRICKS , TESTING OF BRICKS , SPECIAL BRICKS ,HOLLOW BLOCKS , FLY ASH BRICKS. C) MORTARS – CLASSIFICATIONS, LIME MORTAR, CEMENT MORTAR, SPECIAL MORTARS. FUNCTIONS OF MORTAR, PROPORTIONS, PROPERTIES OF MORTAR AND TESTS FOR MORTAR.		
	1.3 TIMBER BASED MATERIAL USE OF TIMBER, CHARACTERISTICS OF GOOD TIMBER, DEFECTS IN TIMBER, PLYWOOD, PARTICLE BOARD ,VENEER, SUN MICA , FORE MICA, NUWOOD, ARTIFICIAL TIMBER, RUBBER WOOD.		
	1.4 MISCELLANEOUS MATERIALS GLASS, PLASTIC, FIBERS, ALUMINUM, STEEL , GALVANIZED IRON, ASPHALT BITUMEN ETC .MICRO SILICA, PVC, CPVC, PPF. WATERPROOFING AND TERMITE PROOFING MATERIALS, ADMIXTURES IN CONCRETE, BONDING AGENTS, EPOXY RESINS, POLISHING MATERIALS ETC		
2	**CONSTRUCTION OF SUBSTRUCTURE** **2.1 JOB LAYOUT** SITE CLEARANCE, PREPARING JOB LAYOUT, LAYOUT FOR LOAD BEARING STRUCTURE AND FRAMED STRUCTURE BY CENTER LINE AND FACE LINE METHOD, PRECAUTIONS WHILE MARKING LAYOUT ON GROUND .	06	12
	2.2 EARTHWORK EXCAVATION FOR FOUNDATION, TIMBERING AND STRUTTING EARTHWORK FOR EMBANKMENT MATERIAL FOR PLINTH FILLING. TOOLS AND PLANTS USED FOR EXCAVATION AND EARTHWORK.		
	2.3 FOUNDATION TYPES OF FOUNDATION – OPEN FOUNDATIONS, SHALLOW FOUNDATION, STEPPED FOUNDATION, ISOLATED AND COMBINED COLUMN FOOTING, RAFT FOUNDATION, DEEP FOUNDATION AND PILE FOUNDATION. PUMPING METHOD OF DEWATERING, COFFERDAMS. BEARING CAPACITY OF FOUNDATION SOIL, UNDER REAMED PILE FOUNDATION.		
3	**CONSTRUCTION OF SUPERSTRUCTURE** 3.1 **STONE MASONRY** TERMS USED IN STONE MASONRY – FACING, BACKING, HEARTING, THROUGH STONE, CORNER STONE. UNCOURSED RUBBLE MASONRY, COURSED RUBBLE MASONRY, POINT TO BE OBSERVED IN CONSTRUCTION OF STONE MASONRY, MORTARS FOR STONE MASONRY, TOOLS AND PLANTS USED FOR STONE MASONRY, COL-GROUT MASONRY.	20	24
	3.2 **BRICK MASONRY** COMMON TERMS USED IN BRICK MASONRY, REQUIREMENTS OF GOOD BRICKWORK, BONDS IN BRICK MASONRY, ENGLISH, FLEMISH, STRETCHER AND HEADER BONDS ONLY. BRICK LAYING ,LINE LEVEL AND PLUMB OF BRICKWORK, STRIKING AND RAKING OF JOINTS, LEAD AND LIFT, PRECAUTIONS IN BRICK MASONRY, TOOLS AND PLANTS USED IN BRICK MASONRY . COMPARISON BETWEEN BRICK AND STONE MASONRY. HOLLOW CONCRETE BLOCK MASONRY, COMPOSITE MASONRY , CAVITY WALL- PURPOSE AND CONSTRUCTION.		
	3.3 **DOORS AND WINDOWS**		
	Doors -Components and construction of panelled doors, battened		

	doors, flush doors, collapsible doors, rolling shutters, Revolving doors, Glazed doors. Sizes of door.		
	Windows -Component and construction of fully panelled, partly panelled and glazed, glazed wooden, steel, Aluminum windows, sliding windows, louvered window, ventilators, cement grills. Protective treatment for doors and windows, fixtures and fastenings for doors and window.		
	SILL, LINTEL AND WEATHER SHED - FUNCTIONS, TYPES AND CONSTRUCTION . 3.4 **VERTICAL COMMUNICATION** MEANS OF VERTICAL COMMUNICATION – STAIR CASE, ELEVATOR OR		
	OF GOOD STAIRCASE, TYPES OF STAIRCASE, FABRICATED STAIR.		
	3.5 **SCAFFOLDING AND SHORING** PURPOSE, TYPES OF SCAFFOLDING, PROCESS OF ERECTION AND DISMANTLING. PURPOSE AND TYPES OF SHORING, UNDERPINNING, SAFETY PRECAUTIONS.		
4	***4. Building Finishes*** 4.1 **FLOORS AND ROOF**S FLOOR FINISHES- SHAHABAD , KOTA, MARBLE, GRANITE ,KADAPPA, CERAMIC TILES ,VITRIFIED , MOSAIC TILES ,CHEQUERRED TILES, GLAZED TILES ,PAVEMENT BLOCKS , CONCRETE FLOORS, TREMIX FLOOR, SKIRTING AND DADO. PROCESS OF LAYING- PROCESS OF LAYING AND CONSTRUCTION, FINISHING AND POLISHING OF FLOORS. ROOFING MATERIALS – AC SHEETS ,G.I. SHEETS, PLASTIC SHEETS, FIBRE SHEETS, MANGALORE TILES ETC. STEEL TRUSSES. R.C.C. SLAB	16	24
	4.2 **WALL FINISHES** PLASTERING – NECESSITY OF PLASTERING, SINGLE COAT PLASTER DOUBLE COAT PLASTER , NEERU FINISHING AND POP, SPECIAL PLASTERS STUCCO PLASTER , PLASTER BOARD AND WALL CLADDINGS. PRECAUTION TO BE TAKEN WHILE PLASTERING. DEFECTS IN PLASTER. POINTING – NECESSITY AND PROCEDURE OF POINTING. PAINTING – NECESSITY, SURFACE PREPARATION, METHOD OF APPLICATION, SELECTING SUITABLE PAINTING MATERIAL, WHITE WASH AND COLOUR WASH.		
	5. BUILDING MAINTENANCE 5.1 **CRACKS** CAUSES AND TYPES OF CRACKS, IDENTIFICATION AND REPAIR OF CRACKS. GUNITING AND GROUTING, USE OF EPOXY AND CRACK FILLS.		
	5.2 **SETTLEMENT** SETTLEMENT --CAUSES AND REMEDIAL MEASURES PLINTH PROTECTION – NECESSITY AND MATERIALS USED.		
	5.3 **DEMOLITION** NECESSITY, METHOD OF DEMOLITION-HAND DEMOLITION, MACHINE DEMOLITION, CONTROLLED BLASTING DEMOLITION, PRECAUTIONS DURING DEMOLITION.		
	5.4 **REBARING TECHNIQUES** NECESSITY AND EQUIPMENT FOR REBARING TECHNIQUES		
	TOTAL	**48**	**70**
CONTENT: PRACTICALS-			

SKILLS TO BE DEVELOPED:-

1. **INTELLECTUAL SKILLS:-** STUDENTS WILL BE ABLE TO
   - A) IDENTIFY COMPONENTS OF A BUILDING.
   - B) DIFFERENTIATE AND IDENTIFY TYPES OF BUILDING MATERIALS.
   - C) SELECT APPROPRIATE MATERIAL FOR BUILDING CONSTRUCTION.
   - D) SUPERVISE THE BUILDING CONSTRUCTION ACTIVITIES.

2. **MOTOR SKILLS :-** STUDENTS WILL BE ABLE TO.
   - a) MARK LAYOUT OF BUILDING ON THE GROUND.
   - b) CHECK AND MARK VARIOUS LEVELS IN BUILDING.

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LIST OF PRACITCALS:

1. PREPARING FOUNDATION PLAN AND MARKING ON GROUND LAYOUT OF LOAD BEARING STRUCTURE BY FACE LINE METHOD FROM THE GIVEN PLAN OF THE BUILDING.
2. PREPARING FOUNDATIONS PLAN AND MARKING ON GROUND LAYOUT OF FRAMED STRUCTURE BY FACE LINE METHOD FROM THE GIVEN PLAN OF THE BUILDING.
3. CHECKING AND TRANSFERRING LINE AND LEVEL OF PLINTH, SILL, LINTEL, FLOORING, SLAB LEVEL OF A BUILDING AND WRITING REPORT OF THE PROCESS.
4. CHECKING VERTICALITY (PLUMB LINE) OF FORMWORK FOR COLUMN, BEAM AND WALL AT CONSTRUCTION SITE AND WRITING REPORT OF THE PROCESS.
5. LAYING AND CONSTRUCTING THE PROCESS OF CONSTRUCTION OF BRICKWORK AND REPORT WRITING OF THE PROCESS.
6. OBSERVING THE PROCESS OF PAINTING IN RESIDENTIAL / PUBLIC BUILDING AND WRITING A REPORT WITH REFERENCE TO PROCESS AND TYPE OF PAINT SELECTED.
7. OBSERVING AND WRITING REPORT OF THE PROCESS OF PLASTERING.
8. OBSERVING AND WRITING REPORT OF THE PROCESS OF WATER PROOFING OF TERRACE OR BASEMENT.

OBSERVING THE MODELS, SPECIMEN OF BUILDING MATERIALS KEPT IN THE MODEL ROOM FOR FEW BUILDING ITEMS AND WRITING A REPORT FOR ANY FIVE MODELS/ MATERIALS.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Construction Materials	D.N. Ghose		Tata McGraw-Hill
Building materials	Amarjit Agrawal		New India Publication
Building materials	S. K. Duggal		New Age International
Engineering materials	Sharma		PHI Publication
Building Construction	S. P. Arora and Bindra		Dhanpat Rai Publication
Building Construction	S. C. Rangawala		Charotar Publication
Building Construction	Sushil Kumar		Standard Publication
Building Construction	B. C. Punmia		Laxmi Publication

Building Construction	S.K. Sharma		Tata McGraw-Hill
Civil Engineering materials	TTTI ,Madras		TTTI ,Madras
Building Construction	Dr.Janardan Zha		Khanna Publication
A to Z of Building Construction	Mantri Construction		Mantri Publication
Building Construction Vol. I to IV	W. B. Mackay		Longman(ELBS)

HandBooks:

Sr. No.	Title	Author	Publisher
01	PWD Handbooks for -Materials - Masonry -Building -Plastering and Pointing - Foundation	All India Council for Technical Education	All India Council for Technical Education
02	Practical Civil Engineering Handbook	Khanna	Khanna Publication

BIS/ International Codes of Practice:

r. No.	Title
01	National Building Code
02	BIS 962-1973 Code of Architectural and Building Drawing
03	BIS 1256-1967 Code for Building Byelaws
04	BIS 1038- 1983 Steel Doors, Windows and Ventilators

SOFTWARE:

01	Super Civil CD

Reference books :- Nil
Suggested List of Laboratory Experiments :- Nil
Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (Building Drawing)	
Course code: CE /CS /CR/CV	**Semester :** Third
Duration :6 Semester	**Maximum Marks :150**
Teaching Scheme C	**Examination Scheme**
Theory : 1 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 3 hrs/week	End Semester Exam: 70 Marks
Credit :- 3	

Aim :-

S.No	
1.	To develop the ideas, vision and its practical reality through engineering graphics.
2.	Developing the approach of visualization, drafting, modeling and analysis.
3.	To develop the concept and applicability of engineering graphics to construction sector.

Objective :-

S.No	The students will be able to
1.	• Read, interpret and draw the building drawings.
2.	• Prepare submission drawings for the building.
3.	• Prepare working drawings for the building.
4.	• Plan various types of buildings considering the functional requirements.
5.	• Apply the building rules, regulations and byelaws.

Pre-Requisite :-

S.No	
1.	Perfection in geometry and sketching.
2.	The students should be perfect in plotting the geometrical shapes and skill of reading the geometrical designs.

Contents : Theory (Name of the Topic)		Hrs/week	**Marks**
Unit -1	**1 Conventions** 1.1 Conventions as per IS:962-1967 and other practices 2 Types of Lines – Visible line, Centerline, Hidden line, Section line, Dimension line, Extension line, Pointers, Arrow heads or dots. 2.1 Symbols – Materials used in construction, building components **3** Reading of available ammonia prints of residential buildings.	**02**	**03**
Unit -2	**Planning Of Building** 2.1 Principles of planning of Residential and Public building. 2.2 Space requirements and norms for various units of	**06**	**14**

	Residential and Public building. Rules and byelaws of local governing authorities for construction. 2.3 Drawing of line plans for Residential and Public building.		
Unit – 3	**Types Of Drawing** 3.1 Development of line plan 3.2 Elevation 3.3 Section 3.4 Site plan 3.5 Location Plan 3.6 Foundation plan 3.7 Area statement and other details. 3.8 Measured Drawing and its significance 3.9 Submission Drawing and Working Drawing	**06**	**45**
Unit – 4	**Perspective Drawing** 4.1 Definition, Necessity, Principles of Perspective Drawing, Terms used in perspective drawing 4.2 Two point perspective view of a small object like pedestal, step block, small single storied building with flat roof etc.	**02**	**08**
	Total	**16**	**70**

Practical:

Skills to be developed**:**

Intellectual Skills**:**

1. Read and interpret the building drawings
2. Plan residential and public buildings
3. Apply the building rules, regulations and byelaws.

Motor Skills:

1. Prepare line plans of Residential and Public Buildings
2. Prepare Detailed Plans, Elevations, Sections and other working drawings for the buildings.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Text Book of Building Drawing	Shah, Kale, Patki		--
Elements of Building Drawing	D. M. Mahajan		--
Planning and Design of Building.	Y. S. Sane		--
Civil Engineering Drawing	Malik & Mayo		New Asian Publishers New Delhi

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil	
Suggested List of Assignments/Tutorial :- Nil	
S.No	**Assignments :** Following exercises should be drawn on full imperial size drawing sheets.
1	• Drawing various types of lines, lettering and symbols of materials, doors and windows etc. used in construction on Full Imperial size drawing sheet.
2	• Drawing the lines plans of following buildings on Full Imperial size **graph paper.** • Residential Building (Min. three rooms) • Public Building – School building, Primary health center / Hospital building, Bank, Post Office, Hostel building etc.(At least four)
3	• Measured Drawing of an existing residential Building (Load bearing/ Framed structure Type) , showing Plan , Elevation, Sections, Construction notes, Schedule of openings, Site Plan, Area statement etc .
4	• Submission Drawing of two storied residential building (Framed structure type) showing Plans , Elevation, Sections, Foundation Plan ,construction notes, Schedule of openings, Site Plan ,Area statement etc.
5	• Working drawing of above drawing sheet preferably one plan, section through stair case to scale 1:50
6	• Two point perspective view of a building drawn in submission drawing.
7	• Tracing of a submission drawing prepared at Sr. No.4 above.
8	• Ammonia print of submission drawing prepared at Sr. No.4 above.

Name of the Course : Civil Engineering Group (Concrete Technology)	
Course code: CE/CS/CR/CV	**Semester : Third**
Duration :6 semester	**Maximum Marks :150**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of cement and concrete.

Objective :-

S.No	The Students will be able to
1.	• Determine the properties of concrete ingredients i.e. cement. sand. coarse aggregate by conducting different tests.
2.	• Use different types of cement as per their properties for different fields applications.
3.	• Design economic mix proportion for different exposure conditions and intended purposes.
	• Supervise various concreting operations.
	• Carry out field and laboratory tests on concrete in plastic and hardened stage.
	• Use different types of admixtures to improve the properties of concrete for different field applications.
	• Describe different types of concrete.
	• Infer the test results as per relevant I.S. provisions.

Pre-Requisite :-

S.No	
1.	Student should take survey of different types of materials used in building construction.

Contents : Theory (Name Of The Topic)		Hrs/week	**Marks**
Unit -1	**Properties of Cement:** 1.1 Physical properties of Ordinary Portland cement (OPC), determination and test on OPC ,Hydration of cement, physical properties of cement – fineness, standard consistency, initial & final setting times, compressive strength & soundness, different grades of opc 33, 43 , 53 & their specification of physical properties as per relevant I. S. codes. Adulteration of cement (field test), storing cement at site, effect of storage of cement on properties of cement / concrete. 1.2 Types of Cement Physical properties, specifications as per relevant IS codes & field	**06**	**10**

	application of the following types of cement i) Rapid hardening cement Ii) Low heat cement Iii) Pozzolana Portland cement Iv) Sulphate resisting cement Vi) Blast furnace slag cement Vii) White cement		
Unit -2	**Properties of Aggregates :** 2.1 Properties of fine aggregates : Concept of size, shape, surface texture, strength, specific gravity, bulk density , water absorption, surface moisture, soundness, bulking impurities 2.2 Determination of fineness modulus & grading zone of sand by sieve analysis, determination of silt content in sand & their specification as per IS 383 2.3 Bulking of sand, phenomenon of bulking, its effect on concrete mix proportion. 2.4 Properties of coarse aggregates : Concept of size, shape, surface texture, water absorption, soundness, specific gravity & bulk density 2.5 Determination of fineness modulus of coarse aggregate by sieve analysis, grading of Coarse Aggregates 2.6 Determination of crushing value, impact value & abrasion value of coarse aggregate, flakiness index & elongation index of coarse aggregate and their specification.	**08**	**15**
Unit – 3	**Properties of Concrete:** 3.1 Introduction to concrete - Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (ordinary concrete, standard concrete & high strength concrete as per provisions of IS 456- 2000), minimum grade of concrete for different exposure conditions, minimum grade of concrete for R.C.C., water retaining structure & in sea water construction, durability of concrete. 3.2 Water cement ratio Definition of w/c ratio, Duff Abraham w/c law, significance of w/c ratio, selection of w/c ratio for different grades of concrete prepared from different grades of OPC as per graphs specified in IS 10262 -1982, maximum w/c ratio for different grades of concrete for different exposure conditions. 3.3 Properties of fresh concrete Definition of workability, factors affecting workability of concrete. Determination of workability of concrete by slump cone test, compaction factor test, vee bee consistometer & flow table tests. Range values of workability requirement for different types of concrete works, cohesiveness, segregation, harshness, bleeding. 3.4 Properties of hardened concrete Definition of compressive strength, durability, impermeability,	**12**	**15**

	elastic properties of concrete, modulus of elasticity of concrete. Creep, factors affecting creep, shrinkage, factors affecting shrinkage ***3.5 CONCRETE MIX DESIGN*** Objectives of mix design, list of different method of mix design ,study of mix design procedure by I.S. method as per I.S. 10262-1982 ,determination of design mix proportion by mass for M 20 grade of concrete using I.S. Method for given data (such as grading zone of sand, proportion of 20 mm & 10 mm metals, specific gravities of cement, sand & aggregate , water absorption of sand & aggregate, compacting factor and exposure condition). 3.6 Testing of concrete Significance of testing, determination of compressive strength of concrete cubes at different ages, interpretation & co-relation of test results 3.7 Non- destructive testing of concrete Importance of NDT, methods of NDT - rebound hammer test & ultrasonic pulse velocity test, working principle of rebound hammer and factor affecting the rebound index, specification for deciding the quality of concrete by ultrasonic pulse velocity as per I.S. 13311 (part 1 & 2). Determination of rebound index & compressive strength of concrete by rebound hammer test as per I.S. 13311, determination of quality of concrete by ultrasonic pulse velocity test		
Unit – 4	**Quality Control of Concrete:** 4.1 Batching, Different Types of Mixers & Vibrators Volume & weight batching, volume batching for nominal mixes & weight batching for design mix concrete, types of mixers (tilting & non-tilting type) Different types of vibrators - needle vibrator, surface vibrator, table vibrator, principle & application of each type of vibrator 4.2 Formwork : formwork for concreting, different types of formworks for different works such as beams, slabs, columns, well foundation, materials used for formwork, requirement of good formwork, stripping time for the removal of formwork as per I.S. 456- 2000 provisions for different structural members. 4.3 Transportation, placing, compaction & finishing of concrete: Modes of transportation of concrete , precautions to be taken during transportation and placing of concrete in formwork compaction of concrete, methods of compaction, care to be taken during compaction, purpose of finishing, types of finishing & methods of application (surface treatment, expose aggregate finish, applied finish, coloured finish), requirement of good finish. 4.4 Curing of concrete : definition of curing, necessity of curing, different methods of curing and their application (spraying water, membrane curing, steam curing, curing by infra red radiations, curing by wet gunny bags, ponding methods). 4.5 Waterproofing of concrete & joints in concrete construction:	**12**	**16**

	Importance & need of waterproofing, methods of waterproofing & materials used for waterproofing, types of joints, joining old & new concrete, methods of joining, materials used for filling joints.		
Unit – 5	**Extreme weather concreting & chemical Admixture in concrete :** 5.1Extreme weather concreting Effect of cold weather on concrete, effect of hot weather on concrete, precautions to be taken while concreting in hot & cold weather condition. 5.2 Chemical admixture in concrete Properties & application for different types of admixture such as accelerating admixtures, retarding admixtures, water reducing admixture, air entraining admixture & super plasticizers.	**05**	**07**
Unit – 6	**Properties of Special Concrete:** Properties, Advantages & Limitation of the following types of Special concrete i) Ready mix Concrete ii) Reinforced Concrete iii) Prestressed Concrete iv) Fiber Reinforced Concrete v) Precast Concrete vi) High performance Concrete	**05**	**07**
	Total	**48**	**70**

Practical:

Skill to be developed:

Intellectual Skills:

1. Analyze the given data
2. Select proper method for analysis
3. Interpret the results

Motor Skills :

1. Measure the quantities accurately
2. Handle instruments properly

Term work shall consist of eight experiments in part A & mini project work in Part B

Part A: PART A consists of GROUP I & GROUP II.

Group I– Physical tests on ordinary Portland cement (any four)

1) Determination of fineness of cement preferably by Blaine's air permeability apparatus or by sieving.
2) Determination of standard consistency of OPC
3) Determination of initial & final setting times of OPC.
4) Determination of compressive strength of ordinary portland cement
5) Determination of soundness of OPC.

Group II – Tests on fine & coarse aggregates (any four)

1) Determination of silt content in sand by volume / weight
2) Determination of maximum % of bulking of sand
3) Determination of aggregate impact value.
4) Determination of aggregate abrasion value.
5) Determination of aggregate crushing value.
6) Determination of bulk density & water absorption, fine & coarse aggregated.

Part B:

Mini Project :

Comparative study of compressive strength of concrete for different Water cement ratio With and without curing.

Note: video cassettes or cd's of above experiments developed by NITTTR (if available) shall be shown to the students on T. V. / L.C.D. projector prior to the conductance of above experiments.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Concrete Technology	M. L. Gambhir		Tata Mc Graw . Hill Publishing Co. Ltd. New Delhi
Concrete technology	A. M. Neyille & J J Brooks		Pearson Education (Singapore) Pyt. Ltd. New Delhi
Concrete technology	M. S. Shetty		S. Chand Publication
Text book of Concrete technology	P. D. Kulkarni		M. H. Ghosh and Phull publication
Chemical	H.R. Rixom		Powells' Books

Admixtures for concrete			

Reference I.S. Codes:

1. I.S.4031- (Part 1 to Part 6) Indian standard method of physical tests for hydraulic cement, BIS, New Delhi.
   I.S.4031 (Part 1) - 1996 Part 1 – Determination of fineness by dry sieving.
   I.S.4031(Part 2) -1999 Part 2 – Determination of fineness by air permeability method.
   I.S.4031(part 3) -1988 (reaffirmed 2000) Part 3– Determination of soundness
   I.S.4031(part 4) - 1988 (reaffirmed 1995)
   Part 4 - Determination of consistency of standard cement paste.
   I.S.4031 (part 5) – 1988, (reaffirmed 2000) Part 5 - Determination of initial and final setting times
   I.S : 4031 (part 6) – 1988, (reaffirmed 2000) Part 6 - Determination of compressive strength of hydraulic cement other than masonry cement
2. I.S : 2386 (part i to part vi) – 1963 Indian standard methods of test for aggregate for concrete. BIS, New Delhi.
   Part i - Particle size and shape. (reaffirmed 1997)
   Part ii - Estimation of deleterious materials and organic impurities. (reaffirmed 2002)
   Part iii - Specific gravity, density, voids, absorption & bulking. (reaffirmed 1997)
   Part iv - Mechanical properties (reaffirmed 1997)
   part v - Soundness. (reaffirmed 1997)
   part vi - Measuring mortar making properties of fine aggregate. (reaffirmed 2002)
3. I.S. : 383 – 1970 Indian standard specification for coarse & fine aggregates from natural sources for concrete. B.I.S.., New Delhi.
4. I.S. : 1911 - 1959 **(** reaffirmed **)** Indian Standard methods of sampling and analysis of concrete), B.I.S.., New Delhi.
5 I.S. : 456 - 2000 Indian standard , plain and reinforced concrete – code of practice. (fourth revision), B.I.S.., New Delhi.
6. I.S. : 516 – 1959 Indian standard methods of tests for strength of concrete (xii reprint December 1987), B.I.S.., New Delhi.
7. I.S. : 8112- 1989 Indian standard - 43 grade ordinary portland cement Specification
8. I.S. : 12269 – 1987 (reaffirmed 1999) Indian standard specification for 53 grade O.P.C..
9. I.S. : 9103 – 1999 Indian standard –concrete admixtures specification
10. I.S. : 455- - 1989 (reaffirmed 1995) –Indian standard – Portland slag cement specification
11. I.S. : 1489 (part 1) 1991 – Portland – Pozzolana Cement – specification part 1 fly ash based
12. I.S. : 7861 (part 1) 1975 (reaffirmed 1997) – Indian standard of practice for extreme weather concreting part 1 recommended practice for hot weather concreting
13. I.S.: 7861 (part 2) – 1981 (reaffirmed 1997) – Indian standard of practice For extreme weather concreting part 2 – recommended practice for cold weather concreting
13. I.S. : 8041 – 1990 – Indian standard – rapid hardening Portland Cement specification BIS- New Delhi
14. I.S. : 12330 – 1988 (reaffirmed 1995) – Indian standard specification for sulphate resisting Portland cement
15. I.S. : 12600 - 1989 (reaffirmed 1995) - Portland cement, low heat Specification
16. I.S. : 10262 – 1982 Indian standard recommended guidelines for concrete mix Design

17. Sp 23 handbook on concrete mixes (based on Indian standards) 18. I.S. 13311 (part-1 & 2)- 1992 methods of non-destructive testing of concrete. part-1 ultrasonic pulse velocity, part-2 rebound hammer
Reference books :- Nil
Suggested List of Laboratory Experiments :- Nil
Suggested List of Assignments/Tutorial :- Nil

Name of the Course : **Mechanical Engineering and Technology (Development of Life Skills-II)**	
Course code: ME / PG / PT / AE / FE / MI	**Semester : THIRD**
Duration : 6 semester	**Maximum Marks : 50**
Teaching Scheme C	**Examination Scheme**
Theory : 1 hrs/week	Mid Semester Exam: -- Marks
Tutorial: -- hrs/week	Assignment & Quiz: 50 Marks
Practical : 2 hrs/week	End Semester Exam: --- Marks
Credit: 2	

Aim :-

S.No	
1.	Develop the confidence in self ability.
2.	Developing the team work culture.
3.	Personality development and problem solving ability.

Objective :-

S.No	**The students will be able to:**
1.	• Developing working in teams
2.	• Apply problem solving skills for a given situation
3.	• Use effective presentation techniques
4.	• Apply techniques of effective time management
5.	• Apply task management techniques for given projects
6.	• Enhance leadership traits
7.	• Resolve conflict by appropriate method
8.	• Survive self in today's competitive world
9.	• Face interview without fear
10.	• Follow moral and ethics
11	• Convince people to avoid frustration

Pre-Requisite :-

S.No	
1.	Students should know work culture and job profile at the working place.
2.	Best communication skill

Contents		Hrs/week
Unit -1	**SOCIAL SKILLS** SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY.	**01**
Unit -2	Swot Analysis – Concept , How to make use of SWOT.	**01**

Unit – 3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	**02**
Unit – 4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)IDENTIFY AND CLARIFY THE PROBLEM, 2)INFORMATION GATHERING RELATED TO PROBLEM, 3)EVALUATE THE EVIDENCE, 4)CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 5)CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW **II)Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
Unit – 5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
Unit – 6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS.	**03**
Unit – 7	**Working in Teams** UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPORT, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP.	**02**
Unit – 8	**Task Management** INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK	**02**
	TOTAL	**16**

CONTENTS: PRACTICAL-

List of Assignment: (Any Eight Assignment)

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2) Undergo a test on reading skill/memory skill administered by your teacher.
3) Solve the puzzles.
4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.####
7) Conduct an interview of a personality and write a report on it.
8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

MINI PROJECT ON TASK MANAGEMENT. DECIDE ANY TASK TO BE COMPLETED IN A STIPULATED TIME WITH THE HELP OF TEACHER. WRITE A REPORT CONSIDERING VARIOUS STEPS IN TASK MANAGEMENT.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Adams Time management	Marshall Cooks		Viva Books
Basic Managerial Skills for All	E.H. Mc Grath , S.J.		Pretice Hall of India, Pvt Ltd
Body Language	Allen Pease		Sudha Publications Pvt. Ltd.
Creativity and problem solving	Lowe and Phil		Kogan Page (I) P Ltd
Decision making & Problem Solving	by Adair, J		Orient Longman
Develop Your	Bishop , Sue		Kogan Page India

Assertiveness			
Make Every Minute Count	Marion E Haynes		Kogan page India
Organizational Behavior	Steven L McShane and Mary Ann Glinow		Tata McGraw Hill
Organizational Behavior	Stephen P. Robbins		Pretice Hall of India, Pvt Ltd
Presentation Skills	Michael Hatton (Canada – India Project)		ISTE New Delhi
Stress Management Through Yoga and Meditation	--		Sterling Publisher Pvt Ltd
Target setting and Goal Achievement	Richard Hale ,Peter Whilom		Kogan page India
Time management	Chakravarty, Ajanta		Rupa and Company
Working in Teams	Harding ham .A		Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

Reference books :- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Mechanical and Production Engineering / Production Technology (Professional Practices-III)	
Course code: ME/PT/PG/MH/MI	**Semester :** Third
Duration : 6 semester	**Maximum Marks :50**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 3 hrs/week	End Semester Exam: -- Marks
Credit: 2	

Aim :-

S.No	
1.	Development and evaluation of individual skills.
2.	Enhancement in soft skills through innovation.

Objective :-

S.No	Student will be able to:
1.	• Acquire information from different sources.
2.	• Prepare notes for given topic.
3.	• Present given topic in a seminar.
4.	• Interact with peers to share thoughts.
5.	• Prepare a report on industrial visit, expert lecture.

Pre-Requisite :-

S.No	
1.	Communication skill must be perfect.

	Contents	Hrs/week
Unit -1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. **TWO** industrial visits may be arranged in the following areas / industries : i) Manufacturing organizations for observing various manufacturing processes including heat treatment ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) ST workshop / City transport workshop	08
Unit -2	Lectures by Professional / Industrial Expert be organized from **ANY THREE** of the following areas : i) Use of a plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications	08

	iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics x) Safety Engineering and Waste elimination	
Unit – 3	**Individual Assignments :** **Any two** from the list suggested a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties , specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – a. Ceramics b. fiber reinforcement plastics c. thermo plastic plastics d. thermo setting plastics e. rubbers. OR Conduct **ANY ONE** of the following activities through active participation of students and write report i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange **any one** training in the following areas : a) Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances.	08
Unit – 4	**Modular courses (Optional) :** A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students. Course may be organized internally or with the help of external organizations. a) Forging Technology. b) CAD-CAM related software. c) Welding techniques. d) Personality development. e) Entrepreneurship development.	08
Unit – 5	j) 3-D Design using software k) Computer screen, coordinate system and planes, definition of l) HP,VP, reference planes How to create them in 2nd/3rd m) environment. Selection of drawing site & scale. Commands of n) creation of Line, coordinate points, Axis, Poly lines, square,	16

	o) rectangle, polygon, spline, circles, ellipse, text, move, copy, p) offset, Mirror, Rotate, Trison, Extend, Break, Chamfer, Fillet, q) Curves, Constraints fit tangency, perpendicularity, dimensioning r) Line convention, material conventions and lettering. s) t) The Student should draw – different orthographic Views (including sections), Auxiliary views according to first/ Third angle method of projection. (Minimum two sheets, each containing two problems) after learning the contents as above.	
	Total	**48**
Text Books:- Nil		
Reference books :- Nil		
Suggested List of Laboratory Experiments :- Nil		
Suggested List of Assignments/Tutorial :- Nil		

Name of the Course : Civil Engineering Group (Surveying)	
Course code: CE /CS/ CR/CV	**Semester : Third**
Duration :	**Maximum Marks :**
Teaching Scheme	**Examination Scheme**
Theory : hrs/week	Mid Semester Exam: Marks
Tutorial: hrs/week	Assignment & Quiz: Marks
Practical : hrs/week	End Semester Exam: Marks
Credit :- Nil	

Aim :-

S.No	
1.	Developing the surveying skill required for civil engineering.

Objective :-

S.No	Students will be able to:
1.	• Use the survey instruments.
2.	• Take linear and angular measurements.
3.	• Measure the area of land.
4.	• Prepare layouts and maps.
5.	• Set out alignments for roads, railways, canals, pipelines, tunnels etc.
6.	• Prepare contour map.
7.	• Compute area and volume from given contour map.

Pre-Requisite :-

S.No	
1.	Student should be perfect in drawing and sketching.

	Contents : Theory (Name of the Topic)	Hrs/week	**Marks**
Unit -1	**TYPES OF SURVEY** DEFINITION. OBJECTS OF SURVEYING,. PRINCIPLES OF SURVEYING. USES OF SURVEY, CLASSIFICATION OF SURVEYING. PRIMARY –PLAIN, GEODETIC. SECONDARY – BASED ON INSTRUMENTS, METHOD, OBJECT, NATURE OF FIELD.	**04**	**06**
Unit -2	**Chain & Cross Staff Survey** 2.1 PRINCIPLE OF CHAIN SURVEY .STUDY AND USE OF INSTRUMENTS FOR LINEAR MEASUREMENTS – CHAIN, TAPE, RANGING ROD, ARROWS, PEGS , CROSS STAFF , OPTICAL SQUARE , LINE RANGER. 2.2 RANGING –DIRECT AND INDIRECT RANGING CHAINING – PLAIN AND SLOPING GROUNDS. Chain Triangulation – Survey Station and their Selections,	**08**	**14**

	Survey lines, Check lines, Tie lines, base line. Taking offsets .long and short offset, degree of offset. OBSTACLES IN CHAINING. 2.3 CHAIN & CROSS STAFF SURVEY FOR FINDING AREA OF A FIELD (NUMERICAL PROBLEMS) ERRORS IN CHAIN SURVEYING & APPLYING CORRECTIONS FOR CHAIN & TAPE (NUMERICAL PROBLEMS). CONVENTIONAL SIGNS RELATED TO SURVEY.		
Unit – 3	**COMPASS SURVEY** 3.1 PRINCIPLE OF COMPASS SURVEY. BEARING OF LINES – MERIDIAN –TRUE, MAGNETIC, AND ARBITRARY. BEARING –FORE BEARING, BACK BEARING, WHOLE CIRCLE BEARING, QUADRANTAL BEARING SYSTEM AND REDUCED BEARING, CONVERSION OF BEARINGS, FINDING INCLUDED ANGLES FROM BEARINGS. 3.2 PRISMATIC COMPASS – COMPONENT, CONSTRUCTION AND USE. 3.3 LOCAL ATTRACTION, CAUSES, PRECAUTIONS TO BE TAKEN TO AVOID AND CORRECTION OF BEARINGS AFFECTED DUE TO LOCAL ATTRACTION, CALCULATION OF INCLUDED ANGLES. 3.4 TRAVERSING – OPEN TRAVERSE, CLOSED TRAVERSE, CHECK ON OPEN AND CLOSED TRAVERSE. GRAPHICAL ADJUSTMENT FOR CLOSING ERROR. 3.5 NUMERICAL PROBLEMS ON CALCULATION OF BEARINGS, ANGLES AND LOCAL ATTRACTION.	**12**	**16**
Unit – 4	**Leveling** 4.1 Definitions – Level surface, Level line, horizontal line, Vertical line, Datum surface , Reduced level, Bench mark and its types . 4.2 DUMPY LEVEL –COMPONENTS, CONSTRUCTION, LINE OF SIGHT, LINE OF COLLIMATION, BUBBLE TUBE AXIS, LEVELING STAFF – TELESCOPIC AND FOLDING TYPE .FORESIGHT, BACK SIGHT, INTERMEDIATE SIGHT, CHANGE POINT, HEIGHT OF COLLIMATION . FUNDAMENTAL AXES AND THEIR RELATIONSHIP 4.3 RECORDING IN LEVEL BOOK. TEMPORARY ADJUSTMENTS OF DUMPY LEVEL. 4.4 METHOD OF REDUCTION OF LEVELS – HEIGHT OF INSTRUMENT METHOD AND RISE AND FALL METHOD. ARITHMETICAL CHECKS, NUMERICAL PROBLEMS, COMPUTATION OF MISSING READINGS. 4.5 CLASSIFICATIONS OF LEVELING - SIMPLE, DIFFERENTIAL, PROFILE, CROSS SECTIONAL, FLY AND CHECK LEVELLING. 4.6 STUDY AND USE OF TILTING LEVEL & AUTO LEVEL. 4.7 SOURCES AND ERRORS IN LEVELLING, PRECAUTIONS AND DIFFICULTIES FACED IN LEVELLING.	**16**	**20**
Unit – 5	CONTOURING 5.1 DEFINITIONS – CONTOUR, CONTOUR INTERVAL, HORIZONTAL EQUIVALENT. 5.2 CHARACTERISTICS OF CONTOURS .METHOD OF LOCATING CONTOURS. INTERPOLATION OF CONTOURS. ESTABLISHING GRADE CONTOURS. 5.3 USES OF CONTOUR MAPS. INTERPRETATION OF TYPICAL CONTOUR SHEETS.	**04**	**08**
Unit – 6	***AREA AND VOLUME MEASUREMENTS*** CONSTRUCTION AND USE OF POLAR PLANIMETER FOR MEASUREMENT OF AREA AND SIMPLE NUMERICAL PROBLEMS.	**04**	**06**

	STUDY AND USE OF DIGITAL PLANIMETE .CONCEPT OF COMPUTATION OF VOLUME BY TRAPEZOIDAL AND PRISMOIDAL FORMULAE.(NO NUMERICAL PROBLEMS)		
	TOTAL	**48**	**70**

PRACTICAL:

SKILLS TO BE DEVELOPED**:**

INTELLECTUAL SKILLS:

1) IDENTIFY THE DIFFERENT INSTRUMENTS FOR LINEAR MEASUREMENT AND LEVELLING
2) RECORD AND OBSERVING NECESSARY OBSERVATION WITH THE SURVEY INSTRUMENTS
3) CLASSIFY AND DISCRIMINATING VARIOUS TYPES OF SURVEY INSTRUMENTS.
4) IDENTIFY THE ERRORS OF THE SURVEY INSTRUMENTS.

MOTOR SKILLS:

1. MEASURE DISTANCES, BEARINGS AND FINDING REDUCED LEVELS WITH SURVEY INSTRUMENTS.
2. PREPARE DRAWING USING SURVEY DATA.
3. PREPARE CONTOUR MAP OF A GIVEN TERRAIN/TOPOGRAPHY.
4. MEASURE AREA OF AN IRREGULAR SHAPE FIGURE WITH PLANIMETER.

INSTRUCTIONS:

1) GROUP SIZE FOR SURVEY PRACTICAL WORK SHOULD BE MAXIMUM 6 STUDENTS.
2) EACH STUDENT FROM A GROUP SHOULD HANDLE THE INSTRUMENT INDEPENDENTLY TO UNDERSTAND THE FUNCTION OF DIFFERENT COMPONENTS AND USE OF THE INSTRUMENT.
3) DRAWING, PLOTTING SHOULD BE CONSIDERED AS PART OF PRACTICAL.
4) ONE FULL DAY PER PROJECT IS REQUIRED FOR CARRYING OUT PROJECT WORK.

TERM WORK SHALL CONSIST OF RECORD OF ALL PRACTICAL AND PROJECTS IN FIELD BOOK AND DRAWING OF PROJECT WORK ON FULL IMPERIAL SIZE DRAWING SHEETS.

1) MEASUREMENT OF DISTANCES WITH CHAIN & TAPE ON GROUND WITH DIRECT OR INDIRECT RANGING.
2) CONSTRUCTION AND USE OF OPTICAL SQUARE AND OPEN CROSS STAFF FOR SETTING OUT PERPENDICULAR AND RUNNING A SURVEY LINE FOR LOCATING DETAILS .
3) MEASUREMENT OF AREA BY CHAIN AND CROSS STAFF SURVEY.
4) USE OF PRISMATIC COMPASS AND OBSERVING FORE BEARING AND BACK BEARING.
5) MEASURING FORE BEARING AND BACK BEARING OF 5-6 SIDE CLOSED POLYGON. IDENTIFYING STATIONS AFFECTED BY LOCAL ATTRACTION AND CALCULATION OF CORRECTED F.B. & B.B.
6) MEASURING FORE BEARING AND BACK BEARING FOR AN OPEN TRAVERSE (5 TO 6 SIDED). CALCULATE DIRECT ANGLES BETWEEN SUCCESSIVE LINES.
7) USE OF DUMPY LEVEL, TEMPORARY ADJUSTMENTS AND TAKING READING ON LEVELLING STAFF. RECORDING READINGS IN FIELD BOOK.
8) DIFFERENTIAL LEVELLING PRACTICE, REDUCTION OF LEVEL BY H.I. METHOD.
9) DIFFERENTIAL LEVELLING PRACTICE, REDUCTION OF LEVEL BY RISE & FALL METHOD.
10) CARRYING BENCH MARK FROM ONE POINT TO ANOTHER POINT ABOUT 200 M BY FLY LEVELLING WITH TILTING LEVEL.
11) USE OF AUTO LEVEL AND TAKING OBSERVATION.
12) MEASUREMENT OF AREA OF IRREGULAR FIGURE BY POLAR PLANIMETER
13) MEASURING AREA ENCLOSED BY CLOSED CONTOURS ON CONTOUR MAP PREPARED EARLIER, BY SIMPLE DIGITAL PLANIMETER

SURVEYING PROJECTS:-

1) **CHAIN & COMPASS TRAVERSE SURVEY** – A SIMPLE CLOSED TRAVERSE OF 5-6 SIDES ENCLOSING A BUILDING. CALCULATION OF INCLUDED ANGLES, LOCATING DETAILS AND PLOTTING THEM ON A 1 SIZE IMPERIAL DRAWING SHEET.
2) **BLOCK CONTOURING** – A BLOCK OF 100 X 150M WITH SPOT LEVELS AT 10X10M PLOTTING THE CONTOURS ON A-1 SIZE IMPERIAL DRAWING SHEET WITH A CONTOUR INTERVAL 0F 1M.
3) **PROFILE LEVELLING SURVEY** – RUNNING A LONGITUDINAL SECTION FOR A LENGTH OF 500 M FOR A ROAD /CANAL /RAILWAY ALIGNMENT. CROSS SECTION SHALL BE TAKEN SUITABLY. PLOTTING PLAN, L- SECTION AND CROSS SECTION ON A1 SIZE IMPERIAL DRAWING SHEET.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Surveying and Levelling	N.N.BASAK		Tata Mc Graw-Hill
SURVEYING AND LEVELLING PART I AND II	T .P. Kanetkar & S. V, Kulkarni		PUNE VIDHYARTHI GRIHA Prakashan
SURVEYING AND LEVELLING VOL. I AND II	Dr. B. C. Punmiya		Laxmi Plublication
TEXT BOOK OF SURVEYING	S.K.Husain, M.S. Nagaraj		S. Chand and company
SURVEYING AND LEVELLING VOL. I AND II	S. K. Duggal		TATA MC GRAW-HILL
PLANE SURVEYING	A.M.Chandra		NEW AGE INTERNATIONAL PUBLISHERS

Reference books :-

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME: CIVIL ENGINEERING GROUP

COURSE CODE : CE/CS/CR/CV

DURATION OF COURSE : 6 SEMESTERS

SEMESTER: FOURTH SEMESTER **SCHEME : C**

Sr.No.	SUBJECT	PERIODS			EVALUATION SCHEME							Credits
	THEORY	L	TU	P	SESSIONSAL EXAM			ESE	PR	Oral #	TW @	
					TA	CT	Total					
1	Advance Surveying	02	--	04	10	20	30	70	50	--	25	4
2	Mechanics of Structures	03	-	02	10	20	30	70	--	--	25	4
3	Geo Technical Engineering	02	--	02	10	20	30	70	--	--	25	3
4	Transportation Engineering	03	--	--	10	20	30	70	--	--	--	3
5	Hydraulics	03	01	02	10	20	30	70	--	25	25	4
6	Computer Aided Drawing	--	--	03	--	--	--	--	--	--	50	2
7	Professional Practices-IV	--	--	03	--	--	--	--	--	--	50	2
	Total	**13**	**01**	**18**	**50**	**100**	**150**	**350**	**50**	**25**	**200**	**22**

STUDENT CONTACT HOURS PER WEEK: **31 HRS**

HTEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

, External Assessment @ , Internal Assessment ESE - End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA - Teachers Assessment, L - Lecture, TU - Tutorial, P - Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks : 775

Minimum passing for sessional marks is 40%, and for theory subject 40%.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : Civil Engineering Group (Advance Surveying**)**	
Course code: CE/CS/CR/CV	**Semester : Fourth**
Duration :6 semester	**Maximum Marks :175**
Teaching Scheme C	**Examination Scheme**
Theory : 2 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 75 Marks
Practical : 4 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :- Nil

S.No	
1.	Development of advanced skill in surveying.

Objective :-

S.No	The Students will be able to:
1.	• Use survey instruments like the odolite and plane table.
2.	• Record the data in field book and plot the collected data.
3.	• Find out horizontal and vertical distances with a tachometer
4.	• Set out simple curve using Theodolite.
5.	• Use of Modern Survey equipments - Micro Optic Theodolite and EDM.
6.	• Apply principles of surveying and leveling for Civil Engineering works.

Pre-Requisite :-

S.No	
1.	Student should have skill in readin, drawing and sketching.
2.	Students should know the basic principles, requirements and purpose of surveying.

Contents		Hrs/week	Marks
Unit -1	**Plane Table Survey** 1.1 Principles of plane table survey. Accessories required 1.2 Setting out of plane table , Leveling ,Centering and orientation. 1.3 Methods of plane table surveying – Radiation, Intersection, and Traversing. 1.4 Merits and Demerits of plane table Surveying. situations where plane table survey is used. 1.5 Use of Telescopic Alidade.	**05**	**12**
Unit -2	***Theodolite Survey*** 2.1 Components of Transit Theodolite and Their functions. Technical terms used. Temporary adjustments of Transit Theodolite.	**10**	**23**

	Swinging the telescope, Transiting, Changing the face. 2.2 Measurement of Horizontal angle, method of Repetition, errors eliminated by method of repetition. 2.3 Measurement of Deflection angle. 2.4 Measurement of Vertical angle. 2.5 Measurement of magnetic bearing of a line by Theodolite . 2.6 Prolonging a Straight line. 2.7 Sources of errors in Theodolite Surveying. 2.8 Permanent adjustment of transit Theodolite (only relationship of different axes of Theodolite.). 2.9 Traversing with Theodolite – Method of included angles, locating details, checks in closed traverse, Calculation of bearings from angles. 2.10 Traverse Computation - Latitude, Departure Consecutive Co-ordinates error of Closure, Distribution of a angular error, balancing the traverse by Bodwitch rule and Transit Rule, Gale's traverse table .simple problems on above topic.		
Unit – 3	**Tacheometric Survey** 3.1 Principle of Tacheometry. 3.2 Essential requirements of Tacheorneter. 3.3 Use of Theodolite as a Tacheometer with staff held in vertical and fixed hair method (No derivation). 3.4 Determination of tacheometric constants, simple numerical problems on above topics.	**06**	**12**
Unit – 4	***Curves*** 4.1 Types of curves used in road and railway alignments. Notations of simple circular curve. Designation of curve by radius and degree of curves. 4.2 Method of Setting out curve by offset from Long chord method and Rankine's method of deflection angles.Simple Numerical problems on above topics.	**05**	**10**
Unit – 5	**Advanced Survey Equipments** 5.1 Construction and use of one second Micro Optic Theodolite, Electronic Digital Theodolite. Features of Electronic Theodolite 5.2 Principle of E.D.M, Components of E.D.M and their functions, use of E.D.M. 5.3 Total station	**04**	**08**
Unit – 6	**Aerial Survey and Remote sensing** 6.1 Aerial Survey Introductions, definition, Aerial photograph. 6.2 Remote Sensing – Introduction, Electro-Magnetic Energy , Remote sensing system- Passive system , Active system. Applications – mineral, land use / Land cover, Natural Hazards and Environmental engineering system.	**02**	**05**
	Total	**32**	**70**

PRACTICAL:

SKILLS TO BE DEVELOPED:

INTELLECTUAL SKILL:

1) Identify the components of plane table, theodolite, and advanced survey instruments.
2) Know the working principles of these survey instruments.
3) Finding the horizontal and vertical distances.
4) Identifying errors in setting out curve and tabulating elements of a curve.

Motor Skills:

1) Taking and recording the observation in the field book.
2) Preparing drawings, maps etc. with the observed data.
3) Setting out curve for the given alignment.
4) Use Micro optic thodolite, EDM for finding different parameters.

Instructions:-

1) Group size for Practical work should be limited to maximum 6 Students.
2) Each student from the group should handle the instrument to understand. the function of different components and use of the instrument.
3) Drawing, plotting should be considered as part of practical.
4) One full day per project is required for carrying out project work, which is to be plotted on a drawing sheet.
5) **TERM WORK** SHOULD CONSIST OF RECORD OF ALL PRACTICALS AND PROJECTS, IN FIELD BOOK AND DRAWING SHEETS FOR THE GIVEN PROJECTS.

LIST OF PRACTICAL:(MINIMUM 12 PRACTICAL FROM LIST GIVEN BELOW)

1) USING ACCESSORIES CARRY OUT TEMPORARY ADJUSTMENTS OF PLANE TABLE.
   LOCATING DETAILS BY METHOD OF RADIATION.
2) Locating details with plane table by method of intersection.
3) Understanding the components of Theodolite and their functions, reading the vernier and temporary adjustments of theodolite.
4) Measurement of Horizontal angle by transit theodolite.
5) Measurement of Horizontal angle by method of Repetition.
6) Measurement of vertical angles by theodolite.
7) Measurement of Magnetic bearing of a line using theodolite.
8) Measurement of deflection angle by taking open traverse of 4 –5 sides.
9) To find Reduced levels and horizontal distances using theodolite as a Tacheometer.
10) To find constants of a given Tacheometer.
11) Study and use of 1 second Micro Optic Theodolite for measurement of Horizontal and Vertical angles
12) Study of E.D.M. for knowing its components.

13) Use of EDM for finding horizontal and vertical distances and reduced levels.
14) Determine the geographical parameters by total station.

List Of Projects:

1) Plane table survey project for 5-6 sided traverse and locating details of buildings , Roads etc. by radiation and Intersection method , Sheet to be drawn by each student separately on A-1 size imperial drawing sheet.

2) Theodolite traverse Survey for a closed traverse of 5-6 sides for a small area. Computation by Gale's traverse table. Plotting the traverse with details on A1 size imperial drawing sheet.

3) Setting out simple circular curve by Rankine's method of Deflection angles for a given problem and plotting the details of curve on A-1 size imperial drawing sheet

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Surveying and Levelling	**N N Basak**		**Tata Mc Graw-Hill**
Surveying and Levelling Part I and II	**T .P. Kanetkar & S. V, Kulkarni**		PUNE VIDHYARTHI GRIHA **Prakashan**
Surveying and Levelling Vol. I and II	**Dr. B. C. Punmiya**		**Laxmi Publication**
Text book of Surveying	**S.K.Husain, M.S. Nagaraj**		**S. Chand and company**
Surveying and Levelling Vol. I and II	**S. K. Duggal**		TATA MC GRAW-HILL
Plane Surveying	**A.M.Chandra**		NEW AGE INTERNATIONAL PUBLISHERS

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group: Computer Aided Drawing	
Course code: CE/CS/CR/CV	**Semester : Fourth**
Duration : 6 semester	**Maximum Marks :50**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: ---- Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 3 hrs/week	End Semester Exam: ----- Marks
Credit :- 2	

Aim :-

S.No	
1.	Development of computer based knowledge in surveying.

Objective :-

S.No	Students will be able to:
1.	• Use different CAD commands for drawing.
2.	• Prepare line plans with CAD software.
3.	• Prepare submission drawing/working drawing for the buildings with CAD software.
4.	• Prepare drawings of civil engineering structures.

Pre-Requisite :-

S.No	
1.	Student should know basic functions of computer.

	Contents	Hrs/week
Unit -1	**CAD Software** Meaning, various CAD software available in the market AutoCAD, Felix Cad, Auto Civil, 3D Max ; etc.)Starting up of CAD, CAD Window, Tool bar, Drop down menu, Command window, Saving the drawing. Introduction of Graphic screen.	
Unit -2	**CAD Commands** WCS icon, UCS icon, co-ordinates, drawing limits, grid, snap, ortho features. Drawing commands, line, circle, polyline, multiline, ellipse, polygon etc. Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc. Working with hatches, fills, dimensioning, text etc.	
Unit – 3	**Submission / Working Drawing** Generation of line plan, Detailed Plan, elevation, section, site plan, Area statement	

	Generation of 3D view and print commands Introduction to Auto Civil , 3D Max.	

Note: Above theoretical aspects should be covered in the practical periods.

Practical:

A) Building Drawing:

Following exercises shall be completed with CAD software and Print of all the drawings should be prepared on A3 / A4 size paper

1) Preparation of line plan of a residential building.
2) Preparation of line plan of a Public building.
3) Preparation of detailed plan of a small residential building .
4) Preparation of submission drawing of residential building – showing Plan, Elevation, Section, Schedule of openings, Site Plan and Area Statement

B) Civil Engineering Drawing.

Preparation of Drawings with CAD software for the following exercises (Any THREE) and Print of all the drawings should be prepared on A3 /A4 size paper.

1) Plan, Cross Section and Longitudinal section of a Culvert (Pipe culvert/Box Culvert).
2) Section of an Earthen Dam.
3) Plan and Section of K. T. Weir.
4) Cross Section of Retaining wall.
5) Bonds in brickwork – Plan and Elevation for English bond and Flemish bond for one brick thick wall.
6) Cross Section of ESR.
7) Cross Section of Clarri-flocculator.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
AutoDesk	Reference Manual of AutoCAD		
Felix CAD	Reference Manual of Felix cad		
--	Reference Manual of Intel CAD		
--	Reference Manual of Auto Civil		
--	Reference Manual of 3D-Max		

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

3	

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (Geo-Technical Engineering**)**	
Course code: CE/CS/CR/CV	**Semester :** Fourth
Duration :6 semester	**Maximum Marks :125**
Teaching Scheme C	**Examination Scheme**
Theory : 2 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 3	

Aim :-

S.No	
1.	Study of geo-technical virtue of the surroundings required for building construction.

Objective :-

S.No	Students will be able to:
1.	• Explain soil as three phase system and establish relationship between properties of soil.
2.	• Determine properties of soil by following standard test., procedure and plot particle size distribution curve.
3.	• Determine permeability by constant head and falling head test using Darcy's Law
4.	• Obtained OMC & MDD for any soil sample by performing Proctor Compaction test.
5.	• calculate shearing strength of soil, using Coulomb's law

Pre-Requisite :-

S.No	
1.	Students should think over the nature and profile of the geo-region where the building is to be constructed.

Contents : Theory		Hrs/week	
Unit -1	**Overview Geotechnical Engineering** 1.1 IS definition of soil 1.2 Importance of soil in Civil Engineering as construction material in Civil Engineering Structures, as foundation bed for structures 1.3 Field application of geotechnical engineering foundation design, pavement design, design of earth retaining structures, design of earthen dams (brief ideas only)	**02**	**02**
Unit -2	**Physical Properties of Soil** 2.1 Soil as a three phase system 2.2 Water content, Determination of water content by oven drying method as per IS code 2.3 Void ratio, porosity and degree of saturation, density index 2.4 Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight	**08**	**20**

	2.5 Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code 2.6 Specific gravity, determination of specific gravity by pycnometer. 2.7 Consistency of soil, stages of consistency, Atterberg's limits of consistency viz. Liquid limit, plastic limit and shrinkage limit, plasticity index. 2.8 Determination of liquid limit, plastic limit and shrinkage limit as per IS code. 2.9 Particle size distribution, mechanical sieve analysis as per IS code particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils. 2.10 Particle size classification of soils & IS classification of soil		
Unit – 3	**Permeability of Soil & Seepage Analysis** 3.1 Definition of permeability 3.2 Darcy's law of permeability, coefficient of permeability, typical values of coefficient of permeability for different soil 3.3 Factors affecting permeability 3.4 Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability. 3.5 Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equipotential lines. 3.6 Flow net, characteristics of flow net, application of flow net (no numerical problems)	**04**	**10**
Unit – 4	**Shear Strength of Soil** 4.1 Shear failure of soil, field situation of shear failure 4.2 Concept of shear strength of soil 4.3 Components of shearing resistance of soil – cohesion, internal friction 4.4 Mohr-coulomb failure theory, Strength envelope, strength equation 4.5 Purely cohesive and cohesion less soils 4.6 Laboratory determination of shear strength of soil – Direct shear test, Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil	**04**	**08**
Unit – 5	**Bearing Capacity of Soils** 5.1 Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure 5.2 Terzaghi's analysis and assumptions made. 5.3 Effect of water table on bearing capacity 5.4 Field methods for determination of bearing capacity – Plate load test and standard penetration test. Test procedures as Per IS:1888 & IS:2131 5.5 Typical values of bearing capacity from building code IS:1904 5.6 Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field	**04**	**08**
Unit – 6	**Compaction of Soil & Stabilization** 6.1 Concept of compaction, purpose of compaction field situations where compaction is required. 6.2 Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, Zero air	**06**	**14**

	voids line. 6.3 Modified proctor test 6.4 Factors affecting compaction 6.5 Field methods of compaction – rolling, ramming & vibration and Suitability of various compaction equipments. 6.6 California bearing ratio, CBR test, significance of CBR value 6.7 Difference between compaction and consolidation 6.8 Concept of soil stabilization, necessity of soil stabilization 6.9 Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization		
Unit – 7	**Site Investigation And Sub Soil Exploration** 7.1 Necessity of site investigation & sub-soil exploration. 7.2 Types of exploration – general , detailed. 7.3 Method of site exploration open excavation & boring 7.4 Criteria for deciding the location and number of test pits and bores 7.5 Disturbed & undisturbed soil samples for lab testing. 7.6 Field identification of soil – dry strength test, dilitancy test & toughness test 7.7 Empirical correlation between soil properties and SPT values.	**04**	**08**
	Total	**32**	**70**

Practical

Skills to be developed:

Intellectual Skills:

a. Identify properties of soil.
b. Interpret test results.
c. Follow IS procedure of testing.

Motor Skills:

a. Measure the quantities accurately.
b. Handle the instruments carefully.

List of Practical (Any ten)

1. Determination of water content of given soil sample by oven drying method as per IS Code.
2. Determination of bulk unit weight dry unit weight of soil in field by core cutter method as per IS Code.
3 Determination of bulk unit weight dry unit weight of soil in field by sand replacement method as per IS Code.
5. Determination of Liquid limit & Plastic limit of given soil sample as per IS Code.
6 Determination of grain size distribution of given soil sample by mechanical sieve analysis as per IS Code.
7. Determination of coefficient of permeability by constant head test
8. Determination of coefficient of permeability by falling head test
   Practical (Live demo or Prerecorded demo)
9. Determination of shear strength of soil using direct shear test.
10. Determination of shear strength of soil using Laboratory Vane shear test
11. Determination of MDD & OMC by standard proctor test on given soil sample as per IS Code.
12. Determination of CBR value of given soil sample.
13. Determination of shear strength of soil using unconfined compressive strength.
14. Determination of shear strength of soil using tri-axial shear test.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Dr. B. C. Punmia	Soil Mechanics & Foundation Engineering		Standard Book house, New Delhi
Murthi	Soil Mechanics & Foundation Engineering		Tata McGraw Hill , New Delhi
B. J. Kasmalkar	Soil Mechanics		Pune Vidhyarti Griha, Pune
Gulhati & Dutta	Geo-technical Engineering		Tata McGraw Hill , New Delhi

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (Hydraulics**)**			
Course code: CE/CS/CR/CV		**Semester : Fourth**	
Duration :6 semester		**Maximum Marks :150**	
Teaching Scheme		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: 1 hrs/week		Assignment & Quiz: 50 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 4			

Aim :-

S.No	
1.	Study of hydraulics.

Objective :-

S.No	The student will able to:
1.	• Compute the total hydro static pressure & center of pressure.
2.	• Describe the principle of pressure measuring devices.
3.	• Identify the concept of fluid flow.
4.	• Compute the loss of water flowing through pipes.
5.	• Design most economical channel section.
6.	• Describe working of the velocity measuring devices.

Pre-Requisite :-

S.No	
1.	Student should know the basic properties of fluid.

Contents: Theory		Hrs/week	Marks
Unit -1	**Properties Of Fluid** 1.1 Definition of fluid, Difference in behavior of fluid with respect to solids. Introduction to fluid mechanics and hydraulics, Branches of hydraulics- Hydrostatics and hydrodynamics, Importance of Hydraulics with respect to Irrigation and Environmental engineering. 1.2 Physical properties of fluid Mass density, Weight density, Specific volume, Specific gravity, Surface tension and capillarity, Compressibility, Viscosity, Newton's law of viscosity – Dynamic and kinematics viscosity. Ideal and Real liquids	**04**	**06**
Unit -2	**HYDROSTATIC PRESSURE** 2.1 Free liquid surface, Definition of pressure and its SI unit Hydrostatic pressure at point, Pascal's law Variation of pressure in horizontal and vertical direction in static liquid Pressure diagram.	**08**	**10**

	2.2 Total hydrostatic pressure and center of pressure, Determination of total pressure & center of pressure on vertical & inclined faces of dams, sluice gates, sides and bottom of water tanks, Determination of total hydrostatics pressure & center of pressure on sides and bottom of tank containing two liquids. Determination of net hydrostatic pressure and center of pressure on vertical surface in contact with liquid on either side. Numerical Problems.		
Unit – 3	**Measurement Of Liquid Pressure In Pipes** Concept of pressure head and its unit, Conversion of pressure head of one liquid in to other devices for pressure measurements in pipes – Piezometer, U-tube manometer, Bourdon's pressure gauge. Principle of working and limitations. Measurement of pressure difference using differential manometer – U-tube differential manometer and inverted U-tube differential manometer. Numerical Problems.	**04**	**06**
Unit – 4	*Fundamentals Of Fluid Flow* 4.1 Concept of flow, Gravity flow and pressure flow. Types of flow – steady and Unsteady, uniform and non-uniform , Laminar and turbulent. Various combinations of flow with practical examples, Reynolds number and its application, Stream line and equi-potential line. Flow net and its uses 4.2 Discharge and its units Continuity equation for fluid flow. Datum head, pressure head, velocity head and total head, Bernoulli's theorem, Loss of head and modified Bernoulli's theorem, Impulse momentum theorem Numerical Problems.	**06**	**08**
Unit – 5	*Flow Of Liquid Through Pipes* 5.1 Loss of head due to friction, Darcy-Weisbach Equation Friction factor, relative roughness. Moody's diagram and its use. Common range of friction factor for different types of pipe material. 5.2 Minor loss of head in pipe flow- loss of head due to sudden Contraction, sudden expansion, gradual contraction & expansion, at entrance and exit of pipe in various pipe fittings. Pipes in series and parallel Equivalent pipe – Dupuit's equation 5.3 Hydraulic gradient line and Energy gradient line, Siphon pipe. Water hammer in pipes – cause effects and remedial measures Use of Nomograms for design of water distribution system. Numerical	**07**	**10**
Unit – 6	**Flow Through Open Channel** 6.1 Types of channels- artificial & natural, purposes of artificial channel, Different shapes of artificial channels Geometrical properties of channel section – wetted area, wetted Perimeter, hydraulics radius Prismatic channel sections, steady- uniform flow through prismatic channel section. 6.2 Chezy's equation and Manning's equation for calculation of discharge through an open channel, common range of values of Chezy's constants and Manning's constant of different types of channel surfaces.	**07**	**14**

	Most economical channel section, conditions for most economical channel sections. 6.3 Froud's number and its significance. Critical, sub-critical and supercritical flow in channel Hydraulic jump its occurrence in field, uses of hydraulic jump.		
Unit – 7	**Flow Measuring Devices** 7.1 Velocity measuring devices for open channels.Floats-surface, sub-surface and float rod Pitot tube – principle, expression for velocity Current meter-cup type & propeller type 7.2 Discharge measuring devices for channels Notches -Types of notches, expression for discharge. Francis formula, end contraction and velocity of approach Weirs - Broad crested weir, ogee spillway, and expression for discharge. Flumes - Venturi flume, standing wave flume, expression for discharge. Velocity area method for measurement of discharge through open channels. Discharge measuring devices for pipes. 7.3 Venturimeter – Component parts, principle of working, Study and use of Water meter Flow through orifice Orifice- Definition and use, Types of orifice based on various criteria. Coefficient of contraction, coefficient of velocity and coefficient of discharge, Relationship between them. Discharge through small sharp-edged circular orifice Determination of hydraulic coefficient of orifice. Numerical.	**08**	**10**
Unit – 8	**Hydraulic Machines** Pumps - Definition and types. Suction head, delivery head, static head and manometric head. Centrifugal pump - component parts and their functions, principle of working, priming. Reciprocating pump - component parts and working. Submersible pump and Jet pump. Selection and choice of pump. Computation of power required for pumps. Turbines - Definition and types.	**04**	**06**
	Total	**48**	**70**

Practical:

Skills to be developed**:**

Intellectual Skills:

a. Interpret test results
b. Calculate quantities of parameters
c. Draw graphs

Motor Skills:

a. Measure different parameters accurately
b. Adjust levels by operating valves

List of Practical:

1. Measurements of pressure and pressure head by Piezometer, U-tube manometer
2. Measurement of pressure difference by U-tube differential manometer. Study of bourdon's gauge
3. Verification of Bernoulli's theorem
4. Reynolds experiment to study types of flow.
5. Determination of Darcy's friction factor for a given pipe
6. Determination of Minor losses in pipes (any two)
7. Study and use of Moody's diagram, Nomogram of Manning's equation
8. Determination of Manning's constant or Chezy's constant for given rectangular channel section.
9. Demonstration of Hydraulic jump
10. Determination of coefficient of discharge for given rectangular or triangular notch.
11. Determination of coefficient of discharge for a given Venturimeter.
12. Demonstration and use of Pitot tube and current meter
13. Determination of hydraulic coefficients for sharp edge orifice.
14. Study & use of water meter.
15. Study of a model of centrifugal and reciprocating pump.
16. Use of characteristic curves/ nomograms /charts / catalogs from manufactures for selection of pump for the designed discharge and head (Refer IS: 9694)

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Dr. P.N.Modi & Dr. S.M.Seth	Hydraulics & Fluids Mechanics		Standard Book House, Dehli
S.Ramamrutham	Hydraulics & Fluids Mechanics		Dhanpat Rai & Sons, Delhi
R.S.Khurmi	A Text Book of Hydraulics, Fluids Mechanics Hydraulics Machines		S.Chand & Company Ltd. New Delhi
R.K.Rajput	A Text Book of Fluids Mechanics Hydraulics Machines		S.Chand & Company Ltd. New Delhi
Dr. Jagdish Lal	Fluids Mechanics Hydraulics		Metropolitan Book Co. Private Ltd. New Delhi
S.K.Likhi	Hydarulics Laboratory Manual		T.T.T.I. Chandhigrah

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group **(Mechanics of Structures)**			
Course code: CE/CS/CR/CV		**Semester :** Fourth	
Duration :6 semester		**Maximum Marks :125**	
Teaching Scheme C		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 4			

Aim :-

S.No	
1.	Study of mechanics of the structures.

Objective :-

S.No	The students will be able to:
1.	• Calculate stresses in simple and composite sections.
2.	• Calculate deformations of the specimen subjected to uni-axial, bi-axial &
3.	• Tri-axial stress system.
4.	• Analyse the truss by using different methods.
5.	• Draw shear force and bending moment diagrams.
6.	• Calculate moment of Inertia of standard plane section & their composites
7.	• Calculate shear stress & bending stress in beam cross section.

Pre-Requisite :-

S.No	
1.	Student should be perfect in basic concepts of engineering mechanics and mathematical analysis.
2.	Student should be perfect in theory of elasticity.

	Contents : Theory (Name of the Topics)	Hrs/week	Marks
Unit -1	**Stress & Strain** 1.1 Definition of rigid body, plastic body, mechanical properties of metal such as elasticity & elastic limit. 1.2 Definition of stress, strain, modulus of elasticity, S. I. Unit. Classification of stress, strain, Sign convention. Stress, strain curve for mild steel and HYSD bar , yield stress/ proof stress, Ultimate stress, breaking stress and percentage elongation. 1.3 Deformation of body due to axial load. Deformation of a Body subjected to axial forces. Deformation of body of stepped c/s due to axial load, max. stress and min. stress induced. Stresses in bars of composite section & deformation. 1.4 Shear stress, shear strain & modulus of rigidity, complementary shear stress, state of simple shear, punching shear.	**10**	**10**
Unit -2	**Elastic Constants & Principal Stresses**	**08**	**10**

	2.1 Definition of lateral strain, Poisson's ratio, Change in lateral dimensions 2.2 Volumetric strain due to uni-axial force and change in volume 2.3 Biaxial and tri-axial stresses and volumetric strain & change in volume 2.4 Definition of bulk modulus, volumetric strain. 2.5 Relation between modulus of elasticity, modulus of rigidity and bulk modulus. 2.6 Definition of principal planes & principal stresses 2.7 Principal planes & stress due to bi-axial stress system & due to state of simple shear. (Analytical method only)		
Unit – 3	**Shear Force And Bending Moment :** 3.1 Types of beams - cantilever, simply supported, fixed and continuous beams, types of loading- point load, uniformly distributed load, support reactions for determinate structures 3.2 Concept of shear force and bending moment, sign convention. Relation between bending moment, shear force and rate of loading 3.3 Shear force and bending moment diagrams for simply supported beams, overhanging beams and cantilever subjected to point loads, UDL and couples, point of contra flexure	**08**	**14**
Unit – 4	**Moment Of Inertia:** 4.1 Concept of moment of inertia M.I of plane areas such as rectangle, triangle, circle, semicircle and quarter circle 4.2 Parallel axis and perpendicular axis theorem M.I of composite sections, built up sections, symmetrical and unsymmetrical sections, radius of gyration & polar moment of inertia.	**06**	**10**
Unit – 5	**Stresses In Beams:** 5.1 Bending Stresses in Beams: Concept of pure bending, theory of simple bending, assumptions in theory of bending, neutral axis, bending stresses and their nature, bending stress distribution diagram, moment of resistance. 5.2 Application of theory of bending to symmetrical and unsymmetrical sections. 5.3 Shear stresses in beams: Shear stress equation, meaning of terms in equation, shear stress distribution for rectangular, hollow rectangular, circular sections and hollow circular sections 5.4 Relation between max. shear stress and average shear stress.	**06**	**10**
	Analysis Of Trusses 6.1 Definition frames, classification of frames, perfect, imperfect, redundant and deficient frame, relation between members and joints, assumption in analysis. Method of joint, method of section and graphical method to find nature of forces.	**06**	**10**
	Strain Energy 7.1 Types of loading – gradual, suddenly applied load & Impact load 7.2 Definition of strain energy, modulus of resilience and proof resilience. 7.3 Comparison of stresses due to gradual load, sudden load and impact load.	**04**	**06**
	Total	**48**	**70**

Practical:

Skill to be developed:

Intellectual Skills:

1. Interpret the results.
2. Calculate design parameters.

Motor Skills:

1. Observe the phenomenon during testing of specimen.
2. Draw the graphs and diagrams.

List of Practical:

Group – A (Any Six)

1. Identify the components of universal testing machine & tension test on mild steel.
2. Tension test on tor steel / deformed bars .
3. Izod Impact test on mild steel, brass, copper and cast iron.
4. Charpy impact test on mild steel, brass, copper and cast iron.
5. Flexural test on timber.
6. Flexure test on floor tiles or roofing tiles.
7. Shear Test on metal.
8. Water Absorption & Compression test (Dry & Wet) on bricks
9. Abrasion Test on flooring tiles.

Group - B

1. Drawing of Shear force and Bending Moment diagrams on Graph Paper (6 Problems)
2. Graphical Solution of Two Problems on simple frames i) Cantilever ii) Simply supported on A2 size sheet with their analytical solutions

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
F. L. Singer	Strength of Materials		Harpe Collins Publishers India , Delhi
R. S. Khurmi	Strength of Materials		S. Chand & Company Delhi
S. B. Junnarkar	Mechanics of Structures volume –I & II		Charotar Publishing House, Anand.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (Professional Practices-IV)	
Course code: CE/CS/CR/CV	**Semester :** Fourth
Duration :6 semesters	**Maximum Marks :50**
Teaching Scheme	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: - Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 3 hrs/week	End Semester Exam: - Marks
Credit :- 2	

Aim :-

S.No	
1.	Development and evaluation of individual skills.
2.	Enhancement in soft skills through innovation.
3.	Development of professional approach.

Objective :-

S.No	Student will be able to:
1.	• Acquire information from different sources.
2.	• Prepare notes for given topic.
3.	• Present given topic in a seminar.
4.	• Interact with peers to share thoughts.
5.	• Prepare a report on industrial visit, expert lecture.

Pre-Requisite :-

S.No	
1.	Communication skill must be perfect.

	Contents	Hrs/week
Unit -1	Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. The industrial visits may be arranged in the following areas / industries (Any three) i) Bridge under construction ii) Adarsh Gram iii) Railway station iv) Construction of basement/retaining wall/sump well	**20**
Unit -2	Lectures by Professional / Industrial Expert / Student Seminars based on information search, expert lectures to be organized from any two of the following areas: i) Construction of Flyovers: Special Features ii) Ready Mix concrete iii) Safety in Construction	**10**

	iv) Latest Trends in Water proofing v) Software for drafting	
Unit – 3	Information search can be done through manufacturers, catalogue, internet, magazines; books etc. and submit a report.(any three) Following topics are suggested : i) Collection and reading of drawings of buildings from architect / Practicing engineers and listing of various features from the drawings. ii) Market survey for pumps ,pipes and peripherals required for multi storied buildings iii) Non Conventional Energy Sources with focus on solar energy iv) Elevators installation and maintenance v) Any other suitable areas	**14**
Unit – 4	Seminar : Seminar topic should be related to the subjects of fourth semester. Each student shall submit a report of at least 10 pages and deliver a seminar (Presentation time – 10 minutes)	**16**
Unit – 5	Mini Project / Activities :(any one) a) Optimum design of concrete b) Preparing three dimensional model of residential building using CAD	**20**
	Total	**80**
Text Books:- Nil		
Reference books :- Nil		
Suggested List of Laboratory Experiments :- Nil		
Suggested List of Assignments/Tutorial :- Nil		

Name of the Course : Civil Engineering Group (Transportation Engineering)			
Course code: CE/CS/CR/CV		**Semester :** Fourth	
Duration :6 semester		**Maximum Marks :100**	
Teaching Scheme C		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: - Marks	
Practical : - hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			

Aim :-

S.No	
1.	Development of conceptual knowledge in transportation engineering.

Objective :-

S.No	Students should be able to..
1.	• Know component parts of railway
2.	• Understand methods of survey and investigation of alignment of railway
3.	• Organize
4.	• Understand

Pre-Requisite :-

S.No	
1.	Student should take survey of required places to know basic terms.
2.	Student should have the knowledge and modes of transportation.

	Contents: Theory (Name of the Topic)	Hrs/week	Marks
Unit -1	**Overview of Transportation Engineering** 1.1 Role of transportation in the development of nation. 1.2 Modes of transportation system – roads, railway, airways, waterways, Importance of each mode, comparison and their relative merits and demerits. 1.3 Necessity & importance of Cross drainage works for roads & railways.	**02**	**04**
Unit -2	**Railway Engineering.** 2.1 Alignment and Gauges Classification of Indian Railways, zones of Indian Railway. Alignment- Factors governing rail alignment. Rail Gauges – types, factors affecting selection of gauge. Rail track cross sections – standard cross section of BG & M.G Single & double line in cutting and embankment. 2.2 Permanent ways Ideal requirement, component parts. Rails – function & its types. Rail Joints – requirements, types,	**18**	**26**

	Creep of rail , causes & prevention of creep. Sleepers – functions & Requirement, types – wooden, metal, concrete sleepers & their suitability, sleeper density. Ballast – function & different types with their properties, relative merits & demerits. Rail fixtures & fastenings – fish plate, bearing plates, spikes, bolts, keys, anchors & anti creepers. 2.3 Railway Track Geometrics. Coning of wheels, tilting of rails, Gradient & its types, Super elevation limits of Super elevation on curves, cant deficiency negative cant, grade compensation on curves. 2.4 Branching of Tracks Definition of point & crossing, a simple split switch turnout consisting of points and crossing lines. Sketch showing different components, their functions & working. Line sketches of track junctions-crossovers, scissor cross over, diamond crossing, triangle. Inspection of points and crossings 2.5 Station and Yards : Site selection for railway stations, Requirements of railway station, Types of stations (way side, crossing, junction & terminal) Station yards , types of station yard, Passenger yards, Goods yard Locomotive yard – its requirements, water column , Marshalling yard – its types. 2.6 Track Maintenance- Necessity, types, Tools required and their function, orgnisation, duties of permanent way inspector, gang mate, key man		
Unit – 3	**Bridge Engineering :** 3.1 Site selection and investigation Factors affecting selection of site of a bridge. Bridge alignment Collection of design data Classification of bridges according to function, material, span, size, alignment, position of HFL. 3.2 Component parts of bridge. Plan & sectional elevation of bridge showing component parts of , substructure & super structure. Different terminology such as effective span, clear span, economical span, waterway, afflux, scour, HFL, freeboard, etc. Foundation – function, types Piers-function, requirements, types. Abutment – function, types Wing walls – functions and types. Bearing – functions, types of bearing for RCC & steel bridges. Approaches –in cutting and embankment. Bridge flooring- open and solid floors 3.3 Permanent and Temporary Bridges- Permanent Bridges - Sketches & description in brief of culverts, causeways, masonry, arch, steel, movable steel bridges, RCC girder bridge, prestressed girder bridge, cantilever, suspension bridge.	**18**	**26**

	Temporary Bridges- timber, flying, floating bridges 3.4 Inspection & Maintenance Of Bridge. Inspection of bridges Maintenance of bridges & types – routine & special maintenance.		
Unit – 4	**Tunnel Engineering.** 4.1 Definition, necessity, advantages, disadvantages 4.2 Classification of tunnels. 4.3 Shape and Size of tunnels 4.4Tunnel Cross sections for highway and railways 4.5 Tunnel investigations and surveying –Tunnel surveying locating center line on ground, transferring center line inside the tunnel. 4.6 Shaft - its purpose & construction. 4.7 Methods of tunnelling in Soft rock-needle beam method, fore-poling method. line plate method, shield method. 4.8 Methods of tunnelling in Hard rock-Full-face heading method, Heading and bench method, drift method. 4.9 Precautions in construction of tunnels 4.10 Drilling equipments-drills and drills carrying equipments 4.11 Types of explosives used in tunnelling. 4.12 Tunnel lining and ventilation.	**10**	**14**
	Total	**48**	**70**

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Railway Engineering	S.C. Saxena		Dhanpatrai & sons
Railway Track	K.R. Antia		The New Book Co. Pvt. Ltd Mumbai
Principles of Railway Engineering	S.C. Rangwala		Charotar Publication
Principles and Practice of Bridge Engineering	S.P. Bindra		Dhanpatrai & sons
A Text Book of Transportation Engineering	N.L.Arora and S.P. Luthra		IPH New Delhi
Elements of Bridge Engineering	J.S. Alagia		Charotar Publication
Bridge Engineering	D.R. Phatak		Everest Publisher
Elements of Bridges	D. Johnos Victer		Oxford & IBH Publishing co.
Road, Railway and Bridges	Birdi & Ahuja.		Std. Book House
Tunnel Engineering	S.C. Saxena		Dhanpatrai & sons
Explosive	C. B. Navalkar		--

Engineering			
2. IS / International Codes. : IS 4880, I.S. 5878, Part-I to X.			
Reference books :- Nil			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME: AUTOMOBILE ENGINEERING

COURSE CODE : AE

DURATION OF COURSE : 6 SEMESTERS

SEMESTER: FIFTH SEMESTER **SCHEME : C**

Sr.No.	SUBJECT	PERIODS			EVALUATION SCHEME							Credits
	THEORY	L	TU	P	SESSIONSAL EXAM			ESE	PR	Oral #	TW @	
					TA	CT	Total					
1	Automobile Component Design	03	--	02	10	20	30	70	--	25	25	
2	Advanced Automobile Engines	03	--	02	10	20	30	70	50	--	25	
3	Basic Electrical & Electronics	03	--	02	10	20	30	70	--	25	--	
4	Hydraulics & Pneumatics	03	--	02	10	20	30	70	--	25	25	
5	**Elective-I (Any One)**											
	Mechatronics	03	--	02	10	20	30	70	--	--	25	
	Vehicle Aerodynamics and Design	03	--	02	10	20	30	70	--	--	25	
	Vehicle Testing	03	--	02	10	20	30	70	--	--	25	
	Environmental Pollution and Control	03	--	02	10	20	30	70	--	--	25	
6	Industrial Project & Entrepreneurship Development	01	01	02	--	--	--	--	--	--	25	
7	Professional Practices-V (AE)	--	--	03	--	--	--	--	--	--	50	
	Total	**16**	**01**	**15**	**50**	**100**	**150**	**350**	**50**	**75**	**175**	

STUDENT CONTACT HOURS PER WEEK: **32 HRS**

HTEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

, External Assessment @ , Internal Assessment ESE - End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA - Teachers Assessment, L - Lecture, TU - Tutorial, P - Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks : 800

Minimum passing for sessional marks is 40%, and for theory subject 40%.
Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : CIVIL ENGINEERING GROUP (BUILDING SERVICES AND ENTREPRENEURSHIP DEVELOPMENT)		
Course code: : CE/CS/CR	**Semester : FIFTH FOR CE/CS/CR AND SIXTH FOR CV**	
Duration :6 semester	**Maximum Marks :25**	
Teaching Scheme	**Examination Scheme**	
Theory : 1 hrs/week	Mid Semester Exam: - Marks	
Tutorial: 1 hrs/week	Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week	End Semester Exam: -- Marks	
Credit :- 3		

Aim :-

S.No	
1.	Testing of proficiency of students in the field of Civil engineering

Part - A: Building Services

Objective :-

S.No	Students will be able to:
1.	Plan and design various building services required in residential and commercial buildings.
2.	Apply various methods of providing these services & its maintenance.

Pre-Requisite :-

S.No	
1.	Students should be perfect in their selected subject / topic / theme.

Contents : Theory (A: Building Services:)		Hrs/week
Unit -1	**Plumbing** 1.1 Elements of plumbing Objectives of plumbing, purpose of plumbing, role of plumber, licensing of plumbers their functions, sewer Air, supply pipes, drainage & vent pipes application for obtaining supply connection. 1.2 Pipes joints & fittings Introduction. Types of Pipe – G.I. Pipes, PVC Pipes, Copper pipes, C.I. Pipes, A.C. Pipes, prestressed concrete pipes, joints in pipes, method of fixing pipes such as G.I. fitting C.I. fitting. 1.3 Valves & Terminal Fittings Types of valves & its purpose, sluice valve, reflux valve, scour valve, Air relief valve, pressure relief valve, gate valves, Bio-taps &	**08**

	stop valve self closing valve. Flush valve, mixing valve. 1.4 Sanitary fixture & Building drainage system Building sanitary fittings – water closet, flushing appliances, urinals, washbasins, flushing cisterns, principles of building drainage siphonic action, traps & its types. Capacity & sizing of pipe, soil pipe, waste pipe, rain water pipe, system of plumbing. Installation of pipes, testing of pipes.	
Unit -2	**Water Proofing Treatment** Introduction, material required for water proofing and its specification. Water proofing of water closet and bath room procedure & Cross section. Terrace and basement water proofing, Precautions to be taken while water proofing.	**04**
Unit – 3	**Termite Proofing** Introduction, general principles of termite proofing. Methods of termite proofing. Material used in termite proofing treatment.	**02**
Unit – 4	**Damp Proofing** Sources of dampness & its effects. Material used for damp proofing, Methods of damp – proofing. Damp proofing treatment in building such as basement, floors, walls.	**02**
	Total	**16**

Practical:

1. Practical on joining P.V.C. / G.I. Pipes & fittings/Models and writing report on the process.
2. Practical based on sanitary fitting like, traps, wash basin & water closet fittings.
3. Prepare drawing for water supply. Layout plan for campus showing following details service pipe, communication pipe. consumer pipe, water meter, rain water pipes
4. Prepare drawing for drainage line plan for campus showing following details:
   Inspection chambers sewage pipes, traps, man holes.
5. Market survey for different materials available in market their trade names & rates used for water proofing, termite proofing and damp proofing treatment and writing report on the materials collected.

Part B : Entrepreneurship Development

Objective :-

S.No	Students will be able to:
1.	• Identify entrepreneurship opportunity.
2.	• Acquire entrepreneurial values and attitude.

3.	• Use the information to prepare project report for business venture.	
4.	• Develop awareness about enterprise management.	
Contents : Theory		Hrs/week
Unit -1	Entrepreneurship, Creativity & Opportunities 1.1) Concept, Classification & Characteristics of Entrepreneur 1.2) Creativity and Risk taking. 1.2.1) Concept of Creativity & Qualities of Creative person. 1.2.2) Risk Situation, Types of risk & risk takers. 1.3) Business Reforms. 1.3.1) Process of Liberalization. 1.3.2) Reform Policies. 1.3.3) Impact of Liberalization. 1.3.4) Emerging high growth areas. 1.4) Business Idea Methods and techniques to generate business idea. 1.5) Transforming Ideas in to opportunities transformation involves Assessment of idea &Feasibility of opportunity 1.6) SWOT Analysis	**03**
Unit -2	Information and Support Systems 2.1) **Information Needed and Their Sources**. Information related to project, Information related to support system, Information related to procedures and formalities 2.2) Support Systems 1) Small Scale Business Planning, Requirements. 2) Govt. & Institutional Agencies, Formalities 3) Statutory Requirements and Agencies.	**03**
Unit -3	**Market Assessment** 3.1) Marketing –Concept and Importance 3.2) Market Identification, Survey Key components 3.3) Market Assessment	02
Unit -4	**Business Finance & Accounts** **Business Finance**	**03**

	4.1) Cost of Project 1) Sources of Finance 2) Assessment of working capital 3) Product costing 4) Profitability 5) Break Even Analysis 6) Financial Ratios and Significance **Business Account** 4.2) Accounting Principles, Methodology 1) Book Keeping 2) Financial Statements 3) Concept of Audit,	
Unit -5	**Business Plan & Project Report** 5.1) Business plan steps involved from concept to commissioning: Activity Recourses, Time, Cost 5.2) **Project Report** 1) Meaning and Importance 2) Components of project report/profile **(Give list**) 5.3) **Project Appraisal** 1) Meaning and definition 2) Technical, Economic feasibility 3) Cost benefit Analysis	**03**
Unit -6	**Enterprise Management and Modern Trends** 6.1) Enterprise Management: - Essential roles of Entrepreneur in managing enterprise 2) Product Cycle: Concept And Importance 3) Probable Causes Of Sickness 4) Quality Assurance Importance of Quality, Importance of testing 6.2) E-Commerce Concept and process 6.3) Global Entrepreneur	**02**
	Total	**16**

Text Books:- Nil			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. Deolalikar	Plumbing Design & Practice		Sata M.C. Graw hill publishing company, New Delhi
Prof. S.M. Patil	Building services		Patil Publication & Goregaon, Mumbai.
S.R. Mohan & Vivek Anand	Design & Practica Handbook on plumbing		Standard Publishing, New Delhi.
Sandeep Mantri	A to Z of practical building and its management		Mantri Institute of Development & research, Pune.
Bindra & Arora	Building Construction		Dhanpat rai publishing
Rangwala	Building Construction		Charotor publishing House Anand
2. IS / International Codes : 1. National Building Code – 1983, Bureau of Indian Standards, New Delhi.			
Reference books :- Nil			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
E. Gorden K.Natrajan	Entrepreneurship Development		Himalaya Publishing. Mumbai
Preferred by Colombo plan staff college for Technical education.	Entrepreneurship Development		Tata Mc Graw Hill Publishing co. ltd. New Delhi.
J.B.Patel D.G.Allampally	A Manual on How to Prepare a Project Report		EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : ediindia@sancharnet.in/olpe@ediindia.org Website : http://www.ediindia.org
J.B.Patel S.S.Modi	A Manual on Business Opportunity Identification & Selection		
S.B.Sareen H. Anil Kumar	National Directory of Entrepreneur Motivator & Resource Persons.		
Gautam Jain Debmuni Gupta	New Initiatives in Entrepreneurship Education & Training		
P.C.Jain	A Handbook of New Entrepreneurs		
D.N.Awasthi , Jose Sebeastian	Evaluation of Entrepreneurship		

	Development Programmes		
V.G.Patel	The Seven Business Crisis & How to Beat Them.		
Poornima M. Charantimath	Entrepreneurship Development of Small Business Enterprises		Pearson Education, New Delhi
--	Entrepreneurship Development		McGraw Hill Publication
J.S. Saini B.S.Rathore	Entrepreneurship Theory and Practice		Wheeler Publisher New Delhi
	Entrepreneurship Development		TTTI, Bhopal / Chandigadh

2) Video Cassettes

SUBJECT	SOURCE
Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : ediindia@sancharnet.in/olpe@ediindia.org Website : http://www.ediindia.org
Assessing Entrepreneurial Competencies	
Business Opportunity Selection and Guidance	
Planning for completion & Growth	
Problem solving-An Entrepreneur skill	

Glossary:
Industrial Terms:

Terms related to finance, materials, purchase, sales and taxes.

Components of Project Report:

1. Project Summary (One page summary of entire project)
2. Introduction (Promoters, Market Scope/ requirement)
3. Project Concept & Product (Details of product)
4. Promoters (Details of all Promoters- Qualifications, Experience, Financial strength)
5. Manufacturing Process & Technology
6. Plant & Machinery Required
7. Location & Infrastructure required
8. Manpower (Skilled, unskilled)
9. Raw materials, Consumables & Utilities
10. Working Capital Requirement (Assumptions, requirements)
11. Market (Survey, Demand & Supply)
12. Cost of Project, Source of Finance
13. Projected Profitability & Break Even Analysis
14. Conclusion.

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :-

S.No	
1	Assess yourself-are you an entrepreneur?
2	Prepare project report and study its feasibility.

Name of the Course : CIVIL ENGINEERING GROUP (DESIGN OF STEEL STRUCTURES)			
Course code: CE/CS/CR/CV		**Semester : FIFTH FOR CE/CS/CR AND SIXTH FOR CV**	
Duration :6 semester		**Maximum Marks :150**	
Teaching Scheme C		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 75 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 4			

Aim :-

S.No	
1.	Study of design and implementation steel structure used in building construction.

Objective :-

S.No	Students will be able to:
1.	• Analyze the steel structure and its members for determining the forces acting in the member
2.	• Select proper material and sections from steel table
3.	• Calculate design values for members
4.	• Use IS 875 Part 1, 2 & 3 provisions for dead load, live load and wind load.
5.	• Design the tension member, compression member, beam, purloins and column bases and their connection.
6.	• Use of IS 800 – 1984 for designing the member.
7.	• Read and interpret the structural drawings
8.	• Prepare the detailed working drawing of steel roof truss, showing sections and connections.

Pre-Requisite :-

S.No	
1.	Student should understand the load bearing capacity of components of building.
2.	Student should be perfect in building drawing and its reading process.

Contents : Theory (Name of the Topic**)**		Hrs/week	
Unit -1	**Introduction** Tyes of sections used, Grades of steel and strength characteristics; advantages and disadvantages of steel as construction material; Use of steel table and relevant I. S . code; Types of loads on steel structure and its I. S. code specification.	**02**	**08**
Unit -2	**Connections** Riveted connections, Types of rivets and their use, Types of riveted joint and its failure, Strength of riveted joint and efficiency of a	**06**	**10**

	riveted joint. Assumptions in theory of riveted joint Design of riveted joint for axially loaded member. Welded connection Introduction, Permissible stress in weld, strength of weld, advantages and disadvantages of welded joint. Types of weld and their symbols. Types of welds and their symbols. Design of fillet weld and butt weld subjected to axial load.		
Unit – 3	**Design of Tension Member** ***TYPES OF SECTIONS USED, PERMISSIBLE STRESSES IN AXIAL TENSION AND GROSS AND NET CROSS- SECTIONAL AREA OF TENSION MEMBER*** Analysis and Design of tension member with welded and riveted connection. Introduction to Lug Angle and Tension splice.	**04**	**08**
Unit – 4	**Design of Compression Member** Angle struts Types of 151ections used, Effective length, Radius of gyration, slenderness ration and its limit, Permissible compressive stresses. Analysis and Design of axially loaded angle struts with welded and riveted connection. Stanchion and Columns types of sections used; simple and built up sections, effective length, Analysis and design of axially loaded column introduction to lacing and battening (No numerical problem on Lacing and Battening)	**06**	**12**
Unit – 5	**Steel Roof Truss** Types of steel roof truss & its selection criteria Calculation of panel point load for Dead load; Live load and wind load as per I.S. 875-1987 Analysis and Design of steel roof truss. Design of Angle purlin as per I. S. Arrangement of members at supports	**06**	**14**
Unit – 6	**Beams** Different steel sections used; Simple and built-up sections Permissible bending stresses. Design of simple beams, check for shear only. Design of built-up beams (Symmetrical I Section with cover plates only), check for shear only. Introduction to Plate Girder: Various components and their functions. (No numerical Problem on Plate Girder)	**04**	**08**
Unit – 7	**Column Bases** Types of column bases design of slab base & concrete block introduction to gusseted base (no numerical problems on gusseted Base)	**04**	**10**
	Total	**32**	**70**

PRACTICAL:

TERM WORK SHALL CONSISTS OF SKETCH BOOK AND DESIGN REPORT OF STEEL ROOF TRUSS FOR AN INDUSTRIAL BUILDING, TWO FULL IMPERIAL SIZE SHEET SHALL BE USED FOR DRAWINGS.

1. **Sketch Book:**

Sketch book shall consists of any five plates out of the below mentioned

1. Typical sketches of sections of tension member, determination of net effective cross sectional area of tension member for angle section.
2. Typical sketches of sections of compression member, determination of effective length for different end conditions.
3. Type of trusses for different spans.
4. Riveted and welded connections for axially loaded member.
5. Column section and slab base
6. Important information of clauses of IS800-1984 and IS875 (Part-1,2 & 3)

2. **Design of Steel roof truss:**

The student should draw two full imperial size sheets covering design of steel roof truss any one of the truss fink, fan, pratt, lattice truss for Span from 8 to 16 meter the design shall cover calculations for the dead load, live load, wind load with design of the various elements. The drawing shall include detailing the truss for below mentioned elements.

a. Architectural drawing
b. Data for structural design
c. Key plan at tie level
d. Detailed layout of steel roof truss.
e. Details at end support.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. K. Duggal	Design of steel structure		Tata Macgraw Hill Publication Company ltd. New Delhi
M. Raghupati	Design of steel structure		Tata Macgraw Hill publication Company ltd. New Delhi
L. S. Negi	Design of steel structure		Tata Macgraw Hill publication Company ltd. New Delhi
Ramchandra	Design of steel structure		Dalpatrai & Sonts publication Company ltd. New Delhi

2. Is Codes :

1. IS 800-1984 Indian Standard code of practice for use of structural steel in general building construction, BIS New Delhi.
2. IS-875 Part-1, 2, & 3- 1987 Indian Standard code of practice for use of structural steel in general building construction, BIS New Delhi.
3. IS hand book No. 1 Properties of structural steel rolled section
4. Steel table.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil
Suggested List of Assignments/Tutorial :- Nil

Name of the Course : CIVIL ENGINEERING GROUP (ESTIMATING & COSTING)	
Course code: CE/CS/CR/CV	**Semester :** FIFTH FOR CE/CS/CR AND SIXTH FOR CV
Duration :6 semester	**Maximum Marks :125**
Teaching Scheme	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of financial budget and costing of building construction.

Objective :-

S.No	**Students should be able to**
1.	• DECIDE APPROXIMATE COST OF CIVIL ENGINEERING STRUCTURE.
2.	• Prepare check list of items of construction.
3.	• Prepare estimate for civil engineering work.
4.	• Prepare rate analysis of item of construction.
5.	• Take measurement of completed work.
6.	• Compare actual quantity with estimated quantity

Pre-Requisite :-

S.No	
1.	Student should know accounting process.

Contents : Theory		Hrs/week	
Unit -1	Overview Of Estimating & Costing 1.1 Meaning of the terms estimating, costing. Purpose of estimating and costing . 1.2 Types of estimate - Approximate and Detailed. Approximate estimate Types- Plinth area rate method, Cubic Content method, Service Unit method, Typical bay method, Approximate Quantity method , Problems on Plinth area rate method & application of Service unit method for selection of service unit for different types of civil Engineering Structures. 1.3 Types of detailed estimate. Detailed estimate for new work. Revised estimate. Supplementary estimate. Revised & Supplementary estimate. Maintenance & Repair estimate.	**06**	**08**

	Uses of detailed estimate		
Unit -2	***Detailed Estimate*** 2.1 Unit quantity method, Total quantity method, Data required for detailed estimate. Factors to be considered during preparation of detailed estimate, Specification, Quantity availability of material, Location of site, Labour Component. 2.2 Steps in preparing detailed estimate. Taking out quantities, squaring, abstracting. 2.4 Preparing check list – by adoption of Sequence of execution. drafting Brief Specification of items, contents of measurement Sheet , Abstract sheet , face sheet	**04**	**06**
Unit – 3	**Mode of Measurements**. 3.1 General Rules for fixing units of Measurements for different – items of work as per IS 1200 & As per PWD Hand Book 3.2 Desired accuracy in taking measurements of various items of work & rules for deductions as per IS 1200 & P.W.D. handbook.	**06**	**09**
Unit – 4	Procedure for Preparing Detailed Estimate 4.1 Procedure for taking out quantities for various items of works by P.W.D & IS 1200 for. a) for Load bearing Structure –Long Wall and short wall method , Center line method . b) Framed Structure building. -- - By using thumb rules for reinforcement quantity calculation - By preparing bar bending Schedule 4.2 Provisions in detailed estimate for contingencies, work charged establishment, Provisional items, Provisional Sum, Provision for water Supply & Sanitary works, Electrical wiring & installations, centage charges, Tools & Plants, Prime cost, Day work.	**14**	**22**
Unit – 5	**Rate analysis** 5.1 Meaning of term Rate analysis –Factors affecting rate analysis, lead, lift, task work, materials and labour component, Market Rate and labour rate. 5.2 Transportation of Materials, load factor for different materials. Standard lead , extra lead, Transportation Charges , Labour - Categories of labours, labour rates, overheads , contractor's profit, water charges, taking out quantities of materials for different items of works. 5.3 Preparing rate analysis of different items of work 5.4 Standard Schedule of rates, full rates & labour rates.	**10**	**14**
Unit – 3	Taking out quantities of work for different Civil Engineering Works Roads, Dam , Canals ,Railway embankments, methods of mean area , mid sectional area, trapezoidal, Prismoidal formula. Calculation of quantity of earth work.	**08**	**09**
	Total	**48**	**70**
Assignments:			

Skills to be developed:

Intellectual Skills:

a. List various items of work with their units in a Civil Engineering Structure.
b. Calculate quantities of various items of work.
c. Prepare rate analysis.

List of Assignments:

1) Prepare Check list of items of following type of Civil Engineering works.
   a) Load Bearing type Building
   b) Framed structure type building
   c) W.B.M.Road
   d) Septic Tank
   e) Community well
2) Writing the rules of deduction's for below mentioned items of work as per IS 1200.
   a) Brick / Stone masonry.
   b) Plastering / Pointing
3) Taking out quantities of various items of work for load bearing building.
   i) Earth work in excavation for foundation
   ii) Base Concrete of foundation
   iii) U.C.R./BB Masonry work in foundation and plinth.
   iv) D.P.C.
   v) Plinth Filling.
   vi) Brick work in masonry.
   vii) Flooring
   viii) Plastering.
   ix) Wood work in doors & windows
4) Taking out quantities of following items for small R.C.C. Hall
   i) Concreting for footing, Column, Beam, slab.
   ii) Reinforcement for above items by preparing Schedule of bars.
   iii) Form work for all above items.
5) Preparing detailed estimate of a RCC single & two storied residential building for all items of work. (The quantity of reinforcement shall be calculated by percentage.)
6) Preparing Rate analysis of following items:
   Building work – Brick work, P.C.C., R.C.C., Plastering, Flooring, Doors, Windows.
7) Taking out quantities of earth work for a Road profile prepared in surveying subject. Prepare the lead statement.
8) Taking out quantities of work for a Community well or Jack well or Septic Tank.
9) Taking out quantities of work for pipe culvert.

(Drawings shall be provided for the above exercises by subject teacher.)

Text Books:- Nil

Name of Authors	Titles of the Book	Edition	Name of the Publisher

B.N. Datta	Estimating & costing in Civil Engineering		UBS Publishers Distributors Pvt Ltd New Delhi
M. Chakraborti	Estimating & costing, Specification and Valuation in Civil Engineering		M. Chakraborti , Calcutta
S.C. Rangwala	Estimating & costing		Charotar Publication Anand
B.S. Patil	Civil Engineering Estimating, Contracts and accounts Vol . I		Orient Longman, Mumbai
G. S. Birdie	Estimating & costing		Dhanpat Rai and Sons Delhi

2. Video Cassettes /CDS

MSBTE CAI Package.

Q. E. PRO software

3. IS/INTERNATIONAL CODES:

IS 1200- Method of Measurement of building and Civil engineering works

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : Civil Engineering Group (**Highway Engineering**)	
Course code: CE/CS/CR/CV	**Semester :** Fifth for CE/CS/CR and Sixth for CV
Duration :6 semester	**Maximum Marks :**
Teaching Scheme C	**Examination Scheme**
Theory : hrs/week	Mid Semester Exam: Marks
Tutorial: hrs/week	Assignment & Quiz: Marks
Practical : hrs/week	End Semester Exam: Marks
Credit :- Nil	

Aim :-

S.No	
1.	Study of surveying, designing and making of highway.

Objective :-

S.No.	Student should to able to:
1.	Survey and investigation for location of new road.
2.	Organize, supervise and co-ordinate construction activities of road.
3.	Prepare & interpret the drawings related to the work.
4.	Select & test materials on site and laboratory as per requirements.
5.	Handle skilled workers and monitor quality control parameter related to work
6.	Improve, maintain and repairs of existing roads.

Pre-Requisite :-

S.No	
1.	Student should be able to read and draw morphological nature of land.

Contents: Theory (Name of the Topic)		Hrs/week	Marks
Unit -1	**Road Engineering** : 1.1 Importance of road in India. 1.2 Classification of roads according to Nagpur plan (Location and function), and third road development plan. Traffic and tonnage, 1.3 Classification of urban roads.	**03**	**04**
Unit -2	**Investigation for Road Project** 2.1 Reconnaissance survey, Preliminary survey and Location survey for a road project. 2.2 Detailed survey for cross drainage- L-section and C/S sections. 2.3 Fixing the alignment of road, factors affecting alignment of road. 2.4 Drawings required for road project- Key map, Index map,	**03**	**04**

	Preliminary survey plan and detailed location survey plan, L-section and C/S sections cross drainage work, land acquisition plan. 2.5 Survey for availability of construction material, location plan of quarries.		
Unit – 3	**Geometric Design Of Highways** 3.1 Camber- definition, purpose, types, IRC – specifications. 3.2 Kerbs, road margin, road formation, right of way. 3.3 Design speed- IRC – specifications 3.4 Gradient – definition, types, IRC specification. 3.5 Sight distances– definition, types, IRC specification. 3.6 Curves–Necessity, types– horizontal, vertical and transition curves. 3.7 Widening of roads on curves. 3.8 Super Elevation – definition, formula for calculating super elevation, minimum and maximum values of super elevation, and methods of providing super elevation. 3.9 Sketching of standard C/S of national highway in embankment and cutting. 3.10 Simple problems on geometric design of road.	**12**	**18**
Unit – 4	**Construction of Roads Pavements and materials** 4.1 Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test. 4.2 Pavement – objective of pavement, structure of pavement, function of pavement components, types of pavement. 4.3 Construction of earthen road – general terms used- borrows pits, spoil bank, lead and lift, balancing of earthwork. Construction procedure. 4.4 Soil stabilized roads – necessity, methods of soil stabilization, brief details of mechanical soil stabilization. 4.5 Water bound macadam roads – materials used, size and grading of aggregates and screening, construction procedure including precautions in rolling. 4.6 Construction of bituminous roads. Terms used– bitumen, asphalt, emulsion, cutback, tar, common grades adopted for construction. Types of bituminous surface – prime coat, tack coat, seal coat, Surface dressing – procedure of construction bituminous penetration macadam, and Bitumen/Tar carpets – procedure of construction. 4.7 Cement concrete pavements- Construction procedure and equipments, Construction joints, joint filler, joint sealer.	**14**	**18**
Unit – 5	**Traffic Engineering** 5.1 Traffic volume study, 5.2 Traffic control devices-road signs, marking, Signals, Traffic island.	**06**	**10**

	5.3 Road intersections- intersections at grade and grade separator intersections. 5.4 Road accident. Building code IS:1904 5.5 Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field		
Unit – 6	**Hill Roads** 6.1 Parts and functions of hill road components, types of curves, Hill road formation. 6.2 Land slides- causes and prevention. 6.3 Structures- drainage structures.	**04**	**06**
Unit – 7	**Drainage of Roads** 7.1 Surface drainage – side gutter, catch water drains, surface drainage. 7.2 Sub-surface drainage –Longitudinal drains and cross drains.	**03**	**05**
Unit – 8	**Maintenance and Repairs of Roads** 8.1 Necessity of maintenance of roads 8.2 Classification of maintenance operation – ordinary, routine and periodic maintenance. 8.3 Maintenance of W.B.M., bituminous and cement concrete roads.	**03**	**05**
	Total	**48**	**70**

List of Assignments:

1. Road project for a road of minimum 0.5 km. length having at least one small cross drainage work.
   - 1.1 Site selection.
   - 1.2 Reconnaissance survey.
   - 1.3 Fixing the alignment.
   - 1.4 Detailed profile survey along the alignment and cross section of road and CD Work.
   - 1.5 Prepare computer generated drawing of longitudinal section and typical cross sections of the road in cutting and filling.
   - 1.6 Prepare computer generated drawing of proposed typical CD work/culvert. (Using CAD)
2. Visit to a road under construction/constructed to study the construction of (a) WBM road (b) flexible pavement (c) Rigid pavement roads for observing the type of construction and construction equipments.
3. Preparing drawings of detailed cross sections of (a) major district road b) state Highway (c) National highway (d) Express Highway in cutting and banking showing details and dimensions with proper scale. (Any two)
4. Traffic volume study and its representation of an important road intersection in your city.
5. Visit to a W.B.M. and Bituminous road for observing the different types of defects in roads.

Prepare a visit report. Which should consist of (a) List of various defects observed b) Suggestions regarding the possible remedial measure.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Khanna & Justo	Highway Engineering		Khanna Publication
L.R. Kadiyali	Traffic Engineering		--
N.L. Arora, S.P. Luthara	Transportation Engineering		I.P.H. New Delhi
Vazarani & Chandola	Transportation Engineering		Khanna Publication
Biridi & Ahuja.	Road, Railway, Bridges		S.B.H.New Delhi
Kamala.	Transportation Engineering		T.M.H. New Delhi
--	DATA book of P.W. D.		--

2. IS / International Codes. : IRC 36 – 1970, IRC 16 –1965, IRC 20 -1966

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : CIVIL ENGINEERING GROUP(IRRIGATION ENGINEERING)	
Course code: CE/CS/CR/CV	**Semester : FIFTH FOR CE/CS/CR AND SIXTH FOR CV**
Duration : 6 semester	**Maximum Marks :**
Teaching Scheme	**Examination Scheme**
Theory : hrs/week	Mid Semester Exam: Marks
Tutorial: hrs/week	Assignment & Quiz: Marks
Practical : hrs/week	End Semester Exam: Marks
Credit :- Nil	

Aim :-

S.No	
1.	Study of irrigation engineering.

Objective :-

S.No	The students will be able to:
1.	• Collect the data for irrigation system.
2.	• Calculate the yield from catchments.
3.	• Calculate the capacity of Canals.
4.	• Calculate the storage capacity of reservoirs.
5.	• Find out and fix the control levels of reservoirs.
6.	• Decide the section of Dams, Weirs and Barrages.
7.	• Classify the Canals and design the Canals.
8.	• Classify different irrigation systems.

Pre-Requisite :-

S.No	
1.	Student should be able to read and draw morphological nature of land.
2.	Student should know regarding hydrological pressures.

Contents : Theory		Hrs/week	
Unit -1	**Introduction** Definition – Irrigation and irrigation engineering, advantages of irrigation, ill effects of over irrigation, types of irrigation project- purpose wise and administrative wise, Methods of irrigation.	**04**	**04**
Unit -2	**Hydrology** Definition of rainfall , rain gauge and rain gauge station , types of rain gauges (names only0 average annual rain fall and its calculation , definition of run of , factor affecting run off, calculation of run off by run of coefficient, inglis' formula , Stranges and Binnie's tables and curves. Maximum food discharge and methods of calculation. Yeild and Dependable yield and methods calculation.	**08**	**06**

Unit – 3	**Water Requirement Of Crops** Cropping seasons and crop in Maharashtra. Definition – Crop period base period Dully Delta , factors affecting Duly , relation between Duly Delta and base period Definition – CCA , GCA, IA, intensity of irrigation time factor capacity factor. Problems on water requirement and capacity of canal . Modified Penman method . Assessment of irrigation water.	**08**	**08**
Unit – 4	**Investigation And Reservoir Planning** Survey for irrigation project data collected for irrigation project. area capacity curve, silting of reservoir, rate of siling , factors affecting siling , methods to control levels and respective storage in reservoir . Fixing control levels.	**06**	**08**
Unit – 5	**Dams And Spillways** Types of dams – Earthen dams and Gravity dams (masonry and concrete) Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance Earthen Dams – Components and their function , typical cross section seepage through embankment and foundation seepage control though embankment and foundation . Methods of constructions, types of failure of earthen dams and remedial measures. Gravity Dams Theoretical and practical profile, typical cross section, drainage gallery, joint in gravity dam, high dam and low dam Spillways-Definition, function, locstion and components. Emergency and services, ogee spillway and bar type spillway, discharge over spillway. Spillway with and with out gates.	**14**	**18**
Unit – 6	**Bandhara , Precolation Tanks And Lift Irrigation** Advantages and disadvantages of bandharairrigation layout and component parts, solid and open bandhara. Percolation Tanks – necessity and importance, selection of site. Layout of lift irrigation scheme. Irrigation department standard design and specification.	**04**	**06**
Unit – 7	**Divertion Head Works** Weirs – components parts, unction and types, layout of diversion head works wits its components and their function, canal head regular, silt excluders and slit ejectors. Barrages – components and their function. Difference between weir and barrage irrigation department standard design and specifications.	**10**	**10**
Unit – 8	**Canals** CANALS – classification of canals according to alignment and position in the canal network. Design of most economical canal section. Canal lining – Definition, purpose, types of canal lining advantages of canal lining properties of good canal lining material. CD. works- different C.D. works, canal falls, escapes, cross regulators and canal outlets.	**10**	**10**
	Total	**64**	**70**

Assignments:

Term work shall consist of the following assignments.

Data should be collected from irrigation engineering department or irrigation project and processed accordingly

1. Collection of information and prepare list of documents and drawings required for irrigation project.
2. Calculation of yield from given Tope sheet of a catchment area, plotting catchment area, determination of catchment area by plan meter.
3. Canal capacity calculation from a given commend area and cropping pattern.
4. Plotting of area capacity curve of a given contour map of irrigation project
5. From a given data fixation of control levels of reservoir.
6. Layout of drainage in earthen dam on A4 size plate
7. Neat labeled sketch of ogee spillway with gate and energy dissipation arrangement.
8. Study of National Water Policy and Maharashtra Water Policy.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. K. Garg	Irrigation and hydraulic structure		Khanna publisher, New Delhi
B.C.punmia	Irrigation Engineering		Laxmi Publication, Delhi

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : CIVIL ENGINEERING GROUP (PROFESSIONAL PRACTICES-V)	
Course code: CE/CS/CR/CV	**Semester : FIFTH FOR CE/CS/CR AND SIXTH FOR CV**
Duration :6 semester	**Maximum Marks :50**
Teaching Scheme	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 3 hrs/week	End Semester Exam: -- Marks
Credit :- 2	

Aim :-

S.No	
1.	Development of professional awareness in before and after sales and services.

Objective :-

S.No	Student will be able to:
1.	• Acquire information from different sources.
2.	• Prepare notes for given topic.
3.	• Present given topic in a seminar.
4.	• Interact with peers to share thoughts.
5.	• Prepare a report on industrial visit, expert lecture

Pre-Requisite :-

S.No	
1.	Students should have complete knowledge of design and maintenance of the building.

Contents		Hrs/week
Unit -1	**Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work.** Following are the suggested type of Industries/ Fields –(Any three visits) vi) Irrigation project for observing components of dam and canal. vii) Steel structure for study of its details. viii) Residential apartment /public building to study plumbing system. ix) Hot mix plant	**18**
Unit -2	**The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs duration), minimum 2 nos. from the following or alike topics. The brief report to be submitted on the guest lecture by each student as a part of Term work.** a) Construction of highway, material of construction ,machinery used and manpower requirement . b) To set up a small scale industry. c) Planning and design of irrigation project.	**10**
Unit – 3	**Information Search ,data collection and writing a report on the topic** a) Collecting an estimate from P.W.D.	**14**

	b) International Plumbing code and material specifications from market. c) Collecting market rates for material and labor for building items . d) Collecting D.S.R. /C.S.R. from PWD and its use for preparing revise estimate.	
Unit – 4	The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are - i) Recent trends in civil engineering as a service industry. j) Waterproofing and leakage prevention. k) Troubleshooting in plumbing system. l) Causes of failure of road.	**18**
Unit – 5	**Seminar :** Seminar topic should be related to the subjects of fifth semester Each student shall submit a report of 5 to10 pages and deliver a seminar (Presentation time – 10 minutes)	**10**
	Total	**70**
Text Books:- Nil		
Reference books :- Nil		
Suggested List of Laboratory Experiments :- Nil		
Suggested List of Assignments/Tutorial :- Nil		

Name of the Course : CIVIL ENGINEERING GROUP (THEORY OF STRUCTURES)	
Course code: CE/CS/CR/CV	**Semester :** FIFTH FOR CE/CS/CR AND SIXTH FOR CV
Duration :6 semester	**Maximum Marks :175**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 75 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of construction profile.

Objective :-

S.No	The students will be able to-
1.	Calculate the stresses in the members due to eccentric load & wind pressure
2.	Find slope & deflection in beams
3.	Calculate support moments in fixed beams and draw SFD and BMD
4.	Calculate support moments for continuous beam and draw SFD and BMD.
5.	Design medium and long columns

Pre-Requisite :-

S.No	
1.	Student should be perfect in engineering mechanics.
2.	Student should know the properties of material used in building construction.

Contents : theory (Name of the Topic)		Hrs/week	
Unit -1	**Direct And Bending Stresses** 1.1 Concept of direct and eccentric loads, eccentricity about one principal axis, nature of stresses, maximum and minimum stresses, resultant stress distribution diagram. **1.2 Condition for no tension or zero stress at extreme fiber, limit of eccentricity, core of section for rectangular and circular cross sections.** 1.3 Columns, pillars and chimneys of uniform section subject to lateral wind pressure, coefficient of wind resistance, stress distribution at bases	**10**	**16**
Unit -2	**Slope And Deflection** 2.1 Concept of slope and deflection, stiffness of beam 2.2 Relation between slope, deflection and radius of curvature, differential equation (no derivation), double integration method to find slope and	**10**	**14**

	deflection of simply supported and cantilever beam 2.3 Macaulay's method for slope and deflection,, application to simply supported and cantilever beam subjected to concentrated and uniformly distributed load.		
Unit – 3	**Fixed Beam** 3.1 Concept of fixity, effect of fixity, advantages and disadvantages of fixed beam. 3.2 Principle of superposition. 3.3 Fixed end moments from first principle for beam subjected to UDL over entire span, central point load, Point load other than mid span. 3.4 Application of standard formulae in finding moments and drawing S.F. and B.M. diagrams for a fixed beam (Derivation need not be asked in the examination)	**06**	**10**
Unit – 4	**Continuous Beam** 4.1 Definition, effect of continuity practical example, nature of moments induced due to continuity, concept of deflected shape 4.2 Clapeyron's theorem of three moment (no derivation) 4.3 Application of theorem maximum up to three spans and two unknown support moment only, Support at same level, spans having same moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span. 4.4 Drawing SF and BM diagrams for continuous beams.	**08**	**10**
Unit – 5	**Moment Distribution Method** 5.1 Introduction, sign convention 5.2 Carry over factor, stiffness factor, distribution factor. 5.3 Application of moment distribution method for various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia up to three spans and two unknown support moment only, SF and BM diagrams (Supports at same level) 5.4 Application of moment distribution method to single storey single bay symmetrical portal frames, SF and BM diagrams	**08**	**10**
Unit – 6	**Columns** 6.1 Definition, classification of column 6.2 Buckling of axially loaded compression member, Types of end conditions for column, effective length, radius of gyration, slenderness ratio 6.3 Assumptions in the theory of long column Euler's theory, buckling load and Rankin's theory, crippling load , factor of safety, safe load 6.4 Application of Rankin's and Euler theory, designing solid circular or hollow circular sections	**06**	**10**
	Total	**48**	**70**

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. B. Junnarkar	Mechanics of structures		Charotar Publishing House, Anand
S. Ramanrutham	Theory of structures		Dhanpatrai & Sons, Delhi

Dr. B.C. Punmia	Theory of structures		SBH, New Delhi
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION												
TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES												
COURSE NAME : CIVIL ENGINEERING												
COURSE CODE : CE/CS/CR/CV												
DURATION OF COURSE : 6 SEMESTERS												
SEMESTER: SIXTH SEMESTER										**SCHEME : C**		
Sr.No.	**SUBJECT**	**PERIODS**			**EVALUATION SCHEME**							**Credits**
	THEORY	**L**	**TU**	**P**	**SESSIONSAL EXAM**			**ESE**	**PR**	**Oral #**	**TW @**	
					TA	**CT**	**Total**					
1	Management	03	--	--	10	20	30	70	--	--	--	3
2	Contracts and Accounts	03	--	02	10	20	30	70	--	--	25	4
3	Environment Engineering	03	--	02	10	20	30	70	--	--	25	4
4	Design of Structures	03	--	02	10	20	30	70	--	25	50	4
5	**Elective for CE/CS/CV (Any One)**											
	Advanced Construction Techniques and Equipments	02	--	02	10	20	30	70	--	--	25	3
	Maintenance and Rehabilitation of Structures	02	--	02	10	20	30	70	--	--	25	3
	Architectural Practices and Interior Design	02	--	02	10	20	30	70	--	--	25	3
	Plumbing Services	02	--	02	10	20	30	70	--	--	25	3
6	**Elective for CR (Any One)**											
	Micro Irrigation	02	--	02	10	20	30		--	--	25	3
	Maintenance and Rehabilitation of Structures	02	--	02	10	20	30		--	--	25	3
	Water shade Management	02	--	02	10	20	30		--	--	25	3

	Plumbing Services	02	--	02	10	20	30		--	--	25	3
6	Civil Engineering Project	--	--	05	--	--	--	--	--	50	50	3
7	Professional Practices	--	--	02	--	--	--	--	--	--	50	2
8	Rural Engineering	--	--	02	--	--	--	--	--	50	50	1
	Total	**14**	**--**	**19**	**60**	**120**	**180**	**420**	**--**	**125**	**275**	**23**

STUDENT CONTACT HOURS PER WEEK: **33 HRS**

HTEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

, External Assessment @ , Internal Assessment ESE - End Semester Exam.

ABBREVIATIONS: CT- Class Test, TA - Teachers Assessment, L - Lecture, TU - Tutorial, P - Practical

TA: Attendance & surprise quizzes = 6 marks. Assignment & group discussion = 4 marks.

Total Marks :900

Minimum passing for sessional marks is 40%, and for theory subject 40%.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENTS (ELECTIVE))			
Course code: CE/CS/CV		**Semester :** SIXTH FOR CE/CS AND SEVENTH FOR CV	
Duration :6 semester		**Maximum Marks :125**	
Teaching Scheme C		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			

Aim :-

S.No	
1.	Study of advanced techniques and building materials.

Objective :-

S.No	The students shall be able to:
1.	• Know the new materials of construction.
2.	• Understand various advanced methods of construction.
3.	• Select suitable construction equipments for execution of various constructions activities.

Pre-Requisite :-

S.No	
1.	Student should study current techniques and properties of building materials.
2.	Student should think over the problems and the alternatives to it.

Contents : THEORY (Name of the Topic)		Hrs/week	
Unit -1	**1.0 Advanced Construction Materials** **1.1 FIBERS AND PLASTICS.** Types of fibers – Steel, Carbon, Glass fibers. Use of fibers as construction materials. Properties of fibers. Types of Plastics – PVC, RPVC, HDPE, FRP, GRP etc. Colored plastic sheets. Use of plastic as construction Material. **1.2 Artificial Timber** Properties and uses of artificial timber. Types of artificial timber available in market, strength of artificial timber. **1.3 Miscellaneous materials** Properties and uses of acoustics materials, wall claddings, plaster boards, Micro-silica, artificial sand, bonding agents, adhesives etc.	**02**	**08**
Unit -2	**Advanced Concreting Methods** **2.1 Prestressed Concrete** Grades of Concrete and prestressing cables for prestressed concrete. Methods of pre-tensioning and post tensioning. Equipments and accessories for prerstressing. Precautions during prestressing of members.	**06**	**12**

	2.2 Under water Concreting Underwater concreting for bridge piers and bored pile construction. Tremy method of under water concreting. Procedure and equipments required for tremy method. Properties, workability and water cement ratio of the concrete required. **2.3 Ready Mix concrete** Necessity and use of Ready Mix Concrete. Production and equipments for RMC. Ready Mix Concrete plant. Conveying of RMC. Transit mixers- working and time of transportation. Workability and water cement ratio for RMC. Strength of RMC. **2.4 Tremix Concreting method** Definition, application of vacuum dewatering concreting. Equipments used in tremix concreting. Procedure of vacuum dewatering concreting (Tremix). **2.5 Special Concretes** Properties, uses and procedure of Roller compacted concrete. Properties and uses of High Impact Resisting concrete. Properties, uses and constituents of Steel fiber reinforced concrete. Percentage of steel fibers in SFRC. Effect of size, aspect ratio and percentage of steel fibers on strength of concrete.		
Unit – 3	**Advanced Construction Methods.** **3.1 Formwork** Steel Formwork, H frames, Steel plates, Steel props, Telescopic props, Girders or trestles. Tubular formwork. Slip formwork- meaning, use of slip formwork. Process of concreting with slip forms. **3.2 Construction of Multistoried Buildings** Use of lifts, belt conveyors, Pumped concrete, Equipments and machinery required for construction of Multistoried Buildings. Precautions and safety measures. **3.3 Prefabricated Construction** Meaning of prefabrication and precast. Methods of prefabrication- plant prefabrication and site prefabrication. Linear members, rigid frames, roofing and flooring members, R.C. Doors and windows, wall panels, Jointing of structural members. **3.4 Soil Reinforcing techniques** Necessity of soil reinforcing, Use of wire mesh and geo-synthetics. Strengthening of embankments, slope stabilization in cutting and embankments by soil reinforcing techniques.	**08**	**14**
Unit – 4	**Hoisting and Conveying Equipments** **4.1 Hoisting Equipments** Principle and working of Tower cranes, Crawler cranes, Truck mounted cranes, gantry cranes, Mast cranes, Derricks. **4.2 Conveying Equipments** Working of belt conveyors. Types of belts and conveying mechanism. Capacity and use of dumpers, tractors and trucks.	**04**	**08**
Unit – 5	**Earth Moving machinery** **5.1 Excavation Equipments** Use, Working and output of bulldozers, scrapers, graders, and power	**04**	**10**

	shovels, JCB, draglines. **5.2 Compacting Equipments** Use of rollers, Roller types- Plain rollers , Sheep footed rollers, Vibratory rollers, pneumatic rollers. Rammers- use and working.		
Unit – 6	**6.0Concreting Equipments** **6.1 Concrete Mixers** Types of concrete mixers. Weigh batching equipments, Equipments for transportation of concrete- trollies, lifts. Transit mixers, Concrete vibrator- Needle vibrators, Screed vibrators. Automatic concrete plants – layout, process and working. **6.2 Stone Crushers** Types of stone crushers, capacities and working. Equipments for production of artificial sand.	**04**	**10**
Unit – 7	**7.0 Miscellaneous Equipments and Equipment management** **7.1 Miscellaneous Equipments** Pile driving equipment, Pile hammers, selection of hammers. Working of hot mix bitumen plant, Bitumen paver. Grouting equipments, Floor polishing machine. **7.2 Equipment Management** Standard equipment, Special equipment, Selection of equipment, Owning and operating cost of construction equipment. Economic life of construction equipment. Preventive maintenance of equipment, Break down maintenance of equipments.	**04**	**06**
	Total	**32**	**70**

Practical:

Skills to be developed:

Intellectual Skills**:**

1. know the new materials of construction.
2. get acquainted with advanced methods of construction.
3. Select suitable construction equipments for execution of various constructions activities.

List of Practical:

1. Collect Specifications/ properties of at least five advanced materials of construction and write the report on the same.
2. Writing report on Tremie method of concreting for piles/ Bridge piers.
3. Finding effect of size of fibers and aspect ratio (l/d ratio) of steel fibers on the strength of steel fiber reinforced concrete.
4. Finding effect of percentage of steel fibers on the strength of steel fiber reinforced concrete.
5. Writing a report on method of preparation and conveyance of ready mix concrete.
6. Writing a report on working and output of any three earth moving machinery.
7. Observing at site/ Video/ LCD demonstration of bitumen paver and writing report of the process and equipments observed.
8. Preparing a detailed account of types, numbers and drawings of steel formwork required for a two-storied framed structured residential building.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
R. Chudly	Construction Technology Vol. I to IV		ELBS- Longman Group
R.L. Peurifoy	Construction Planning equipment and methods		McGraw-Hill Co. Ltd.
S. Seetharaman	Construction Engineering and management		Umesh Publication, New Delhi.
B. Sengupta and Guha	Construction management and Planning		Tata McGraw Hill
M. L. Gambhir	Concrete Technology(Third Edition)		Tata McGraw Hill
R. C. Smith	Materials of construction		McGraw-Hill Co. Ltd.
TTTI Madras	Building Technology and valuation		TTTI Madras
R. Satyanarayana and S. C. Saxena	Construction Planning and Equipment		Standard Publication New Delhi
TTTI Chandigarh	Civil Engineering materials		TTTI Chandigarh
S. C. Rangawala	Construction of structures and Management of Works		Charotar Publication
D.N. Ghose	Construction Materials		Tata McGraw-Hill
Mantri Construction	A to Z of Building Construction		Mantri Publication
Reference books :-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Govt. of Maharashtra	PWD Handbooks for - Materials - Foundation - Construction equipments		Govt. of Maharashtra
Khanna Publication	Practical Civil Engineering Handbook		Khanna Publication
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (ARCHITECTURAL PRACTICES & INTERIOR DESIGN (ELECTIVE))	
Course code: CE/CS/CV	**Semester : SIXTH FOR CE/CS AND SEVENTH FOR CV**
Duration :	**Maximum Marks :**
Teaching Scheme	**Examination Scheme**
Theory : hrs/week	Mid Semester Exam: Marks
Tutorial: hrs/week	Assignment & Quiz: Marks
Practical : hrs/week	End Semester Exam: Marks
Credit :- Nil	

Aim :-

S.No	
1.	Study of architectural practices.

Objective :-

S.No	Student will be able to:
1.	• Use the basic architecture principles for working drawings.
2.	• Prepare working drawings of buildings.
3.	• Design landscape for a institutional / commercial campus.
4.	• Use the basic principles of interior design for drawing interior plans.
5.	• Prepare innovative sketch plans for presentation to customer as per requirements.
	• Design interior for a commercial buildings or Flats.

Pre-Requisite :-

S.No	
1.	Student should be perfect in engineering drawing.
2.	Student should study the requirements in building construction.

Contents : Theory (Section A – Architectural Practice)		Hrs/week	Marks
Unit -1	**Architectural Design:** 1.1 Review of principles of Architecture. 1.2 Site selection, climatic conditions, sun control, orientation of building & site. 1.3 Building by laws & its applications.	**02**	**05**
Unit -2	**Building Aesthetics:** 2.1 Feeling for aesthetics and utility, composition, unity, mass composition, order, expression, proportion, scale, accentuation & rhythm, contrast, balance, pattern. 2.2 Character of Building.	**02**	**05**
Unit – 3	**Design of Projects**: 1.1 A case study of residential building. 1.2 A case study of public / commercial building.	**08**	**20**

	1.3 Aspect of working drawing – plan, elevation section		
Unit – 4	**Landscaping**: 4.1 Soft and Hard landscaping. 4.2 Basic Principle of landscaping. 4.3 Assessment of land. 4.4 Design procedure. 4.5 A case study of land scape for public/ commercial building campus.	**04**	**10**
	Total	**16**	**40**
Contents : Theory (Section – B: Interior Design)		Hrs/week	Marks
01	**Elements and principles of design**. 1.1 Elements such as form, texture, light, colour, effect of light on colour and texture, space organization of space in design, space pattern. 1.2 Importance of colour as art element. Various colour scheme.	**03**	**05**
02	**Anthropometrics Data:** 2.1 Relation of human measurement to furniture and movement and to circulation patterns.	**01**	**05**
03	**Interior Materials:** 3.1 Different interior materials, paneling, partitions, finishing materials, furniture. 3.2 False ceiling, flooring, paints.	**02**	**04**
04	**Interior of Residential building:** 4.1 Use of space, circulation, standard size of furniture. 4.2 Plans and elevation of interior with furniture for living space, dining space, kitchen, bed room, guest room etc.	**07**	**17**
07	**Interior of small commercial building:** 7.1 Planning of interior for small commercial units such as offices, consulting chambers, shops etc. 7.2 Furniture details such as executive table, architectures table etc. used in commercial units.	**03**	**4**
	Total	**16**	**35**

Term Work: (Any Four)

1. Prepare working drawing – plans, elevation sections, considering thickness of plastering with micro level details and with scale 1:50 of a given submission drawing.
2. Prepare innovative plans, elevations, sections, considering the thickness of plastering with micro details and working drawings for residential building with scale 1:50 special details of components (Minimum 3 components such as kitchen otta details, compound wall gate, grill, front door, windows, staircase etc.) with scale 1:20 / 1:15 with respect to No. 1
3. Design a landscape for any existing public building campus
4. Prepare interior plan for 2 BHK residential bunglow / flat.
5. Prepare interior plan of any one commercial unit such as office, bank, restaurant, shop etc.

Prepare a report of market survey for different materials required for interiors

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher

M. G. Shah, C.M. Kale / S.Y. Patiki	Building construction		Tata McGraw Hill
Joseph De Chiara, Julins Panch, martin Zelnik	Time saver standard for interior design & space planning		MC Graw Hill
Albert O. Halse	The use of colours in interiors		Mc Graw Hill
Bousmaha Baiche & Nicholes Walliman	Nwtert – Architects		Black Well Science

1. **IS/International codes** – National building codes.
2. **Journals / Periodicals**:
    1. Inside out side
    2. A + D Journal on architecture.
    3. Indian Architects and builders.
    4. Design & Interiors.
4. **Software**:
    1. Auto CAD
    2. 3 D Max.
    3. 3 D Home

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (CIVIL ENGINEERING PROJECT)	
Course code: CE/CS/CR/CV	**Semester : SIXTH FOR CE/CS/CR AND SEVENTH FOR CV**
Duration :	**Maximum Marks :100**
Teaching Scheme	**Examination Scheme**
Theory : -- hrs/week	Mid Semester Exam: -- Marks
Tutorial: --- hrs/week	Assignment & Quiz: 100 Marks
Practical : 5 hrs/week	End Semester Exam: - Marks
Credit :- 3	

Aim :-

S.No	
1.	Exposition of professional approach of students towards knowledge gain.

Objective :-

S.No	Students will be able to:
1.	• Collect the information for a given project.
2.	• Apply principles, theorems and bye-laws in the project planning and design.
3.	• Interpret and analyze the data.
4.	• Develop professional abilities such as persuasion, confidence, and perseverance and communication skill.
5.	• Develop presentation skill.
6.	• Enhance creative thinking.

Pre-Requisite :-

S.No	
1.	Students should have entire knowledge of civil engineering.

Contents:- Nil	Hrs/week

Project:

Skills to be developed:
Intellectual skills:

1) Decide and collect data for projects.
2) Read and interpret the drawing, data.
3) Design the components.
4) Apply the principles rules regulations and byelaws.

Motor skills:

1) Plan for different phases of a task.
2) Prepare drawings for project.
3) Use of computer for drawing, networking.

4) Work in a group for a given task.

List of Projects:

Following is the list /areas of suggested civil engineering projects to be undertaken by a group of 4 to 6 students .The project can be selected from any four civil engineering system like Building construction system, transportation engineering system, irrigation engineering system. A topic for project can also be selected on recent development in civil engineering.

The project report shall be in the following format:

- Topic and objectives
- Collection of data, required survey work,
- Management and construction procedure
- Resources scheduling and networking
- Design details
- Required drawing set
- Utility to society if any
- Conclusion

LIST OF CIVIL ENGINEERNG PROJECTS:

1) K.T. Weir
2) Lift Irrigation scheme.
3) Micro irrigation –Drip/Sprinkler Irrigation.
4) Junction planning for city roads/planning for roads for congested area/parking Studies etc.
5) Water shed development of small catchments.
6) Rain water harvesting for domestic or public building.
7) Campus development.
8) Interior decoration.
9) Concrete mix design.
10) Bridge design.
11) NDT of any RCC building.
12) Solid waste management.
13) Hospital waste disposal.
14) Recycling of resources.
15) Manufacturing of Pre cast concrete products.
16) Prestressed concrete.
17) Non conventional sources of energy.
18) Concrete pipe manufacturing unit.
19) Advance construction techniques.
20) Transfer of technology to villages.
21) Planning and design for residential apartments/commercial complex.
22) Planning and design of water treatment plant for given data.
23) Planning and design of water supply scheme for given lay out.
24) Planning and design of sewage treatment plant for given data.
25) Planning and design of sanitary scheme for given lay out.

Any other similar project can be selected.

Term Work: Shall consist of ----Detailed project report in above format.
Separate drawing sheets covering details of the project shall also be prepared.

Learning Resources:

1) Civil Engineering Hand Books / Reference books.
2) Civil Engineering Magazines
3) Relevant IS / International codes.
4) PWD Handbooks / M.I.Manuals
5) Material / Machinery / Product Catalogue.

Text Books:- Nil

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (CONTRACTS AND ACCOUNTS)	
Course code: CE/CS/CR/CV	**Semester :** SIXTH FOR CE/CS/CR AND SEVENTH FOR CV
Duration :6 semesters	**Maximum Marks : 125**
Teaching Scheme	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of contracts, costing and budgeting of building constructions.

Objective :-

S.No	The students shall be able to:
1.	• Differentiate between types of contract.
2.	• Prepare tender documents.
3.	• Draft tender notice for various types of construction
4.	• Prepare specification of an item of construction.
5.	• Calculate the value of a land and old buildings

Pre-Requisite :-

S.No	
1.	Student should know tentative rates of materials to be used.
2.	Student should have knowledge of accounting.

Contents : THEORY		Hrs/week	Marks
Unit -1	**PROCEDURE OF EXECUTION OF WORK BY P.W.D.** 1.1 ORGANIZATION OF P.W.D. FUNCTIONS OF THEIR PERSONNEL. 1.2 P.W.D. PROCEDURE OF INITIATING THE WORK, ADMINISTRATIVE APPROVAL, TECHNICAL SANCTION, BUDGET PROVISION. 1.3 METHODS USED IN P.W.D. FOR CARRYING OUT WORKS CONTRACT METHOD AND DEPARTMENTAL METHOD , RATE LIST METHOD , PIECE WORK METHOD , DAY'S WORK METHOD , DEPARTMENT METHOD (NMR AND CASUAL MUSTER ROLL.)	**08**	**10**
Unit -2	***Contract*** 2.1 DEFINITION OF CONTRACT, OBJECTS OF CONTRACT, REQUIREMENTS OF VALID CONTRACT 2.2 TYPES OF ENGINEERING CONTRACT - LUMP SUM CONTRACT, ITEM RATE CONTRACT, PERCENTAGE RATE CONTRACT, COST PLUS PERCENTAGE, COST PLUS FIXED FEE, COST PLUS VARIABLE PERCENTAGE AND COST PLUS VARIABLE FEE CONTRACT, LABOUR CONTRACT, DEMOLITION CONTRACT , FEE CONTRACT, TARGET CONTRACT, NEGOTIATED CONTRACT .	**12**	**16**

	2.3 Class of contractor, Registration of contractor. 2.4 BOT PROJECT.		
Unit – 3	***Tender & Tender Documents*** 3.1 DEFINITION OF TENDER, NECESSITY OF TENDER, TYPES-LOCAL AND GLOBAL. 3.2 TENDER NOTICE, POINTS TO BE INCLUDED WHILE DRAFTING TENDER NOTICE , DRAFTING OF TENDER NOTICE . 3.3 Meaning of terms: Earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessity. 3.4 TENDER DOCUMENTS – LIST, SCHEDULED A, SCHEDULE B, SCHEDULE C . 3.5 TERMS RELATED TO TENDER DOCUMENTS – CONTRACT CONDITIONS , TIME LIMIT , TIME EXTENSION, PENALTY , DEFECTIVE MATERIAL AND WORKMANSHIP , TERMINATION OF CONTRACT, SUSPENSION OF WORK, SUBLETTING OF CONTRACT, EXTRA ITEMS ,ESCALATION ,ARBITRATION ,PRICE VARIATION CLAUSE, DEFECT LIABILITY PERIOD, LIQUIDATED AND UNLIQUIDATED DAMAGES. 3.6 FILLING THE TENDER BY CONTRACTOR AND POINTS TO BE OBSERVED BY HIM . 3.7 PROCEDURE OF SUBMITTING FILLED IN TENDER DOCUMENT , PROCEDURE OF OPENING TENDER , COMPARATIVE STATEMENT , SCRUTINY OF TENDERS ,AWARD OF CONTRACT, ACCEPTANCE LETTER AND WORK ORDER. 3.8 UNBALANCED TENDER, RING FORMATION.	**12**	**16**
Unit – 4	Accounts in P.W.D. VARIOUS ACCOUNT FORMS AND THEIR USES-MEASUREMENT BOOKS ,NOMINAL MUSTER ROLL, IMPREST CASH , INDENT, INVOICE, BILLS, VOUCHERS, CASH BOOK, TEMPORARY ADVANCE.	**04**	**06**
Unit – 5	Payment to Contractors MODE OF PAYMENT TO THE CONTRACTOR- INTERIM PAYMENT AND ITS NECESSITY, ADVANCE PAYMENT, SECURED ADVANCE, ON ACCOUNT PAYMENT , FINAL PAYMENT , FIRST AND FINAL PAYMENT , RETENTION MONEY, REDUCED RATE PAYMENT, PETTY ADVANCE, MOBILIZATION ADVANCE .	**04**	**06**
Unit – 6	**SPECIFICATIONS** 6.1 NECESSITY AND IMPORTANCE OF SPECIFICATIONS OF AN ITEMS, POINTS TO BE OBSERVED IN FRAMING SPECIFICATIONS OF AN ITEM, TYPES OF SPECIFICATION –BRIEF AND DETAILED, STANDARD AND MANUFACTURERS SPECIFICATION. 6.2 PREPARING DETAILED SPECIFICATIONS OF ITEMS IN CIVIL ENGINEERING WORKS. STANDARD SPECIFICATION BOOK. 6.3 LEGAL ASPECTS OF SPECIFICATION.	**08**	**10**
Unit – 7	**VALUATION** 7.1 DEFINITION, NECESSITY OF VALUATION. DEFINITIONS – COST PRICE, VALUE, DIFFERENCE BETWEEN THEM, CHARACTERISTICS OF VALUE, FACTORS AFFECTING VALUE. 7.2 TYPES OF VALUE: - BOOK VALUE, SCRAP VALUE, SALVAGE VALUE, SPECULATIVE VALUE , DISTRESS VALUE, MARKET VALUE, MONOPOLY VALUE, SENTIMENTAL VALUE, FACTORS AFFECTING VALUE . 7.3 DEPRECIATION, OBSOLESCENCE, SINKING FUND. METHODS OF CALCULATION OF DEPRECIATION – STRAIGHT LINE METHOD,	**16**	**16**

	SINKING FUND METHOD CONSTANT PERCENTAGE METHOD QUANTITY SURVEY METHOD. 7.1 COMPUTATION OF CAPITALIZED VALUE, GROSS INCOME, OUTGOING, NET INCOME, YEARS PURCHASE. TYPES OF OUTGOING AND THEIR PERCENTAGES. 7.2 VALUATION OF LANDS & BUILDINGS, FACTORS AFFECTING THEIR VALUATION, BOOK VALUE METHOD, REPLACEMENT VALUE METHOD AND COMPARISON METHOD. USE OF VALUATION TABLES .DEFERRED VALUE OF LAND. 7.3 FIXATION OF RENT AS PER PWD PRACTICE		
	TOTAL	**64**	**80**

PRACTICAL:

SKILLS TO BE DEVELOPED:

INTELLECTUAL SKILLS:

1. KNOW THE IMPORTANCE OF SPECIFICATION IN CIVIL ENGINEERING WORKS.
2. DRAFT TENDER NOTICE AND PREPARE TENDER DOCUMENTS.
3. IDENTIFY AND USE VARIOUS ACCOUNT FORMS USED IN PWD

MOTOR SKILL:

1. WRITE THE DETAILED SPECIFICATION.
2. DRAFT BRIEF TENDER NOTICE FOR CONSTRUCTION OF WBM ROAD.
3. PREPARE TENDER DOCUMENT FOR CONSTRUCTION OF A RESIDENTIAL BUILDING.
4. PREPARE VALUATION REPORT FOR LAND AND BUILDING.
5. Prepare tender document for a civil engineering work.

Assignments:

1. COLLECTING OLD SET OF TENDER DOCUMENT AND WRITING A REPORT ON IT
2. COLLECTION OF TENDER NOTICES PUBLISHED IN NEWSPAPERS FOR VARIOUS ITEMS OF CIVIL ENGINEERING WORKS. (AT LEAST 5) WRITE SALIENT FEATURES OF THEM.
3. DRAFTING A TENDER NOTICES FOR CONSTRUCTION OF A CIVIL ENGINEERING WORK (W. B. M. ROAD, RESIDENTIAL BUILDING)
4. PREPARATION OF TENDER DOCUMENT FOR THE BUILDING. (DETAILED ESTIMATE PREPARED FOR R.C.C. BUILDING IN ESTIMATING AND COSTING SHALL BE USED)
5. COLLECTION OF VARIOUS ACCOUNT FORMS FROM PWD & WRITING REPORT ON IT
6. WRITING A REPORT ON STORE PROCEDURE AND ACCOUNT PRODUCER OF PWD. FOR IT A
   a. GUEST LECTURE OF PWD OFFICIAL MAY BE ARRANGED.
7. WRITING DETAILED SPECIFICATIONS FOR ONE ITEM FROM EACH OF FOLLOWING :
   A) BUILDING CONSTRUCTION SYSTEM.
   B) IRRIGATION ENGINEERING SYSTEM.
   C) TRANSPORTATION ENGINEERING SYSTEM.

D) ENVIRONMENT ENGINEERING SYSTEM.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
B.N. Datta	ESTIMATING & COSTING IN CIVIL ENGINEERING		UBS Publishers

M. Chakraborti	Estimating & costing, Specification and Valuation in Civil Engineering		M. Chakraborti , Calcutta
S.C. Rangwala	Estimating & costing		Charotar Publication
B.S. Patil	Civil Engineering Contracts and accounts Vol I , II		Orient Longman,
G. S. Birdie	ESTIMATING & COSTING		Dhanpat Rai and Sons
VIDEO CASSETTES / CDS: MSBTE CAI Package.			
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : DIPLOAM IN CIVIL ENGINEERING (DESIGN OF STRUCTURES)	
Course code: CE/CS/CR/CV	**Semester : SIXTH FOR CE/CS/CR AND SEVENTH FOR CV**
Duration : 6 semester	**Maximum Marks :175**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 75 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of design of structure.

Objective :-

S.No	Students will be able to:
1.	• Analyze the section by LSM.
2.	• Select Proper materials and Calculate the design values for the materials.
3.	• Calculate the loads on structural components as per IS 875 (Part-I &II) provisions.
4.	• Read and interpret structural drawing.
5.	• Understand the basic principles of design of R.C.C. sections.
6.	• Use & Correlate the specifications of IS 456-2000 code.
7.	• Draw and appreciate the proper reinforcement detailing of R.C. structural member and their connection.
8.	• Prepare the detailed drawing of structural elements with key plans and schedule of reinforcement
9.	• Design singly reinforced, Doubly reinforced and flanged section of beams, simply supported one way & two way slabs, cantilevers slab, axially loaded columns & footings by LSM.

Pre-Requisite :-

S.No	
1.	Student should be perfect in engineering mechanics.
2.	Student should be perfect in engineering drawing.
3.	Student should know the properties of materials being used.

	Contents : Theory (Name of the Topic)	Hrs/week	Marks
Unit -1	**Working Stress Method & Prestressed Concrete** 1.1 Introduction to reinforced concrete, R.C. Sections their behavior, grades of concrete steel. Permissible stresses, Assumptions in W.S.M. 1.2 Equivalent bending stress distribution diagram for singly	05	07

	reinforced section, 1.3 Concept of prestressed concrete, externally and internally prestressed member. 1.4 Advantages and disadvantages of prestressed concrete. 1.5 Methods of prestressing, pretensioning and post tensioning. Losses in prestressing. (No numerical problems shall be asked in written examination on pre-stressed concrete.)		
Unit -2	**Limit State Method** 2.1 Definition, types of limit states, partial safety factors for materials strength, characteristic strength , characteristic load, design load. Loading on structure as per I.S 875. 2.2 I.S. Specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchoring effective span for beam, & slab.	03	05
Unit – 3	**Analysis and Design of Singly Reinforced Sections (LSM)** 3.1 Limit State of collapse (Flexure), Assumptions stress. Strain relationship for concrete and steel neutral axis, Stress block diagram and Strain diagram for singly reinforced section. 3.2 Concept of under- reinforced, over-reinforced and balanced section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for balanced singly R.C. Section. 3.3 Simple numerical problems on determining design constants, moment of resistance and area of steel .	07	10
Unit – 4	**Analysis and Design of Doubly Reinforced Sections (LSM)** 4.1 General features, necessity of providing doubly reinforced section reinforcement limitations. 4.2 Analysis of doubly reinforced section, strain diagram stress diagram, depth of neutral axis, moment of resistance of the section. 4.3 Simple numerical problems on finding moment of resistance and design of beam sections.	06	08
Unit – 5	**Shear, Bond and Development Length (LSM)** 5.1 Nominal Shear stress in R.C. Section, design shear strength of concrete, Maximum shear stress, Design of shear reinforcement, Minimum shear reinforcement, forms of shear reinforcement. 5.2 Bond and types of bond, Bond Stress, check for bond stress, Development length in tension and compression, anchorage value for hooks 90° bend and 45° bend Standard Lapping of bars, check for development length. 5.3 Simple numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear	06	18

	reinforcement in beams; Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length.		
Unit – 6	**Analysis and Design of T-Beam (LSM)** 6.1 General features, advantages, effective width of flange as per IS : 456-2000 code provisions. 6.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam Section with neutral axis lying within the flange 6.3 Design of T-beam for moment and shear for Neutral axis within or up to flange bottom. 6.4 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section with N. A. lies within or upto the bottom of flange shall be asked in written examination.)	05	08
Unit – 7	**Design of Slab (LSM)** 7.1 Design of simply supported one-way slabs for flexure check for deflection control, and shear. 7.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear. 7.3 Design of two-way simply supported slabs for flexure with corner free to lift. 7.4 Design of dog-legged staircase. 7.5 Simple numerical problems on design of one-way simply supported slabs cantilever slab & two-way simply supported slab. (No problem on design of dog-legged staircase shall be asked in written examination.)	09	14
Unit – 8	**Design of Axially Loaded Column and Footing (LSM)** 8.1 Assumptions in limit state of collapse – compression 8.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties. 8.3 Analysis and design of axially loaded short, square, rectangular and circular columns with lateral ties only; check for short column and check for minimum eccentricity may be applied. 8.4 Types of footing, Design of isolated square footing for flexure and shear. 8.5 Simple numerical problems on the design of axially loaded short columns and isolated square footing. (Problems on design of footing shall be asked in written examination for moment and two way shear only.)	07	10
	Total	**48**	**70**
Practical: ***Skill to be developed:*** *Intellectual skills:*			

1. *ANALYSE THE DATA FOR DESIGN.*
2. Design component parts of building.

Motor Skills:

1. Draw proportionate sketches.
2. Draw constructional details.

Term work shall consist of sketch book, design of R.C.C structural components.

Sketch book:

Sketch book consists of approximately ten plates from R.C.C. Design shall include important information of clauses of IS 456-2000 code. Typical sketches of components members/stress distribution & strain distribution diagrams R.C.C. section/detailing of reinforcement in joints/members. Design of R.C.C. structural components by LSM.

The students should make detailed simple design and drawing of reinforcement detailing on two full imperial size sheets finished in pencil on *any five* of the following R.C.C. component members of a two - storied building with detailing of reinforcement (G+1) at the joints as per requirements & IS 13920

1. One-way simply supported slab.
2. Two-way simply supported slab.
3. Cantilever slab/chajja.
4. T-Beam.
5. Column and column footing.

Dog-legged staircase

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Dr. V. L. Shah & Late Dr. S. R. Karve	Limit State Theory & Design of Reinforced Concrete		Structures Publications
N. C. Sinha & S. K. Roy	Fundamentals of Reinforced Concrete		S. chand & Company,
N. Krishna Raju R. N. Pranesh	Reinforced concrete Design (IS 456- 2000) Principles & Practice		New Age International
N. Krishna Raju	Prestressed Concrete		--
S.U.Pillai & Devdas Menon	Reinforced concrete Design		Tata Mcgraw Hill.
P. C. Varghase	Limit State Design of Reinforced Concrete		Prentice Hall of India,

I.S. Codes:

1. IS 456:2000 - Plain and Reinforced concrete code of Practice.
2. SP16- Design Aids for reinforced concrete to IS 456.
3. I.S. 875 (Part 1-5) - 1987 code of practice of design loads for Buildings and structures.
   Part 1 - Dead load
   Part 2 - Imposed (live) load
   Part 3 - Wind load
4. SP 24 - Explanatory Handbook on IS 456
5. IS 1343-1980 - Indian Standard code of (Reaffirmed 1990) Practice for Prestressed concrete.
6. SP34 : 1987 - Handbook on concrete reinforcement and Detailing.
7. IS 13920-1993 DUCTILE detailing of R. C. Building subjected to Scrims forces.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil
Suggested List of Assignments/Tutorial :- Nil

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (**ENVIRONMENTAL ENGINEERING**)	
Course code: CE/CS/CR/CV	**Semester :** SIXTH FOR CE/CS/CR AND SEVENTH FOR CV
Duration :6 semesters	**Maximum Marks :125**
Teaching Scheme C	**Examination Scheme**
Theory : 3 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 4	

Aim :-

S.No	
1.	Study of management of waste materials and their effects on environment.

Objective :-

S.No	**The students will be able to –**
1.	• Estimate water demands
2.	• Analyse the quality of water
3.	• Suggest the treatment required by knowing the quality of water
	• Know the sewerage system.
	• Analyse the sewage
	• Suggest the waste water treatment
	• Suggest the treatment for industrial waste
	• Know the solid waste management

Pre-Requisite :-

S.No	
1.	Students should know pollutants and their effects on construction and environment.
2.	Student should have knowledge of control of pollution.
3.	Student should know the norms of pollution led by Govt.

Contents : Theory (Name of the Topic)		Hrs/week	Marks
Unit -1	**ENVIRONMENTAL POLLUTION AND CONTROL** 1.1 Introduction Environment, Ecosystem, Environmental Pollution and its types, Causes of Pollution, Effects of Pollution, Control of Pollution, Existing laws related to Environmental Pollution.	**02**	**02**
Unit -2	**PUBLIC WATER SUPPLY** 2.1 Quantity of Water Demands of water: Domestic, Industrial, Commercial & Institutional, Public use, Losses and wastes, Fire demand ; Factors affecting rate of Demand, Variations of water	**19**	**24**

	demands, Forecasting of population, Methods of forecasting of population, Design period for water supply scheme. Estimation of quantity of water supply required for a town or city, Types of water supply schemes. 2.2 Sources of Water Surface and Subsurface sources of water, Intake Structures- Definition and types, Factors governing the location of an intake structure, Water conservation, Ground water recharging – Necessity Importance and advantages. 2.3 Quality of Water Need for analysis of water, Characteristics of water- Physical, Chemical and Biological, Testing of water for Total solids, hardness, chlorides, dissolved Oxygen, pH, Fluoride, Nitrogen and its compounds, Bacteriological tests, E coli index, MPN, Sampling of water, Water quality standards as per I.S. 2.4 Purification of Water Screening- Types of screens, Aeration- objects and methods of aeration, Plain sedimentation, Sedimentation with coagulation, principles of coagulation, types of coagulants, Jar Test, process of coagulation, types of sedimentation tanks, Filtration-theory of filtration, classification of filters : slow sand filter, rapid sand filter, pressure filter, domestic filter, filter media, construction and working of slow sand filter and rapid sand filter, Disinfection: Objects, methods of disinfection, Chlorination- Application of chlorine, forms of chlorination, types of chlorination practices, residual chlorine and its importance, orthotolidine test, Miscellaneous water Treatments (Water softening, Defluoridation techniques), Advanced Water Treatments (Electrolysis, Reverse Osmosis) , Flow diagram of water treatment plants, Low cost water Treatments: Necessity and importance in rural areas, Prevention of pollution of bores and bore wells. 2.5 Conveyance and Distribution of Water Types of Pipes used for conveyance of water, choice of pipe material, Types of joints & Types of valves- their use, location and function on a pipeline. Methods of distribution of water- Gravity, pumping, and combined system Service reservoirs – functions and types , Layouts of distribution of water- Dead end system, grid iron system, circular system, radial system ; their suitability, advantages and disadvantages.		
Unit – 3	**DOMESTIC SEWAGE** 3.1 Introduction Importance and necessity of sanitation, Necessity to treat	**16**	**28**

	domestic sewage, Recycling and Reuse of domestic waste Definitions- Sewage, sullage, types of sewage 3.2 Building Sanitation Definitions of the terms related to Building Sanitation- Water pipe, Rain water pipe, Soil pipe , Sullage pipe, Vent pipe, Building Sanitary fittings- Water closet – Indian and European type, flushing cistern, wash basin, sinks, Urinals, Traps- types, qualities of good trap, Systems of plumbing – one pipe, two pipe, single stack, choice of system Principles regarding design of building drainage, layout plan for building sanitary fittings (drainage plan) , inspection and junction chambers, their necessity, location , size and shape. Maintenance of sanitary units. 3.3 Systems of Sewerage Types of Sewers, Systems of Sewerage, Design of sewers, self cleansing velocity and non scouring velocity Laying, Testing and maintenance of sewers. 3.4 Sewer Appurtenances Manholes and Drop Manhole-component parts, ,location, spacing, construction details, Sewer Inlets , Street Inlets, Flushing Tanks – manual and automatic 3.5 Analysis of Sewage Characteristics of sewage, B.O.D./ C.O.D. and significance. , Aerobic and anaerobic process, Maharashtra Pollution Control Board Norms for the discharge of treated sewage 3.6 Treatment of Sewage Objects of sewage treatment, General layout and flow diagram, Screening, Grit removal, Skimming, Sedimentation of sewage, Sludge digestion, Trickling filters, Activated sludge process, Disposal of sewage, Septic tank, Oxidation pond, Oxidation ditch.		
Unit – 4	**INDU STRIAL WASTE** 4.1 Industrial Waste Water Characteristics of Industrial waste water from sugar, Dairy, Distillery, Textile, Paper and Pulp and Oil industry; and their suggestive treatments	**02**	**02**
Unit – 5	**ENVI RONMENTAL POLLUTION** 5.1 Air Pollution and Noise Pollution Sources, Effects and Control of Air Pollution, Sources , Effects and Control of Noise Pollution (only brief idea) Global warming, Acid Rain	**02**	**02**
Unit – 6	**SOLID WASTES FROM THE SOCIETY** 6.1 Solid Waste Management Definitions – Refuse, Rubbish, Garbage, Ashes, Constituents of solid wastes Sources of solid wastes, Collection of Solid Wastes. Methods of collection of solid wastes	**04**	**05**

	Methods of treatment and disposal of solid waste. 6.3 Hazardous Wastes Introduction, Types of hazardous wastes. Characteristics of hazardous wastes. Treatment and disposal of hazardous wastes.		
Unit – 7	**ENVIRONMENTAL SANITATION** 7.1 Environmental Sanitation Necessity and importance, Rural sanitation- Types of Privies – Aqua privy and Bore Hole Latrine- construction and working Composting (Nadep or Vermiculture), *7.2 Emerging Trends (only brief idea)* ant Gadge Baba Swachhatha Abhiyan Low cost Latrines Jalswarajya Scheme.	**03**	**05**
Unit – 8	**PLUMBING** 8.1 Sanitary Plumbing, Layout, Details of water supply arrangement for residential and public building Rainwater and sewage collection systems	**01**	**02**
	Total	**48**	**70**

Practical:

Skills to be developed:

Intellectual Skills:

1. Identify the method for testing of water.
2. Interpret the results.

Motor Skills:

1. Observe chemical reactions
2. Handle instruments carefully

List of Practical:

Water Supply Engineering:

1) To determine fluoride concentration in given water sample
2) To determine the turbidity of the given sample of water.
3) To determine residual chlorine in a given sample of water.
4) To determine suspended solids, dissolved solids, and total solids of water sample
5) To determine the dissolved oxygen in a sample of water.
6) To determine the optimum dose of coagulant in the given sample by jar test.

Sanitary Engineering:

1) To determine the dissolved Oxygen in a sample of waste water.
2) To determine B.O.D. of given sample of waste water.
3) To determine C.O.D. of given sample of waste water.
4) To determine suspended solids, dissolved solids and total solids of waste water sample.
5) Design the Septic Tank for the public building such as hostel or hospital. Draw Plan and Section of the same along with the drainage arrangement in soak pit.
6) To determine various pollutant levels in the atmosphere using Digital Air Volume Sampler.
   a) Energy generation plants from solid wastes.

Energy generation plants from Gobar Gas.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Santosh Garg	Environmental Engineering (Volume I & II)		Khanna Publishers,
Kamla A. & Kanth Rao D. L.	Environmental Engineering		Tata McGraw Hill,
Birdie G. S. Birdie J. S.	Water Supply and Sanitary Engineering		Dhanpat Rai & Sons
Deolalikar S. G.	Plumbing – Design and Practice		Tata McGraw Hill,
Rao M. N. Rao H. V. N.	Air Pollution		Tata McGraw Hill,

H. M. Raghunath	Ground Water		New Age International
Rao & Dutta	Industrial Water Treatment		-------
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : DIPLOMA IN CIVIL ENGINEERING **(MAINTENANCE & REHABILITATION OF STRUCTURE (ELECTIVE))**	
Course code: CE/CS/CR/CV	**Semester : SIXTH FOR CE/CS/CR AND SEVENTH FOR CV**
Duration :6 semester	**Maximum Marks :125**
Teaching Scheme C	**Examination Scheme**
Theory : 2 hrs/week	Mid Semester Exam: 30 Marks
Tutorial: - hrs/week	Assignment & Quiz: 25 Marks
Practical : 2 hrs/week	End Semester Exam: 70 Marks
Credit :- 3	

Aim :-

S.No	
1.	Study of building maintenance.

Objective :-

S.No	Student will be able to
1.	• Distinguish between different types of causes of damage.
2.	• Decide the appropriate technique according to failure.
3.	• Identify causes of failure of masonry building & its retrofitting.
4.	• List causes of failure of R.C.C. building, its retrofitting.
5.	• Find the strength, age of building & maintenance of life lines.
6.	• Prepare estimates & tenders for structure damage due to hazards.

Pre-Requisite :-

S.No	
1.	Student should have entire knowledge of building constructed.
2.	Student should be perfect in reading the building drawing.

	Contents : Theory (Name of the Topic)	Hrs/week	
Unit -1	**Introduction** 1.1 Necessity, operation, maintenance & repairs of structures 1.2 Classification of maintenance, 1.3 Rehabilitation (restoration), strengthening, retrofitting. 1.4 Methodical approach to repairs, inspection-annual, emergency, special, repairs- minor, special and renovation.	**03**	**06**
Unit -2	**Causes & detection of damages**: 2.1 Causes of damages, damages due to earthquakes, fire hazards, flood, hazards, dilapidation, 2.2 List of basic equipments for investigation.	**02**	**08**
Unit – 3	**Materials for repairs:** 3.1 Epoxy resin, epoxy mortar, gypsum cement mortar, quick setting, cement mortar,	**02**	**06**

	3.2 Shot-creting 3.3 Mechanical anchors.		
Unit -4	**Masonry walls:** 4.1 Damp walls, causes effects, remedies, eradication of efflorescence 4.2 cracks in walls, remedial & preventive measures bond between old & new brick work, reinforced brickwork.	**03**	**07**
Unit -5	**Repairs to foundation:** 5.1 Remedies, types & processes of settlement, foundation sinking 5.2 Examination of existing foundation, strengthening of foundation.	**03**	**07**
Unit -6	**Water proofing:** 1.1 Leaking Basements & roofs	**02**	**03**
Unit -7	**Concept of repairs & strengthening of RCC structures:** 7.1 Concept of repairs of RCC structures 7.2 Physical examination of common defects, 7.3 Structural repairs & strengthening repairs by new developments.	**02**	**03**
Unit -8	**Damage due to fire:** 8.1 Fire resistance, effects of temp. of RCC, 8.2 Repairs to RCC structures damaged due to fire	**02**	**03**
Unit -9	**Advanced Damage detection techniques:** **9.1 Advanced damage detection techniques, non destructive testing.**	**03**	**05**
Unit -10	**Strength ening methods:** 10.1 Cantilevers, beams, slabs, walls, columns, foundation.	**04**	**09**
Unit -11	Evaluation of strength, economic & age of building: 11.1 Determination of approx. age of a building. 11.2 Determination of strength of structural member of old building. 11.3 Finding cost in use of a existing building.	**02**	**05**
Unit -12	**Maintenance of life lines:** 12.1 Maintenance of electric supply, water supply leaking pipe joints and sewerage systems, closed drains, sewers. 12.2Maintenance of roads, road berms, side drain maintenance of bridges, culverts causeways	**02**	**05**
Unit -13	**Estimates and tendering:** 13.1 Estimates of annual repairs, special repairs and maintenance work. 13.2 Preparation of tender	**02**	**03**
	Total	**32**	**70**

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
P.K. Guha	Maintenance and Repairs of Buildings		New Central book Agencies
Nayak B. S.	Maintenance Engineering For Civil Engineers		Khanna Publication
Hutchin Son, BD	Maintenance and Repairs of Buildings		Newnes –Butterworth.

Ransom W. H.	Building Failures – Diagnosis and Avoidance		E and F. N. Span.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :-

S.No	
1	• Inspection of any historical building which has limitations for alternation, finding damages, classifying minor & special repairs, decide suitable method of retrofitting, estimating cost of retrofitting.
2	• Finding the approximate. strength of structural members in a existing building like beams, columns, slabs, calculating additional reinforcement & necessary improvement in section, estimating cost of strengthening.
3	• Prepare estimate of retrofitting of plumbing of a building.
4	• Determine approximate age and economics of an old house.
5	• Determine load carrying capacity of a slab, beam, column by using rebound hammer

Name of the Course : DIPLOMA IN PRODUCTION ENGINEERING / TECHNOLOGY (MANAGEMENT)	
Course code: EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS /CR/CO/ /IF/EE/EP/CH/CT/PS/CD/EDEI/CV/FE/IU/MH/MI	**Semester : SIXTH FOR EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/A CS/CR/ CO/CM/IF/EE/EP/CH/CT/PS/CD/EDEI/CV /IU/ AND SEVENTH FOR MH / MI**
Duration :6 semester	**Maximum Marks :**
Teaching Scheme C	**Examination Scheme**
Theory : hrs/week	Mid Semester Exam: Marks
Tutorial: hrs/week	Assignment & Quiz: Marks
Practical : hrs/week	End Semester Exam: Marks
Credit :-	

Aim :-

S.No	
1.	Study of management systems associated with construction industry.

Objective :-

S.No	The students will able to:
1.	• Familiarize environment in the world of work
2.	• Explain the importance of management process in Business.
3.	• Identify various components of management.
4.	• Describe Role & Responsibilities of a Technician in an Organizational Structure.
5.	• Apply various rules and regulations concerned with Business & Social Responsibilities of the Technician.

Pre-Requisite :-

S.No	
1.	Students should be familiar with every unit of working system of construction sector.

Contents ; Theory (Name of the Topics)		Hrs/week
Unit -1	**Overview Of Business** 1.1. Types of Business • Service • Manufacturing • Trade 1.2. Industrial sectors Introduction to • Engineering industry • Process industry • Textile industry • Chemical industry • Agro industry 1.3 Globalization • Introduction	**02**

	• Advantages & disadvantages w.r.t. India 1.4 Intellectual Property Rights (I.P.R.)		
Unit -2	**Management Process** 2.1 What is Management? • Evolution • Various definitions • Concept of management • Levels of management • Administration & management • Scientific management by F.W.Taylor 2.2 Principles of Management (14 principles of Henry Fayol) 2.3 Functions of Management • Planning • Organizing • Directing • Controlling	**07**	
Unit – 3	**Organizational Management** 3.1 Organization :- • Definition • Steps in organization 3.2 Types of organization • Line • Line & staff • Functional • Project 3.3 Departmentation • Centralized & Decentralized • Authority & Responsibility • Span of Control 3.4 Forms of ownership • Propriotership • Partnership • Joint stock • Co-operative Society • Govt. Sector	**07**	
Unit – 4	**Human Resource Management** 4.1 Personnel Management • Introduction • Definition • Functions 4.2 Staffing • Introduction to HR Planning • Recruitment Procedure 4.3 Personnel– Training & Development • Types of training ➢ Induction ➢ Skill Enhancement 4.4 Leadership & Motivation	**08**	

	• Maslow's Theory of Motivation 4.5 Safety Management • Causes of accident • Safety precautions 4.6 Introduction to – • Factory Act • ESI Act • Workmen Compensation Act • Industrial Dispute Act		
Unit – 5	**Financial Management** 5.1. Financial Management- Objectives & Functions 5.2. Capital Generation & Management • Types of Capitals • Sources of raising Capital 5.3. Budgets and accounts • Types of Budgets ➢ Production Budget (including Variance Report) ➢ Labour Budget • Introduction to Profit & Loss Account (only concepts) ; Balance Sheet 5.4 Introduction to – • Excise Tax • Service Tax • Income Tax • VAT • Custom Duty	**08**	
Unit – 6	**Materials Management** 6.1. Inventory Management (No Numerical) • Meaning & Objectives 6.2 ABC Analysis 6.3 Economic Order Quantity • Introduction & Graphical Representation 6.4 Purchase Procedure • Objects of Purchasing • Functions of Purchase Dept. • Steps in Purchasing 6.5 Modern Techniques of Material Management • Introductory treatment to JIT / SAP / ERP	**08**	
Unit – 7	**Project Management** (No Numerical) 7.1 Project Management • Introduction & Meaning • Introduction to CPM & PERT Technique • Concept of Break Even Analysis 7.2 Quality Management • Definition of Quality , concept of Quality , Quality Circle, Quality Assurance • Introduction to TQM, Kaizen, 5 'S', & 6 Sigma	**08**	
	TOTAL	**48**	

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publishe
Dr. O.P. Khanna	Industrial Engg & Management		Dhanpal Rai & sons New D
Dr. S.C. Saksena	Business Administration & Management		Sahitya Bhavan Agra
W.H. Newman E.Kirby Warren Andrew R. McGill	The process of Management		Prentice- Hall
Rustom S. Davar	Industrial Management		Khanna Publication
Banga & Sharma	Industrial Organisation & Management		Khanna Publication
Jhamb & Bokil	Industrial Management		Everest Publication , Pune

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : DIPLOMA IN CIVIL & RURAL ENGINEERING (**MICRO IRRIGATION (ELECTIVE)**)			
Course code: CR		**Semester : SIXTH**	
Duration :6semester		**Maximum Marks :55**	
Teaching Scheme C		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: -- Marks	
Credit :- 3			

Aim :-

S.No	
1.	Study of water conservation and micro irrigation.

Objective :-

S.No	The student will be able to:
1.	• Find out consumptive use of water.
2.	• Suggest suitable micro irrigation system for a farm.
3.	• Give Layout of micro irrigation system.
4.	• Design micro irrigation system.
5.	• Supervise functioning of micro irrigation system.
6.	• Maintain micro irrigation system

Pre-Requisite :-

S.No	
1.	Student should be perfect on hydrological pressures.
2.	Students should know the morphological study of land used.

Contents : Theory (Name of the Topic**)**		Hrs/week	Marks
Unit -1	**Introduction**: 1.1 Definition of micro irrigation 1.2 Necessity of micro irrigation, 1.3 Advantages of micro irrigation system, 1.4 Difficulties in micro irrigation. 1.5 Comparison between micro irrigation and other methods of irrigation.	**02**	**04**
Unit -2	Soil– Plant-Water-Relation: 2.1 Soil moisture relation, Hygroscopic water, Field capacity water, Gravitational water, Field capacity, Permanent wilting point, Available moisture, Readily available moisture, Soil moisture deficiency, Equivalent moisture. 2.2 Definition of irrigation frequency. Estimating depth and	**06**	**14**

	frequency of irrigation on the basis of soil moisture regime concept, Simple problems. 2.3 Optimum utilization of irrigation water, Definition of irrigation efficiencies. 2.4 Evapotranspiraton and/or Consumptive use of water, Methods of finding evopotranspiration by Pan Evaporimeter and Modified Penman method . (No Problems) 2.5 Water audit , Concept of water audit , Necessity of water audit, Benefits of water audit,		
Unit – 3	**Methods of Micro Irrigation:** 3.1 Sprinkler and Drip irrigation. 3.2 Benefits and limitations of sprinkler and drip irrigation systems. 3.3 Comparison between sprinkler irrigation and drip irrigation system. 3.4 Layout of sprinkler irrigation system and drip irrigation system.	**04**	**06**
	Design of Sprinkler Irrigation System: 4.1 Design of main, sub-main, lateral and sprinkler. 4.2 Types of sprinklers and selection 4.3 Design and selection of micro sprinkler Irrigation systems.	**08**	**18**
	Design of Drip Irrigation System: 5.1 Design of main, Submain, Lateral and Drippers 5.2 Types of drippers and selection 5.3 Design and selection of micro jet 5.4 Selection of Pumps 5.5 Installation and maintenance of drip irrigation system	**08**	**18**
	Fertigation And Filtrations: .1 Advantage and limitations of Fertigation .2 Methods for Fertilizer injection .3 Filtration – Particle size, Selection of filter, Filtration methods, Methods of cleaning filters. .4 Filters and their types.	**04**	**10**
	Total	**32**	**70**

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
A.M.Michael	Irrigation Theory and Practice		Vikas Publisher House, New Delhi.
--	Sprinkler Irrigation		WALMI Aurangabad.
--	Drip Irrigation		WALMI Aurangabad .
Dr.M.S.Mane, B.L.Ayare Dr.S.S.Magar	Principle of Drip Irrigation		Jain Brothers New Delhi.

R.K.Sivanappan	Sprinkler Irrigation		Oxford & I B Publishing New Delhi.

Video Cassettes and CDs:

1. Estimation of reference crop.
2. Evapotranspiration by Modified Penman Method including analysis of weather data - WALMI Aurangabad.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :-

S.No	Assignments:
1	• Report writing on visit to farm with sprinkler irrigation system and preparing layout plan and neat-labeled sketches.
2	• Report writing on visit to farm with drip irrigation system and preparing layout plan and neat-labeled sketches.
3	• Design of sprinkler irrigation system for given farm with cost estimation.
4	• Design of drip irrigation system for a given fruit garden farm with cost estimation.

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (PROFESSIONAL PRACTICES-V)	
Course code: CE/CS/CR/CV	**Semester : SIXTH FOR CE/CS/CR AND SEVENTH FOR CV**
Duration :6 semester	**Maximum Marks :50**
Teaching Scheme C	**Examination Scheme**
Theory : -- hrs/week	Mid Semester Exam: -- Marks
Tutorial: --- hrs/week	Assignment & Quiz: 50 Marks
Practical : 2 hrs/week	End Semester Exam: -- Marks
Credit :- 2	

Aim :-

S.No	
1.	Development of professional awareness in before and after sales and services construction sector.

Objective :-

S.No	Student will be able to:
1.	• Acquire information from different sources.
2.	• Prepare notes for given topic.
3.	• Present given topic in a seminar.
4.	• Interact with peers to share thoughts.
5.	• Prepare a report on industrial visit, expert lecture.

Pre-Requisite :-

S.No	
1.	Students should have complete knowledge of design of construction.
2.	Students should know all the govt norms related to construction industry.

Contents :		Hrs/week
Unit -1	Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work. (minimum 3 visits) Following are the suggested type of Industries/ Fields - i) Visit to RCC framed structure building for details of reinforcement. ii) Visit to water /sewage treatment plant. iii) Visit to works carried out under watershed development/micro irrigation scheme. iv) Visit to any structure undergoing rehabilitation/retrofitting.	**18**
Unit -2	The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs duration), minimum 2 nos. from the following or alike topics. The brief report to be submitted on the guest lecture by each student as a part of Term work. a) HRD and civil engineering projects. b) Project planning and execution of civil engineering projects.	**14**

	c) PWD system of accounts d) Contract Management e) RCC design and detailing	
Unit – 3	Information Search ,data collection and writing a report on the topic a) Collection of data for valuation of old building b) Collection of details of BOT project under execution. c) Collection of Data and case study of failure of RCC structure. d) Collection of information on any topic from journal available in library.	**10**
Unit – 4	The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are **-** i) Role of civil engineer in disaster management. j) Scope of out sourcing of civil engineering services. k) Pollution control.	**10**
Unit – 5	Seminar Presentation The students should select a topic for **Seminar** based on recent developments in civil engineering field, emerging technology etc.	**12**
	Total	**64**
Text Books:- Nil		
Reference books :- Nil		
Suggested List of Laboratory Experiments :- Nil		
Suggested List of Assignments/Tutorial :- Nil		

Name of the Course : DIPLOMA IN CIVIL ENGINEERING (RURAL ENGINEERING)	
Course code: CE/CS/CR/CV	**Semester : SIXTH FOR CE/CS/CR AND SEVENTH FOR CV**
Duration :6 semesters	**Maximum Marks :50**
Teaching Scheme C	**Examination Scheme**
Theory : - hrs/week	Mid Semester Exam: -- Marks
Tutorial: - hrs/week	Assignment & Quiz: 50 Marks
Practical : 2 hrs/week	End Semester Exam: -- Marks
Credit: 1	

Aim :-

S.No	
1.	Study of socio-economical effects of rural area on construction industry.

Objective :-

S.No	The students will be able to:
1.	• Use knowledge for solving the problems of rural population.
2.	• Render their services for the various development schemes of state / central Govt.
3.	• Prepare modified plan for existing farmer's house with due suggestions.
4.	• Provide support services as a Civil Engineer for rural population..
5.	• Provide guidance to start cottage industries related to Civil Engineering.
6.	• Inspire the villagers for using non conventional energy appliances.
7.	• Provide services for developing and propagating the programmes of water shade management.

Pre-Requisite:-

S.No	
1.	Student should study socio economical culture of proposed rural area.
2.	Students should know all the norms of construction led by Govt.

Contents:- Nil	Hrs/week

Practical:

Term work shall consist of reports on any six of the following assignments:

1.1 Socio Economic survey of village, to identify, the needs of village people

1.2 Visit to the Structures built under water shade management program (at least two structure)

1. Gabian structure
2. Underground Bandhara
3. Kolhapur type weir
4. Cement Plug, Contour Bunding
5. Rain Water Harvesting

Prepare neat labeled sketches and report on the above visits.

2 Visit to a farmer's house

2.1 Profile of a farmer for case study

2.2 Measured drawing of existing farmers house

2.3 Preparation of modified plan with due suggestions with respect to water supply, sanitations, cattle shade, fodder shade, court yard, composting yard, bio/Gobar Gas plant.

3 Report writing on the following with neat labeled sketches (Minimum one)

3.1 Sprinkler Irrigation System, with capacity calculation, head and discharge calculation, power calculation for pump, pressure calculation for pipe.

3.2. Drip Irrigation System with capacity calculation, head and discharge calculation, Power calculation for pump, pressure calculation for pipe

3.3 Layout of Lift Irrigation, with capacity calculation, head and discharge calculation, power calculation for pump, pressure and dia. Calculation for pipe.

4 Report writing on any one of the cottage industries related to civil engineering regarding demand, utility, advantages, effect on rural economy etc.

1 Brick Manufacturing
2 Cement Block manufacturing
3 Cement concrete pole for fencing
4 Roof tiles / decorative Terracotta tiles manufacturing.
5 Stone Crusher.

5 Collecting information regarding schemes declared by State / Central Govt. in which Civil Engineer has effective participation (at least one)

1. Indira Awas Yojna
2. Walmiki Awas Yojna
3. Swajal Dhara Yojna
4. Jawahar Well Yojna
5. Village / Farm Tank.

6 Collecting information regarding use of non-conventional energy source like- Solar energy, Bio/Gobar Gas plant, wind mill,

7 A Study report on any one

1) Basic Study of electrical installation for house wiring, its components, different types of wires and its uses, need of fuse and its material used, need of earthling and its use.

2) Identification of electrical motor pump set, its electrical connection, fault finding and its remedies.

8 A Study report on

Concept of Community Polytechnic in India regarding their role in upliftment of rural population, their area of working, such as manpower development, transfer of technology, technical support services, information dissemination, community services. A visit to nearest Community Polytechnic shall be arranged. A visit report shall be prepared covering all aspect.

Text Books:- Nil

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

S.No	

Name of the Course : DIPLOMA IN CIVIL & RURAL ENGINEERING (**WATERSHED MANAGEMENT (ELECTIVE)**)			
Course code: CR		**Semester : SIXTH**	
Duration :6 semesters		**Maximum Marks :55**	
Teaching Scheme		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam: 30 Marks	
Tutorial: - hrs/week		Assignment & Quiz: 25 Marks	
Practical : 2 hrs/week		End Semester Exam: ---- Marks	
Credit: 3			

Aim :-

S.No	
1.	Study of watershed management.

Objective :-

S.No	The students will be able to:
1.	• Apply integrated approach to watershed.
2.	• Apply techniques of soil and water conservation in watershed management.
3.	• Use rainwater-harvesting techniques.
4.	• Identify water harvesting structure
5.	• use peoples participation in local watershed management and development.

Pre-Requisite:-

S.No	
1.	Student should study the sources of water and its limitations.
2.	Students should study the traditional methods of water management.

Contents : Theory		Hrs/week	Marks
Unit -1	**Introduction:** 1.1 Definition of watershed, concept of watershed, definition of watershed management, need of watershed management 1.2 Characteristics of watershed, objectives of watershed management, benefits of watershed development 1.3 Causes and effects of degradation 1.4 Integrated multi disciplinary approach for watershed, steps in watershed management. 1.5 Ill effects of urbanisation on watershed management	**06**	**08**
Unit -2	**Soil and Water Conservation:** 2.1 Soil erosion- definition of erosion, problems of erosion, types of soil erosion. 2.2 Land classification for watershed management	**08**	**20**

	2.3 Soil conservation, need of soil conservation, soil conservation technology. 2.4 Engineering measures for erosion control such as contour cultivation, contour bunding, graded bunding, bench terracing, trenching, construction of grade stabilisation structure, retention of detention reservoirs, agronomical measures (names only) 2.5 Contour bunds, design of contour bunds, drainage of excessive water to protect contour bunds, maintenance of contour bund. 2.6 Graded bunding, design of graded bunding, alignment and construction, maintenance, advantages and limitations of graded bunding. 2.7 Bench terracing, types, design. 2.8 Grassed waterways, shape, planning, construction and vegetation, maintenance, diversion drains. 2.9 Control of gullies and their reclamation for various land Use		
Unit - 3	**Water Harvesting:** 3.1 Definition, need of rainwater harvesting, advantages of rainwater harvesting,. Techniques of rainwater harvesting- roof water harvesting and surface water harvesting (definition) 3.2 Traditional methods of rainwater harvesting in deccan plateau-cheruva, kohli tank, phad, kere, the ramtek model and bhandaras (short description with neat sketch). 3.3 Roof water harvesting- techniques as storage and ground water recharge, components- catchment, coarse mesh, gutters, conduits, first flushing, filters, storage facilities, recharge structures Recharge structures – pit, trench, dug well, hand pump, recharge well, lateral shaft with borehole, percolation pit with borehole. Types of filters 3.4 Reuse of domestic water	**08**	**18**
Unit – 4	**Water Harvesting Structures:** 4.1 Types of watershed structures- such as small weir, banchara, K.T. weir, percolation tank, jalbandh, farm pond and check dam. 4.2 Details of watershed structure with neat sketch.	**05**	**14**
Unit - 5	**Socio Economic Aspects:** .1 People's awareness, participation and response. .2 State and integrated approach. .3 Sustainable society for economical upliftment. 5.4 Economics.	**05**	**10**
	Total	**32**	**70**

Term work should contain Mini project on any one of the following:

1. Rain Water Harvesting of a building.
2. Integrated water resource management of small area (e.g. college campus, small village etc.)
3. Preparation of complete water shed management plan for small area identified from toposheet
4. Case study of watershed management plan.

Text Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
V. V. Dhruvanarayana G. Sastry, U. S. Patnaik	Watershed management		Indian Council for Agricultural Research, Krishi Anusandhan Bhawan, Pusa, New Delhi
J. V. S. Murty	Watershed management in India		Wiley Estern Ltd.
Raj Vir Singh	Watershed planning and management		Yash publishing House,
--	Field manual on watershed management		Central Research Institute For Dry Land Agriculture, Hydrabad-500659
E. M. Tideman	Watershed management		Omega Scientific Publications, New Delhi
N. D. Mani	Watershed management		Saujanya Books, 165-E, Kamla Nagar, Delhi-110007
Robert J. Reimold	Watershed management : practice, policies and coordination		BOSS International US ISBN0070522995

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil