

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
Natakkar Ram Ganesh Gadkari Marg,
Vile Parle (W), Mumbai-400 056.

CURRICULUM

Shri Bhagubhai Mafatlal Polytechnic started 03 year's Diploma courses and affiliated to the Board of Technical Examinations, Maharashtra State, in 1963. Since 1969, academic freedom was granted to the Polytechnic, which enabled it to evolve curriculum and examination scheme and to introduce inplant training, resulting into industry institute interaction. Thus 4 years' semester sandwich pattern came in existence. Since 1978-79 academic freedom was

extended to all the full-time diploma courses. In 1989-90, full autonomy was granted to all seven full-time diploma courses. As a further development to the above, the Multi-Point Entry and Credit System (MPE&CS) was initiated in 1981 on the progressive basis. In the scheme students can regulate their pace of studies within the rules prescribed. From 1993-94, full academic autonomy was extended to all the courses.

(Full Time 04 Year Sandwich Pattern)

Diploma Course In CIVIL ENGINEERING (Aided)

Civil Engineering is a basic branch of Engineering which caters to the basic needs of society, i.e. provide housing and take up all the required development works around the World. The aim of the institute, through civil Engineering education is to provide trained professionals. The mission of civil Engineering department is to be more capable to impart education Which matches with the development of technology. The civil Engineering department is having mission of tuning students into Engineers, Technologies, Managers & Administrators. Besides teaching this, it has a mission of providing services like testing & consultancy to the construction industry by motivating the faculty for taking up the challenges.

Therefore Diploma in civil Engineering Programme envisages in developing competent technicians with a number of professional skills who can perform these jobs in the construction contracting/ consulting companies or as an entrepreneur effectively & efficiently.

The Diploma course of civil Engineering is designed at technician level, covering the basic knowledge of core subjects like Engineering Materials, Surveying, Civil Engineering Drawing, Applied Mechanics & Construction. This is followed by subjects like Materials & Structures, Concrete technology, Highway & Bridge Engineering, before first phase of inplant Training. At sixth & Seven semester subjects like Irrigation Engineering, Environmental Engineering, Design practice of RCC Structures, Soil Mechanics and Foundation Engg, Project Engineering management and contract administration are taught before they proceed to final semester i.e. 7th semester i.e. Phase two of inplant training., to develop all kind of skills project work is included at 7th sem level. Subjects of futuristic areas like MRTS, Building maintenance & repairs, services are also offered as an optional subjects. Subjects duly are classified into Basic, core, application & management & also as compulsory, optional, & award winning. There is structured programme of briefing the students at various levels i.e. at the time of admission, 3rd sem. & before proceeding for inplant training to understand do's & don'ts & also to know about which subjects to register under MPE&CS.

Objectives: On completion of Diploma students will be able to work as:-

- Junior Engineer in both Public & Private Sectors
- Consulting origination for design work
- Civil Contractor

PRACTICAL TRAINING:

The students receive institutional training for the first four semesters. In the 5th semester they are given inplant /field training. They return to the polytechnic in the 6th and 7th semesters for institutional training. In the concluding 8th semester, they again receive inplant /field training. This scheme enables the students to be exposed to industry during the training, which is provided for practice orientation and improves their prospects for employment.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING (Full-Time)
SEMESTER : I SEMESTER

W. e. f.-Batch admitted from June 2012

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Instructions and Periods per week					Theory Paper duration and marks		A Scheme of Examination						Gr	Scheme L/P/Cr		
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total				
1-1	Communication Skill (120005)	--	3	-	-	1	4	03	80	20	80	25@	-	-	125	B*	404		
1-2	Basic Mathematics (120003)	--	3	-	-	1	4	03	80	20	80	-	-	-	100	B*	404		
1-3	Physics-I (120008)	--	2	2	-	-	4	03	80	20	80	25@	50**	-	175	B*	224		
1-4	Chemistry-I (120004)	--	2	2	-	-	4	03	80	20	80	25@	50**	-	175	B*	224		
1-5	Basics of computer systems (120002)	--	2	2	-	-	4	-	-	-	-	50@	50**	-	100	B*	224		
1-6	Engineering Drawing – I (120007)	--	2	-	4	-	6	03	80	20	80	50@	-	50**	200	C*	246		
1-7	Civil Engineering Materials (120101)	--	3	-	-	-	3	03	80	20	80	-	-	-	100	C*	303		
	TOTAL		17	06	4	2	29	No of papers=06		120	480	175	150	50	975				
TOTAL PERIODS = 29									TOTAL MARKS = 975										

* Compulsory , ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral , Gr- Group , B-Basic, C-Core , A-Application , M-Management

1. Subject Details

Subject (Code): Communication Skill (120005)

COURSE: ME/CE/EE

COURSE: PE/CH/DE/IE

Group : B*

Semester : I/I/I
Semester : II/II/II/II

2. Teaching and Examination Scheme

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SS L	Paper	TW	PR	OR	Total		
3	-	-	1	4	3	80	20	80	25@	-	-	125	B*	404

3.Rationale : The communicative competence in English is the pre-requisite for the employment market at national and international level today. However, the ability to communicate effectively does not come easily to many people. No matter how brilliant and invaluable your idea is, it is worthless until shared either orally or in written manner. Here arises the need to learn communication skills which will enable the students to enhance their comprehension, writing and oral skills in English.

4.Objectives:

1. Student will understand the process of communication.
2. Student will learn the various grammatical structures which will enhance their oral and written communication.
3. Student will be proficient in all four language skills (LSRW) Listening, speaking, reading writing
4. Students will acquire proficiency in spoken English by using language lab.

5.Detailed Contains

SECTION -1

Topic No.	Topic & Sub -Topics	Hours	Marks
1.	Basics of communication 1.1 Nature and Definition of communication 1.2 Process/ cycle of communication 1.3 Characteristics of communication 1.4 Objectives of Communication	04	06
2	Methods of communication 2.1 Verbal & Non verbal, 2.2 Formal & Informal 2.3 Oral & written Communication 2.3 Advantages & disadvantages Of Oral and written communication	03	06
3.	Language Grammar 3.1 Tense & its Types 3.2 Parts of speech 3.3 Degree and Its types 3.4 Use of Model Auxiliary 3.5 Basic sentence types 3.6 Clause & its Types	04	06

4.	<u>Vocabulary Building</u> 4.1 Word Formation Processes Affixation : prefix ,Suffix, clipping , Backformation shortforms, Acronyms etc 4.2 Technical jargons , 4.3 Nouns Ending with –tion, -er,-logy,-ee,-aire- metry , -ity 4.4 Errors arising out of wrong use of words	02	06
5	<u>Phonetics & Spoken English</u> 5.1 Language Skills : Listening & Speaking 5.2 English sound system (RP) Vowels & Diphthongs(RP) , Consonants(RP) 5.3 Word Accent , stress a Rhythm and Intonation	05	08
6	<u>Networks of Communication In organization</u> 6.1 Importance communication in Organization 6.2 Horizontal communication 6.3 Vertical – downward & upward 6.4 Grapevine communication 6.5 Diagonal Communication	03	04
7	<u>Non- Verbal Methods of Communication</u> 7.1 Body language and its aspects 7.2 Paralinguistic, use Colour , sign symbols for communication 7.3 Non verbal Codes : Haptics, Chronemics , Proxemics, Artifacts etc	03	04
Total	Total	24	40

SECTION –II

Topic No.	Topic & sub- Topics	Hours	Marks
8	<u>Barriers To communication</u> 8.1 Definition of Barrier 8.2 Types of barriers of communication Mechanical, Psychological , Linguistic, socio-cultural & Environmental etc 8.3 Elimination / Removal of barrier.	04	05
9	<u>Communication : Media & Technology</u> 9.1 Advanced Means Communication 9.2 Facsimile (FAX), Internet, E-mail, 9. 3 Videoconferencing 9.4 Netiquettes	04	05

10.	<u>Letter writing</u> 10.1 Importance of business communication 10.2 7 Cs of Good writing , 10.3 Layouts: Block , semi –block ,Complete Block , 10.4 letter of Enquiry, Complaint , Order , letter to editor	05	10
11	<u>Reading comprehension</u> 11.1 Reading Unseen passages for comprehension	04	08
12	<u>Report Writing</u> 12.1 Definition of Report 12.2 Formats of reports 12.3 Types of Report : Accident, Committee Investigation etc.	04	08
13	<u>Paragraph writing</u> 13.1 Development of Paragraph on Given topic	03	04
Total		24	40

List of Assignments

1. Explain the process of communication with the help of diagram . Give some real life examples , functioning in the similar way .
2. Explain the four types of sentences , Give at least two examples of each .
3. List down the relationship between the clause and sentence , give an example of it .
4. Find out any twenty difficult words from the English newspaper and understand their meaning by using dictionary and use it in your own sentences.
5. Listen and repeat the teacher's (or recorded) pronunciation of the given group of words(#)
6. Define syllable, vowel and consonant form RP , give at least five examples of each.
7. Listen the recorded CD's on particular topic , and try to imitate the pronunciation by following intonation and rhythm .(#)
8. Read the given passage and record it in your own voice the check the correctness of pronunciation. (#)
9. Listen and mark the primary ,secondary accent for following words . (#)
10. Write the phonetic transcription of given words by using dictionary .(#)
11. List down the points related to non verbal communication to be remembered while walking for an interview , and on the stage.
12. Collect the resume of an eminent personality (like scientist , social worker , industrialist or renown politician) an prepare a speech introducing him / her.
13. Explain the Various formats of letter writing and give an examples of each.
14. Develop the paragraph on the given topic .

Note :

1. Each student has to attempt any ten assignments.
2. # marked are compulsory assignments to be conducted in Language Lab.

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Tutorials / assignments

Reference Books:

Name of book	Author	Publication
Business Communication	Lesikar and Petic	Tata Mcgraw Hill Publication New Delhi . 1995
Business communication	P.C Perdesi	Nirali Publications, Pune. 2000
Communication Skills for Technical students	-----	Orient Longman New Delhi .
Business Communication	Dr. Urmila Rai	Himalaya Publication, Mumbai .

QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-
Total	-	40	-	40	-	20

1. SUBJECT DETAILS:-

Program: All

SEMESTER: I

Course: Basic Mathematics

Code: 120003

Group: B*

Compulsory

2. TEACHING AND EXAMINATION SCHEME:-

Scheme of instruction & Periods Per Week					Theory Paper duration & marks			Scheme of Examination						Gr	Scheme L/Pr/Cr
L	P	D	T	Cr	Np	Hrs	Mks	SSL	Theory Paper	T/W	PR	OR	Total		
3	0	-	1	4	1	3	80	20	80	--	--	--	100	B*	404

3. RATIONALE:-

Basic Mathematics is classified as Basic Science subject which intends to teach students the facts concepts and principles of Mathematics that can be applied to solve problem in all Engineering courses

4. OBJECTIVES:-

Students will be able to understand

1. concepts of Partial Fractions, Determinant, Matrices and Binomial Theorem
2. concepts of Trigonometry and Coordinate Geometry
3. Applications of Trigonometry.

5. DETAILED CONTENTS:-

SECTION-I

(A)	ALGEBRA	HOURS	MARKS
1	PARTIAL FRACTION	06	08
	1.1. Definition of partial fraction, proper and improper fractions 1.2. To resolve into partial fractions - Linear factors - Repeated linear factors - Non repeated quadratic factors		
2	DETERMINANT	06	10
	2.1 Definition and expansion of 2 nd and 3 rd order determinant 2.2 Cramer's rule to solve equations in 2 and 3 unknowns 2.3 Properties of determinant and solving problems		
3	MATRICES	12	12
	3.1 Definition of a matrix of order m x n and types of matrices 3.2 Addition, subtraction, scalar multiplication and multiplication between Matrices 3.3 Transpose of a matrix 3.4 Minor cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method 3.5 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion methods.		
4	BINOMIAL THEOREM	08	10
	4.1 Definition of combination		

	4.2 Expansion 4.3 Middle term 4.4 Independent term 4.5 Approximate value		
	TOTAL	32	40
SECTION-II			
5	TRIGONOMETRY	16	20
	5.1 Trigonometric ratios of allied compound and sub-multiple angles 5.2 Factorization and de-factorization formulae. 5.3 Inverse trigonometric functions , principle value 5.4 Properties of the triangle 5.5 Solution of triangle		
6.	CO-ORDINATE GEOMETRY	08	10
	STRAIGHT LINE 6.1 Slope and intercept of straight line 6.2 Equation of straight line - Slope point form - Slope intercept form - Two point form - Intercept form - Normal form 6.3 Intersection of two lines, angle, condition of parallel and perpendicular lines 6.4 Length of perpendicular from a point on the line 6.5 Perpendicular distance between two parallel lines		
	CIRCLE 6.6 Equation of circle - Centre radius form - Diameter form - Intercept form	08	10
	6.7 General equation of circle		
	6.8 Tangent line and normal line		
	TOTAL	32	40

6. Implementation Strategy(planning): Conducting lectures as per lesson plan and conducting tutorial in the same class room.

7. Reference Books:

Sr. No.	Author	Title	Publishers & Address
1.	Shri. S.P. Deshpande	Calculus for Polytechnics	Pune Vidyarthi Graha Prakashan Pune-30
2.	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics	Nirali Prakashan Mumbai
3.	Dr. B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers 2/B, Delhi-6
4.	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics	Pune Vidyarthigraha Prakashan, Pune- 411030
5.	S.S.Sastry	Introductory methods of Numerical analysis	Prentice Hall of India –New Delhi
6.	M.K.Jain	Numerical method for Scientific and engineering computation	Wiley estern

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : CE/ME/EE/IE/PE/CH/DE	Semester : I
Subject : PHYSICS-I	Subject Code : 120008
Group : B*	Duration : 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions & Periods per Week					No. of Papers, Duration & Marks			Scheme of Examination					Scheme L/Pr/Cr.	
L	P	D	T	Cr	NP	Hrs	Mks	SSL	Theory Paper	T/W	Pract.	Oral	Total	
2	2	-	-	4	1	3	80	20	80	25@	50**	-	175	2/ 2/ 4

RATIONALE:

The student has to attain a remarkable knowledge level regarding properties of materials and laws of Physics via concepts of “matter”, “energy” and “measurement”. This stands fundamentals, essential for various branches of engineering and involves a theory and practical approach with due stress on practical application aspect of the subject. This is emphasized by widening scope of Laboratory work, selecting such text and specialized reference books.

4. OBJECTIVES:

Student will be able to :

1. Appreciate the importance of precision involved in measurement.
2. Acquire the knowledge of material properties and laws of Physics.
3. Understand heat as energy, concept of temperature and its measurement, Behaviour of gases, concept of heat engine.
4. Understand nature of sound energy, its propagation, acoustic details, utilization of ultrasonic waves.

5. DETAILED CONTENTS:

A) THEORY CONTENTS:

SECTION-I

	Marks	Hours
Chapter 1 <u>Measurement of physical quantities and units</u>	-	02
1.1 System of units: CGS, MKS, FPS, MKSA; Units: Fundamental, Derived, Supplementary, Conversions		
1.2 SI Units and Standards- 'metre', 'kilogram', 'second', 'degree kelvin', 'candela', 'ampere', 'mole'		
Chapter 2 <u>General Physics</u>		
2.1 <u>Elasticity</u>	08	04
'Elasticity' 'Modulus', Poisson's ratio, Measurement by Searle's method, Elastic behavior of wire, Engineering applications, Numerical problems.		
2.2 <u>Surface Tension and Capillarity</u>	04	02
Molecular theory, Surface Tension and Capillarity, Applications, Numerical Problems.		

2.3	Viscosity Streamline flow, Critical velocity, Newton's formula, 'poise'. Poiseuille's equation, Stokes formula, Applications, Reynolds number, Numerical Problems.	08	03
Chapter 3	Heat		
3.1	Specific heats of gases C_p and C_v in terms of enthalpy, Mayer's relation, Numerical problems.	10	02
3.2	Heat Transfer – Conduction Steady state, Temperature gradient, Coefficient of Thermal conductivity, Thermal conductivity of a good conductor – Searle's method, Thermal conductivity of rubber tube – Calorimetric method, Thermal conductivity of a poor conductor – Lee's method.	10	03
		TOTAL	40 16
<hr/>			
Chapter 4	<u>SECTION-II</u> <u>Thermodynamics</u>		
4.1	Thermometry: Zeroth law, Standard gas thermometer, Platinum resistance thermometer, Thermo-electric thermometer, Optical pyrometer.	06	03
4.2	Elementary Thermodynamics :Mechanical equivalent of heat and First law of thermodynamics, Isothermal and Adiabatic processes.	06	02
4.3	Thermodynamic processes – Reversible, Irreversible. P-V diagram, Heat engine, Entropy.	04	01
Chapter 5	Sound		
5.1	Simple Harmonic Motion: General equation of SHM, Graphical representation, Numerical problems.	04	02
5.2	Wave Motion: Types of waves, Forced vibration and Resonance, Velocity of sound (tube closed at one end), Numerical problems, Sonometer- frequency of A.C. supply.	08	03
5.3	Intensity of Sound : 'phon', 'decibel', Logarithmic formula for Intensity of sound.	04	02
5.4	Acoustics and Reverberation: Reverberation, Sabine's formula, Numerical problems, Acoustical planning, Noise reduction and Sound Insulation, Ultrasonic – Production and Uses; Sonic, Subsonic, Supersonic.	08	03

TOTAL 40 16

B) PRACTICAL CONTENTS:

a) Experiments to be performed (Any 08)

1. Use of Measuring Instruments – Vernier Callipers, Micrometer Screw Gauge, Spherometer.
2. Young's Modulus by Searle's Apparatus
3. Elastic Constants by Searle's Method.
4. Surface tension by Capillary rise method
5. Viscosity by Poiseuille's method
6. Viscosity by Stokes method

7. Ratio of Specific Heats C_p/C_v by Clement and Desorme's Apparatus
8. Thermal Conductivity of a Good Conductor by Searle's Apparatus.
9. Thermal Conductivity of Rubber Tube by Calorimetric Method.
10. Thermal Conductivity of an Insulator by Lee's Method.
11. Constant Volume Thermometer
12. Velocity of Sound by Resonance.
13. Velocity of Sound by C.R.O.
14. Frequency of A.C. Supply by Sonometer and Verification by C.R.O.

b) Demonstrations (Any 04)

- (i) Use of Precision Measuring Instruments (Dial Vernier, Dial Micrometer, Traveling Microscope etc.)
- (ii) Poisson's Ratio for Rubber Tube
- (iii) e.m.f. of a Thermocouple
- (iv) Temperature of Flame (Optical Pyrometer)
- (v) Study of Ultrasonics

6. Term-Work:

Compulsory term-work on the list of experiments written in a journal and carrying 25 marks on timely submission basis specified at the index sheet of Physics Journal.

7. Scheme of Practical Examination:

- (i) Each candidate will be examined in one experiment from among those prescribed in the syllabus. The duration of the experiment will be two hours (with a coupling of Demonstration if any).
- (ii) The performance of the candidate in the practical examination will be assessed out of 50 marks as shown in the following scheme.

Scheme of Assessment:

(a) Connections, adjustments and observations	20 Marks
(b) Circuit Diagram, figures and tabulation	10 Marks
(c) Formula, calculations and graphs if any	10 Marks
(d) Oral	05 Marks
(e) Correct answer or appropriate result	05 Marks
Total	50 Marks

- (iii) Each candidate will be jointly examined by both External and Internal Examiners.
- (iv) Certain demonstrations are coupled with certain conventional experiments during the examination. Marks allotted for demonstration are 15 and marks for conventional experiments are 35. The conventional experiment is assessed out of 50 as mentioned under (iv) in the above scheme and then converted out of 35. Assessment of a demonstration is judged by answers (oral or written) given by candidate in front of the relevant demonstration setup.
- (v) If any candidate is unable to draw a correct circuit diagram, the same may be given by the examiner on request so that the candidate may continue the experiment. However, five marks will be deducted for the same.
- (vi) While assessing, the overall performance and the ability of the candidate to handle the apparatus independently, will be considered.

8. IMPLEMENTATION STRATEGY (PLANNING):

- (i) Theory – Lesson Plan
- (ii) Practical – Scheme of marking for T/W, Scheme of assessment for Practical Examination.

9 (a). TEXT BOOKS:

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	R.K. Gaur and S.L. Gupta	Engineering Physics	Any	1981-96 2001 Reprint 2004, 2008	Dhanpat Rai & Sons, New Delhi
2.	M.R. Shrinivasan	Physics for Engineers	Any	1976	New Age International, New Delhi
3.	P.G. Kshirsagar and M.N. Avadhunuhu	A Text Book of Engineering Physics	Any	1992 Reprint 1993 till 2005	S. Chand and Co. Ltd, New Delhi
4.	Gambhir, Durgapal and Banerjee	Introductory Physics - Vol-1,2 &3.	Any	1972	Wiley Eastern

9 (b). REFERENCE:

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	Resnik and Halliday	Physics Vol. 1 & 2	Any	1986	Wiley Eastern
2.	B.L. Theraja	Engineering Physics	Any	1962 Reprint 1974-87	S. Chand and Co. Ltd, New Delhi

QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-
Total	-	40	-	40	-	20

Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic

1. SUBJECT DETAILS:

Course : C/M/E/IE/PL/CH/DE Engineering	Semester : I
Duration : 16 Weeks	
Subject : Chemistry-I	Sub Code : 120004
Group : Basic	Compulsory

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions & Periods per Week					No. of Papers, Duration & Marks			Scheme of Examination						Scheme L/Pr/Cr.
L	P	D	T	Cr	NP	Hrs	Mks	SSL	Theory Paper	@T/W	Pract.	Oral	Total	
2	2	-	-	4	1	3	80	20	80	25	50**	-	175	2/ 2/ 4

3. RATIONALE:

This subject is classified under the category of Basic Sciences. It intends to develop the understanding of fundamental principles of chemistry. This will form the base for the better understanding of the other core technology and technological subjects of different branches.

4. OBJECTIVES:

After studying the subject the student will be able to

- (i) Understand basic principles of chemistry.
- (ii) Apply the principles to other subject.
- (iii) Understand the language of chemistry.

5. DETAILED CONTENTS:

Chapter	Content	Marks	Hours
1.	<p style="text-align: center;"><u>SECTION-I</u></p> <p>1.0 Atomic Structure:</p> <p>1.1 Dalton's Atomic Theory</p> <p>1.2 Rutherford's Scattering Experiment</p> <p>1.3 Drawbacks of Rutherford's Model</p> <p>1.4 Bohr's Theory of an atom</p> <p>1.5 Quantum numbers</p> <p>1.6 Orbits and orbitals, shape of s and p orbitals</p> <p>1.7 Pauli's exclusion principle</p> <p>1.8 Hund's rule</p> <p>1.9 Aufbau principle</p> <p>1.10 Heseinberg's Uncertainty Principle</p> <p>1.11 Electronic configuration of first twenty elements</p>	18	08

1.12	Study of inert gases		
1.13	N/P Ratio		
1.14	Nuclear stability mass defect and binding energy		
1.15	Definition and types of valency - electrovalency, covalency, co-ordinate valency		
2.	2.0 Electrochemistry :	14	05
	2.1 Atom, ion		
	2.2 Arrhenius theory, degree of ionization		
	2.3 Mechanism of electrolysis		
	2.4 Faraday's Laws of Electrolysis.		
	2.5 Numerical problems based on its applications		
	2.6 Applications of electrolysis		
	a) Electroplating		
	b) Electrotyping		
	c) Electrorefining		
	d) Electrometallurgy		
3.	3.0 Metals and Metalloids :	08	03
	3.1 Types of metals		
	3.2 Mechanical Properties of Metals such as Hardness, Toughness, Ductility, Malleability, Tensile Strength, Tenacity, Machinability, Extrusion, Forging, Castability, Weldability, Soldering.		
	3.3 Physical properties and applications of some commonly used metals and metalloids such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Ag, Si.		

SECTION-II

Chapter	Content	Marks	Hours
4.	4.0 Corrosion :	20	09
	4.1 Definition		
	4.2 Types of Corrosion		
	a) Atmospheric Corrosion		
	b) Mechanism of Atmospheric Corrosion		
	c) Immersed Corrosion – Galvanic Cell Type Corrosion, Concentration Cell Type Corrosion, Oxygen Concentration Cell Type Corrosion		
	d) Mechanism of Immersed Corrosion		
	4.3 Factors affecting corrosion		
	4.4 Methods of prevention of corrosion.		
	a) Purification of Metal		
	b) Alloying		
	c) Cathodic Protection		
	d) Controlling External Environment		
	e) Application of Protective Coatings		
	4.5 Methods of applying Metal Coating.		
	a) Hot Dipping – Galvanizing, Tinning		
	b) Metal Spraying		

- c) Alloying – Sheradizing
- d) Electroplating
- e) Metal Cladding

5.	5.0 Water :	12	04
	5.1 Sources of Water.		
	5.2 Impurities in natural water.		
	5.3 Physical and chemical characteristics of water.		
	5.4 Hardness of water		
	a) Causes of Hardness of Water		
	b) Types of Hardness – Temporary, Permanent		
	c) Degree of Hardness of Water		
	d) Estimation of hardness of water		
	e) Disadvantages of hard water – for domestic purpose, industrial purpose, Steam generation in Boilers.		
	f) Steam generation in Boilers – Boiler Corrosion, Scales & Sludges, Caustic Embrittlement, Priming & Foaming.		
6.	6.0 pH :	08	03
	6.1 Concept of pH		
	6.2 pH scale, applications of pH in industry		
	6.3 Problems based on hydrogen ion and hydroxyl ion concentration		

Total	Marks	Hours
	80	32
Practice Hours	=	32

5A. PRACTICE:

List of Experiments:

01– 06: Techniques of determination of concentration of solutions:

Volumetric Analysis

- a) Neutralization Titration
 - i) Titration between Strong Acid and Strong Base using Phenolphthalein as indicator – 2 sets
 - ii) Titration between Strong Acid and Weak Base using Methyl Orange as indicator – 2 sets
- b) Redox Titration
 - i) Titration between KMnO_4 and $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
 - ii) Titration between KMnO_4 and Mohr's Salt [$\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$]

07- 08: Determination of:

- a) Hardness of water
 - i) EDTA method
 - ii) Soap Solution method
- b) Chloride content in water

09. Determination of pH of different solutions.

10. To prepare a chart showing application of metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co.

6. IMPLEMENTATION STRATEGY (PLANNING):

- Theory topics and practice experiments should be done simultaneously. This will help the students to understand the topics.
- Question papers for the periodical test should cover the topics which have been taught to test the understanding.

7. REFERENCE:

Sr. No.	Author	Title	Publishers & Address
1.	Jain and Jain	Chemistry of Engineering Materials	Dhanpat Rai Publishing Co. New Delhi
2.	Narkhede & Thatte	Engineering Chemistry	
3.	Mahadeokar & Dr. U. P. Kodgire	Chemistry for Engineering students	Everest Publishing House, Pune
4.	B.S. Godbole	Applied Chemistry	Satya Prakashan, New Delhi

QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-
Total	-	40	-	40	-	20

Basics of Computer System

(T.W. = 50 Marks, Pr. = 50 Marks, Lecture 2/week,
Practical 2/week, Credit: 4)

SUB Code: 120002

Teaching And Examination Scheme:

Subject Group : B*	Scheme of Instructions and Periods per week			No. of Papers, duration & Marks	Scheme of Examination					Detailed Syllabus Ref. No.	Scheme L.Pr./Cr.
	Lecture	Pract. or Dig.	Tutorial		Sessional Work	Paper	Term work	Pract. Exam	Total		
Basics of Computer System	2	2	--	--	-	-	50 @	50**	100	--	224

Rationale:

This subject envisages making the students know the fundamentals of computer systems and its organisation. It will enable the students to comprehend the organisation and working of various units of personal computer system for storing and processing information. It will also help the students to have hands on experience of operating systems and different application software used for office automation, day to day problems sharing in particular for creating business documents, data analysis graphical representations and business presentations. It also deals with basics of Internet technology available services internet connectivity and accessing information on internet.

The student will also familiarize themselves with case study on Linux operating System., its design architecture, command structures.

Objective:

The student will be able to:

1. Get familiarized with computerisation.
2. Utilise computers in engineering /technical field.
3. Use computer concepts for Microsoft applications
4. Promote Computer Literacy .
5. Awareness of Open Source technology: Linux OS
6. Familiar with ERP .
7. Learn networking concepts
8. Operate Internet/e-mail facility

Theory Contents:**1. Fundamentals of Computer concepts :****(Periods-5 hrs,)**

Computer specifications PC, PC-XT , PC-AT, Pentium, net book, notebook, Hand held devices and its applications, general architecture of computers; Computer peripherals (I/O Device), Storage DEVICES , printers and output peripherals; General computer terms, computer software, system software, applications software , operating systems, advantages of software and application packages.

2. Introduction to Windows:**(Periods-2 hrs)**

Structure of a Window, Basic techniques for working in Windows Using Menus;, folder, files ,users management, Working with A dialogue box, Type of Options ; Starting Windows , Task Bar, Start Menu.

3. Introduction to Computer Network**(Periods-3 hrs,)**

Network Goals, Devices, Topologies, Cables and connectors, Addressing

4Introduction to MS-Office**4.1 Introduction to WORD package****(Periods-3 hrs)**

Starting Word Document ; Typing and Editing text, Copying and Moving, Typing Special Characters (Symbols); Some common features : Changing the case of text, Moving & copying text with drag and drop, Justifying text, inserting bulleted & numbered lists , Arranging and moving between open documents; Finding and replacing, formatting ; Using the spell checker , Checking grammar, mail merging

4.2 Concepts of POWER POINT**(Periods-3 hrs)**

How to make an effective presentation, Physical aspects of presentation ; A Presentation Graphics package ; Creating a presentation : creating a Title slide, Creating a Graph, Creating Tables, Make Organization Chart, To Save and close presentation; Working with Tools: Create , Edit, Move, Delete , Resize , Format text object, Working with Graphics tools; Slide show

4.3 Fundamentals of EXCEL**(Periods-4 hrs)**

Starting EXCEL: What is a spreadsheet, creating & editing spreadsheet, modifying the sheet. Study of Toolbars, Formula bar and Status bar. Inserting Header and footer, cells, rows, columns, worksheet, formatting individual cells row, column, sheet, manipulating Data by using Sort. Saving and Retrieving saved worksheet.

5. LINUX as Operating System**Linux Fundamentals****(Periods-6 hrs)**

Introduction to open source technology, advantages of linux, Basics of Unix & Linux, Multi-user & Multitasking capabilities of Linux, change of password, the file types, structures of file system, important directories of the file system.

6. Introduction to INTERNET:**(Periods-4 hrs)**

What is INTERNET , intranet, client-server architecture ,various file formats , Application of INTERNET: E-mail, , WWW, Study of various search engine using LYNX, LOGIN PROCEDURE, Study of INTERNET EXPLORER, Creating mailing account, Surfing using WORLD WIDE WEB information relating to e mployment, education, alumni, social networking .

7. Introduction to Enterprise resource planning**(Periods-02hrs)**

Introduction, ERP modules , ERP Vendors , Software, case studies : SAP.

Total Theory Hrs.= 32 hrs**Total Practical Hrs. = 32 hrs.****List of practical:**

- 1) Study of Computer hardware and peripherals
- 2) Study of Networking Topologies and commands ipconfig,ping,netconfig etc.
- 3) i) Getting started with Windows by using different menus and working with dialogue box
ii) Working of Control panel, Screen saver and Help commands using Windows
- 4) i) Creating, Editing and Saving a document , Table using Word package
ii)Creating Document with Table, editing using special characters & saving.
iii) Using tool bar menus like Standard , Formatting , Tables and Borders
iv) Performing functions spell check , find , replace , go to , page setup , print preview and print commands.
5) i) Creating a new presentation and getting acquainted with various menus like FILE, EDIT, VIEW, INSERT, FORMAT, TOOLS, SLIDES HOW
ii) Choosing Auto Layout and working with tools and to prepare a slide show
iii) To Perform special effects using one slide show demonstration
- 6) Creating Spread Sheet for various combinations of computational tables.
- 7) LINUX basic commands.and Advanced commands.
- 8) Creating file using Vi editor, editing, saving file & quit from Vi editor.
- 9)Creating an internet account ,Internet terms, Use of Shell account and study of mailing , Software to send & receive mail on Hard Disk.
10)Use of Internet explorer package ,search Engine & retrieve education related information from TCP/IP account and downloading procedure

Reference Books:

1. Computer and Common sense by Hunt & Shelly.
2. Computer Fundamentals by V. Rajaraman (Prentice hall)
3. PC Guide for Windows (ITC Publication/Galgotia publication)
4. Learning Word 6.0 for Windows step-by-step, Galgotia.
5. Linux: TheComplete reference - 5/E by pettersen
6. Unleashed Linux

Additional References:

1. Mastering MS Office (BPP Publication)
2. Data Communications and Distributed Networks, U.D. Black, Prentice-Hall

Website:

www.linux.orgwww.mocrosoft.comwww.cisco.com

1. SUBJECT DETAILS:

Courses :ME/CE	Semester : I
Subject: Engineering Drawing – I	Duration : 16 Weeks
Group : C*	Code : 120007

2. TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Credits	Examination Scheme and Maximum Marks							
Theory Hrs Per Week	Practical Hrs per Week		Paper			TH	Sessional	T/W	Oral	Total
			Hrs	NP	Mks					
02	04	06	3	01	80	80	20	50 @	50**	200

3. RATIONALE:

Engineering drawing is a language of engineers. It is classified as engineering science subject. It describes scientific facts, principles and technique of drawing in order to visualize and express the ideas and to convey the instructions through drawings without ambiguity. In engineering drawing – I, student will study concept of orthographic projections, isometric projection, isometric view, ideas of two dimensional and three dimensional objects, missing views, curves etc.

4. OBJECTIVES:

Engineering drawing helps in understanding design of parts, assembly, structure etc. used in engineering field. It supports technology and technical subjects. By achieving visualization and drawing skills, the student will successfully discharge his role on shop floor, design department and inspection department etc.

5. DETAILED CONTENTS:

Chapter	Content	Marks	Hours
<u>SECTION-I</u>			
01	1.0 Introduction : 1.1 Importance of Engineering Drawing for the study of technical courses 1.2 Drawing instruments, types of lines and dimensioning. 1.3 Scale (reduced, enlarged and full size) Plain scale and diagonal scale. 1.4 Geometrical constructions. Practice sheet/s: 1. One sheet on lettering, lines, dimensioning techniques and geometrical constructions.	-	02
02	2.0 Principal Planes and Quadrants: 2.1 Concept of principal planes and quadrants 2.2 I and III angle method of projections	-	01
03	3.0 Orthographic Views : 3.1 Projections of various objects having flat and curved surfaces using I and III angle projection method. Practice sheet/s: i) One sheet on orthographic projection four objects with linear features ii) Home Assignment: Four problems in sketchbook.	-	02

04	4.0 Conversion of Pictorial View :	16	04
	4.1 Conversion of pictorial views in to non-sectional orthographic views. The objects may have slots, holes cavities etc. Practice sheet/s: 1. One sheet with non sectional orthographic views for the objects with curvilinear features. 2. Home Assignments: Four problems in sketchbook.		
05	5.0 Isometric Views and Projections:	16	04
	5.1 Isometric Views and Projections of linear and curvilinear features. Practice sheet/s: 1. One sheet with four problems on Isometric view having linear and curvilinear features. 2. On sheet with four problems on Isometric projection having linear and curvilinear features. 3. Home Assignments: Four problems in sketchbook .		
06	6.0 Engineering curves :	08	03
	6.1 Cycloidal curves: Cycloid, epicycloids, hypocycloid (Simple cases) 6.2 involute of circle and polygon.(Simple cases) 6.3 Helix on cylinder (not on cone) Practice sheet/s: 1. One sheet with four Problems containing cycloid, epicycloids, hypocycloid, involute and helix 2. Home Assignments: Four problems in sketchbook.	-	
<u>SECTION-II</u>			
07	7.0 Conversion of Pictorial View into Sectional Orthographic:	16	06
	7.1 Conversion of pictorial views with cutting plane into sectional orthographic projection (full section only) Practice sheet/s: 1. One sheet with four problems. 2. Home Assignments: Four problems in sketchbook.		
08	8.0: Missing Views :	12	05
	8.1 Given two views (F.V. – T.V. or F.V.-S.V.) ,deriving the third view-non sectional or sectional. 8.2 Full section 8.3 Half section 8.4 Offset section concept. Practice sheet/s: 1. Two sheets with four problems each. 2. Home Assignments: Four problems in sketchbook.		
09	9.0 Conic Sections:	12	05
	9.1 Ellipse: Oblong, arcs of circle and concentric circle method. 9.2 Parabola: Eccentricity and rectangular methods.		

9.3 Hyperbola: Eccentricity and rectangular methods.

Practice sheet/s:

1. One sheet with four problems on Ellipse Parabola and Hyperbola, Involute and Helix.
2. Home Assignments: Four problems in sketchbook.

6. IMPLEMENTATION STRATEGY (PLANNING) :

In depth study and understanding of the subject will be implemented by adoption of the following strategy :

1. Theory Teaching Plan
2. Term Work Plan for practical giving problems to draw in the class.
3. Home assignments to practice at home
4. Conduct of three periodical test
5. Use of OHP models and charts during theory class and practical periods

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	N.D.Bhatt and Panchal	Geometrical and Machine drawing	14 th	2000	Rupalee Pub.Opp. Amul Dairy, Court Rd, Anand
2.	R.K. Dhawan	Engineering drawing	2 nd	2001	S.Chand & Co.Ltd., Ram Nagar New Delhi-110 055
3.	R.K. Dhawan	Machine drawing	2 nd	2001	S.Chand & Co. Ltd ,Ram Nagar New Delhi-110 055
4.	M.L. Dabhade	Engineering Graphics	4 th	1995	Mrs.VA.Velhankar 1030, Model Colony, B-12,Akash Ganga Pune-411 016

Instruction to paper setters/ Pattern of question paper

SECTION-I

- Q.1.Attempt the following. (16)
a) On unit no.4
- Q.2 Attempt any one of the following. (16)
a) On isometric projection.
b) On isometric view.
- Q.3 Attempt any one of the following. (08)
a) On unit no.6
b) On unit no.6

SECTION-II

- Q.4.Attempt the following. (16)
a) On unit no.7
- Q.5 Attempt any one of the following. (12)
a) On unit no.8
b) On unit no.8
- Q.6 Attempt any two of the following. (12)
a) On unit no.9
b) On unit no.9
c) On unit no.9

16. SUBJECT DETAILS:	
Course: Civil Engineering	Semester: II
Subject: Engineering Materials.	Code : 120101
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:										
Teaching Scheme		Credits	Examination Scheme and Maximum Marks							
Theory	Practical		Paper			TH Reduced to	Sessional Marks	T/W	Practical Oral	Total
Hrs Per Wk.	Hrs. Per Wk.		Hrs.	N/P	Mks					
3	-	3	3	1	100	80	20	-	-	100

3. RATIONALE:
Any Engineering branch needs to handle various materials and in particularly Civil Engineering is a basic branch of engineering providing infra structure to all other branches of engineering. The objective of the subject is to provide information and knowledge of various materials used for engineering purpose.

4. OBJECTIVE:
The students has to learn a vast variety of materials, their identification, selection , testing, storing & use for civil engineering project. In construction, different processes play key role as far as safety, stability, economy, aesthetic sense are concerned. Working knowledge of this will enable the student to supervise and maintain better in the field of civil Engineering activities.

5. DETAILED CONTENT

Sr.No	Topics	Period	Marks
	SECTION – I		
	1.0 Timber and Timber Products:		
1	1.1 Timber as a material of construction. Relative advantages of its use as compared to other materials.	(02)	(05)
2	2.0 Properties of Timber	(05)	(20)
	2.1 Conversion of timber		
	2.2 Seasoning of Timber: Its necessity, Methods of seasoning and their comparison		
	2.3. Preservation of timber, necessity and methods like brushing, dipping, spraying, full cell process, empty cell process, ASCU treatment.		
	2.4 Types of Boards: Ply, Veneer, Ply wood, Batten Board, Block Board, Lamin Board, their properties and uses.		
	2.5 Varieties of Timber: Important varieties of Timber used in Maharashtra - their properties and uses.		
3	3.0 Lime:	(03)	(12)
	3.1 Varieties of lime.		
	3.2 Their important characteristics and uses in construction.		
	3.3 Importance of Curing.		
4	4.0 Gypsum and Plaster of Paris:	(02)	(05)
	4.1 Properties and its uses.		
5	5.0 Types of Cement:	(03)	(10)
	5.1 Composition of Cement		
	5.2. Varieties :(1) Portland Cement, (2) Rapid Hardening cement, (3) Quick setting , (4) High Alumina cement, (5) Sulphate resistant cement, (6) White cement, (7) Coloured cement,(8) Fly Ash & It's use. Properties & Use of each type of special Cement.		
6	6.0 Properties of Cement:	(03)	(10)
	6.1 Setting and hardening of cement and relative strength. Grades of cement.		
	6.2 General out line of manufacturing.		
	6.3 List of tests and necessity of these tests..		
7	7.0 Stones:	(03)	(10)
	7.1 Varieties of stones commonly used in construction.		
	7.2 Suitability of stone for different uses, such as masonry, flooring, pitching etc.		
	7.3 Quarrying and blasting of stone.		
	7.4 Dressing, object of dressing, different types of dressing. Tools used for dressing.		

8	8.0 Bricks:	(03)	(10)
	8.1 Raw materials required, manufacture of bricks, preparation of clay. 8.2 Moldings and burning in clamps and kilns.		
	8.3 Allahabad, Hoffman's & Bull trench kilns.		
	8.4 Varieties of bricks and their uses in construction. Fire bricks, fire clay and their uses.		
	8.5 Concrete blocks, Hollow Block, Siporex: Advantages & uses of Siporex, Aerocon Panels & their application.		
	SECTION –II		
9	9.0 Tiles:	(04)	(06)
	9.1 Roofing tiles, flat, half round and country tiles, Mangalore and similar tiles.		
	9.2 Glass roofing tiles and their uses.		
	9.3 Types of flooring tiles,, transparent and opaque glazing.		
10	10.0 Sand:	(01)	(05)
	10.1 Sources, properties and uses.		
11	11.0 Mortar:	(02)	(08)
	11.1 Varieties of mortar: mud mortar, lime mortar and cement mortar. 11.2 Ingredients mixing of mortar, properties, uses in construction.		
12	12.0 Curing of Mortar / Concrete.	(02)	(08)
	12.1 Its necessity and methods		
13	13.0 Concrete its properties and uses.	(02)	(08)
	13.1 Ingredients of cement concrete, their functions, mixing and laying of concrete, consolidation and curing, Modern type of Concrete: Polymer Concrete, Stemcrete, FRC.		
14	14.0 Form Work	(02)	(10)
	14.1 Conventional type ,Modern type ,Myone shuttering, Geoplast Shuttering.		
15	15.0 Aluminium & Aluminium Composite Panels	(01)	(05)
	15.1 Properties and Uses as cladding		
16	16.0 Steel ,Cold Twisted Deformed Bar, Tor Steel, Thermo Mechanically Twisted Bars	(01)	(05)
	16.1 Properties and use.		
17	17.0 Types and Properties of Paints:	(03)	(08)
	17.1 Purpose of painting and varnishing materials used in white washing, distempering oil painting, etc.		
	17.2 Varieties like (1) Aluminium paint (2) Cement paint, (3) Enamel Paint, (4) Cellulose Paint, (5) Bituminous paint, (6) Anti-corrosive paint, Their characteristics and uses.		
18	18.0 Varnish:	(02)	(08)
	18.1 Varnish and French Polish - Materials and uses. Process of application.		
	18.2 Varieties like water varnish, oil varnish, spirit varnish and turpentine varnish.		
	18.3 Varnishes as copal, Flatting, Japan, Lacquer, Furniture Polish.		
9	19.0 Packaging Materials:	(02)	(06)
	19.2 Materials used like paper, glass, aluminum foil, card board, general properties and uses.		
20	20.0 Plastics:	(02)	(05)
	20.1 Board introduction to plastics as engineering materials.		
	20.2 Varieties, properties and uses.		
	Total	48	164

Note : Emphasis to be laid on specifications and tests as per ISI

6.IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Preparation of drawing

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	TTTI Chandigarh	Civil Engineering Materials	2010	2010	Tata MaGraw Hill Publish.
2	D.N.Ghosh	Materials of Constructions	1989	1989	Tata MaGraw Hill Publish.
3	Rangawala	Engineering Materials			Charoter

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING (Full-Time)
SEMESTER :II SEMESTER

W. e. f.-Batch admitted from June 2012

Sr. No.	Subject Name & Code	Prerequisite Subject Code	Scheme of Instructions and Periods per week					Theory Papers duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr	
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total			
2-1	Development of life skill (120006)	--	2	-	-	1	3	--	--	--	--	50@	-	50**	100	B*	303	
2-2	Engineering Mathematics (120012)	--	3	-	-	1	4	03	80	20	80	-	-	-	100	B*	404	
2-3	Physics-II (120013)	--	2	2	-	-	4	03	80	20	80	25@	50**	-	175	B*	224	
2-4	Chemistry-II (120010)	--	2	2	-	-	4	03	80	20	80	25@	50**	-	175	B*	224	
2-5	Applied Mechanics (120001)	--	3	2	-	-	5	03	80	20	80	50@			150	C*	325	
2-6	Engineering Drawing-II (120015)	--	2	-	4	-	6	-	-	-	-	50@	50**	-	100	C*	246	
2-7	Workshop Practice (120009)	--	1	4	-	-	5	-	-	-	-	50@	-	-	50	C*	145	
	TOTAL		15	10	4	2	31	No of papers=04		80	320	250	150	50	850			
			TOTAL PERIODS = 31							TOTAL MARKS = 850								

* Compulsory , ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral , Gr-Group , B-Basic, C-Core , A-Application , M-Management

Development of Life Skills

COURSE: ME/CE/EE

COURSE: PE/CH/DE/IE

Sub Code: 120006

Semester : II/II/II

Semester : I/I/I/I

Group : B*

Teaching and Examination Scheme

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
2		-	1	3	-	-	-	-	50@	-	50**	100	B*	303

Rationale : Human resource is the most important resource. Until this resource is motivated and utilized to the maximum, organizational effectiveness cannot be achieved. There is need to help students in the overall growth of personality and train them in organizational requirements their workplace. Students coming from various rural and cultural backgrounds face variety of complexities to faction globally, as they lack in interpersonal skills, self –motivations, leadership and business ethics. Thus learning basic life skills like Time management, Leadership, Conflict Management, Negotiation, and Decision Making will imbibe social adaptability and human sensibility as an integral part of their mind set.

Objectives:

1. Students will learn various life skills to increase his/ her efficiency and utility at workplace.
2. The student will learn to perform the given task with innovative ideas.
3. The Student will learn to express his /her view and experiences on various topics.
4. The Student will learn to make maximum use of time for more creative and constructive work.
5. Students will learn how to cope with stress of study and work .

Topic No.	Topic & sub Topic	Hours	Marks
1.	Area of Self Development 1.1 Introduction, 1.2 Areas of self development, 1.3 self analysis,	02	07
2	Time Management 2.1 Introduction, 2.2 Time planning, How to plan time, 2.3 Time wasters, Time management 2.4 Time matrix etc.	02	06
3.	Stress Management 3.1 Definition of stress, 3.2 Types of personality and stress, 3.3 Sources of stress 3.4 Stress Busters 3.5 Psychological reaction to stress 3.6 Yoga and stress control . etc	02	08
4	Emotion 4.1 Emotional Maturity 4.2 Emotional Stability and Emotional Intelligence, 4.3 How to control Emotions etc.	03	07
5	Frustration 5.1 Definition of frustration, 5.2 Anatomy of frustration, 5.3 Causes of frustration, 5.4 Effects of frustration, 5.5 handling of frustration	02	07

6	<u>Motivation</u> 6.1 Introduction to Motivation	02	07
7	6.2 Self- Motivation , 6.3 Attitude & Aptitude etc <u>7. Interpersonal Skills</u> 7.1 Interpersonal Relations 7.2 Factors of Attraction, 7.3 Personal Effectiveness, Assertiveness/ Non-assertiveness , 7.4 Empathy	03	08
8	<u>Conflict Management</u> 8.1 Definition of Conflict 8.2 Sources of Conflict , 8.3 Types of Conflict, 8.4 Conflict Resolution , 8.5 Steps In Conflict Resolution	02	08
9	<u>SWOT Analysis</u> 9.1 Concept of SWOT 9.2 Scope of SWOT, 9.3 SWOT as decision making tool , 9.4 How to go about SWOT	02	07
10.	<u>Ethics</u> 10.1 What Are Ethics? 10.2 Values & Value formation 10.3 Moral Development 10.4 Decision Making	02	07
11.	<u>Group discussion & Interview techniques</u> 11.1 Importance of Objective GD 11.2 Procedure for GD, 11.3 Evaluation criteria for GD. 11.4 Types of interviews 11.5 preparation for interviews 11.6 Some Do's and Don'ts for interview 11.7 FAQ in interview	04	08
12.	<u>Study Habits</u> 12.1 Establishment of good study habits 12.2 Efficient use of time 12.3 Prioritize the work 12.4 power of concentration 12.5 setting comfortable place for study 12.6 visiting library 12.7 staying alert 12.8 Review of class notes 12.9 study can be funny.	02	07
13	<u>Working in Team</u> 13.1 Definition of Team 13.2 Importance and necessity in working team 13.3 Team dynamics 13.4 Transforming groups into teams	02	07
14	<u>Task Management</u> 14.1 Definition of task 14.2 Task characteristics, 14.3 Task sponsor and task stakeholder 14.4 Planning the task 14.5 Task evaluation	02	06
		32	100

List of Assignments:

1. Identify your areas of self development and plan strategies to improve it.
2. Enlist your time-wasters. And write down how you use your time on any average day, and see how you can improve time utility.
3. Expose yourself to situations that irritate and make you angry. Enlist the thing you will do to remain calm.
4. Look back in your life and list five occasions, when you were frustrated, Recall the strategies you used to overcome that frustration.
5. What are the things that motivate you (Friendliness, Warmth, Honesty, Appreciation) and Things that Demotivate you (Rejection , Criticism, Fear of failure , insult)
6. Enlist the ten various sources of interpersonal conflicts, and Methods to resolve it.
7. Listen to lecturer on particular topic and take down notes and check how good you were in capturing the structure, hierarchy of concepts and essence of speech.
8. What are the things you would do, if you have only One week to live. ?
9. Make a general purpose SWOT analysis to discover your strengths and learning areas and on the basis of that decide a career .
10. Identify some negative attitudes you have and find solutions for replacing it
11. Identify your values and prepare a code of ethics for yourself .

(Note: Teacher will do necessary changes in the assignments as per requirement) .

6. IMPLEMENTATION STRATEGY (PLANNING):

- Theory topics and practice experiments should be done simultaneously. This will help the students to understand the topics.

7.Reference Books:

Name of book	Author	Publication
Organizational Behavior	Fred Luthans	Tata McGraw Hill Sixth 1992
Basic managerial skills for all	E.H. Megrath	Prentice Hall of India Ltd 1989
Managing Time First	Dr.R.L.Bhatia	Wheeler Publishing 1994
Development of Generic skill - I & Development of life skills -II	K . Sudesh	Nandu Publication ,Mumbai
How to motivate people	Patrick Forthsayth	Kogan page first Edition 200

1. SUBJECT DETAILS:-

Program: All	SEMESTER: II
Course: Engineering Mathematics	Code: 120012
Group: B*	Compulsory

2. TEACHING AND EXAMINATION SCHEME:-

Scheme of instruction & Periods Per Week					Theory Paper duration & marks			Scheme of Examination						Gr	Scheme L/Pr/Cr
L	P	D	T	Cr	Np	Hrs	Mks	SSL	Theory Paper	T/W	PR	OR	Total		
3	0	-	1	4	1	3	80	20	80	--	--	--	100	B*	404

3. RATIONALE:-

Engineering Mathematics is classified as Basic Science subject which intends to teach students the facts concepts and principles of Mathematics that can be applied to solve problem in Engineering field

4. OBJECTIVES:-

Students should be able to understand

1. Derivatives and applications of derivatives in different areas
2. Complex numbers and Vector Algebra and their various applications.

5. DETAILED CONTENTS:-

SECTION-I

Chapte r	Contents	Hours	Marks
1.	FUNCTION AND LIMIT	14	18
	1.1.Definition of variable , constant, value of function , composite function 1.2.Limits of algebraic, trigonometric ,exponential and logarithmic functions		
2.	DERIVATIVES	18	22
	2.1 Definition of Derivatives 2.2 Rules of Differentiation 2.3 Composite function 2.4 Inverse trigonometric function 2.5 Implicit function 2.6 Logarithmic function 2.7 Parametric function 2.8 Derivative of one function w.r.t. another function 2.9 Second order differentiation		
	TOTAL	32	40
	SECTION-II		
3	APPLICATION OF DERIVATIVES	08	12
	3.1 Geometrical meaning of Derivative 3.2 Tangent and normal line 3.3.Rates 3.4 Velocity and Acceleration 3.5 Maxima and minima 3.6 Radius of curvature		
4	COMPLEX NUMBER	16	16

	4.1 Definition of complex number 4.2 Algebra of complex number, equality, addition, subtraction, multiplication and division 4.3 De Moivre's theorem 4.4 Euler's form of circular function 4.5 Hyperbolic functions		
5	VECTOR ALGEBRA	08	12
	5.1 Definition of vector 5.2 Algebra of vectors, equality, addition, subtraction and multiplication, 5.3 Dot product 5.4 Cross product 5.5 Scalar triple product 5.6 Work done 5.7 Moment of force about a point and line 5.8 Area of triangle, parallelogram 5.9 Volume parallelepiped, tetrahedron		
	TOTAL	32	40

6. Implementation Strategy(planning): Conducting lectures as per lesson plan and conducting tutorial in the same class room

7. Reference Books:

Sr. No.	Author	Title	Publishers & Address
1.	Shri. S.P. Deshpande	Calculus for Polytechnics	Pune Vidyarthi Graha Prakashan Pune-30
2.	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics	Nirali Prakashan Mumbai
3.	Dr. B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers 2/B, Delhi-6
4.	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics	Pune Vidyarthigraha Prakashan, Pune- 411030
5.	S.S.Sastry	Introductory methods of Numerical analysis	Prentice Hall of India –New Delhi
6.	M.K.Jain	Numerical method for Scientific and engineering computation	Wiley eastern

8 QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : CE/ME/EE/IE/PE/CH/DE

Semester : II

Subject : PHYSICS-II

Subject Code: 120013

Group : B*

Duration : 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions & Periods per Week					No. of Papers, Duration & Marks			Scheme of Examination					Scheme L/Pr/Cr.	
L	P	D	T	Cr	NP	Hrs	Mks	SSL	Theory Paper	T/W	Pract.	Oral	Total	
2	2	-	-	4	1	3	80	20	80	25@	50**	-	175	2/ 2/ 4

3. RATIONALE:

The fundamental coverage under semester-I plus a continued similar way of progressive studies related to laws of Physics forms a foundation for various branches of engineering.

4. OBJECTIVES:

The student will understand:

- 1) Light energy with its 'dual' nature, concept of photon and photo cell, utilization of 'interference', 'diffraction' and 'polarization'
- 2) Concept of static charge and charges in motion, magnetic material, 'Atomic conception/ atomic structure, arrangement of atom in solids'.
- 3) Concept of semi-conductor, Light/Electromagnetic waves in the form of stimulated radiation, 'Light as wave guide', Ohmic resistance and zero resistivity'.
- 4) Non destructive testing technique .
- 5) Material with nano dimensions/ on atomic and molecular scale.

5. DETAILED CONTENTS:**A) THEORY CONTENTS:****SECTION-I**

	Marks	Hours
Chapter 1 <u>Optics</u>		
1.1 Photo electricity Planck's hypothesis, Photoelectric effect, Einstein's equation, Types of Photocells, Applications , Numerical Problems.	12	03
1.2 Interference, Diffraction, Polarization Interference, Thin films, Newton's rings, Optical flatness, Diffraction, Diffraction grating. Polarization, Optical activity and Polarimeter, Photoelasticity (general treatment).	08	03
Chapter 2 <u>Electricity</u>		
Static Electricity	04	02
2.11 Coulomb's law, Intensity and Potential, Numerical Problems.		
2.12 Capacitance, Principle of capacitor, Parallel plate capacitor, 'Combinations', Energy stored, Numerical Problems.	06	02

2.2	Current Electricity Specific resistance, e.m.f. and P.D. Wheatstone's bridge, Post office box, Potentiometer; Numerical problems.	04	03
2.3	Electromagnetism Current carrying conductor in magnetic field, 'ampere', Moving coil and Mirror galvanometer, Shunt, Ammeter, Voltmeter, Numerical problems.	06	03
TOTAL		40	16

SECTION-II

Marks Hours

Chapter 3	<u>Magnetism</u> Magnetic materials – 'dia', 'para', 'ferro'; 'Modern concepts', Magnetic hysteresis and magnetic shielding.	04	03
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Chapter 4	<u>Modern Physics</u>		
4.1	Bohr's Theory Structure of atom, Bohr's postulates and Atom Model, Hydrogen spectrum and Rydberg constant.	06	02
4.2	Crystal Structure Space lattice, Unit cell, Cubical crystal structure – SC, BCC, FCC, Co-ordination Number, Packing density, Miller indices.	06	02
4.3	Band theory of Solids Classification of materials into Conductors, Insulators, Semiconductors, P and N type Semiconductors, P-N Junction.	06	02
4.4	LASERS and MASERS Elementary ideas, Stimulated emission Ammonia gas Maser, Ruby Laser, He-Ne Laser, Holography.	06	02
4.5	Fiber Optics Wave guide for light, Optical fibre, Step and Graded index.	02	01
4.6	Superconductivity Principle of Superconductivity, Meissner effect, Superconducting state materials, Properties, Applications.	02	01

Chapter 5	<u>Nondestructive testing (NDT)</u> US waves, Radiography, X-rays, Liquid penetration.	04	02
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Chapter 6	<u>Nanotechnology</u> Concept of manipulating matter on an atomic and molecular scale, and of new materials with dimensions on the nano scale, applications.	04	01
TOTAL		40	16

B) PRACTICAL CONTENTS:

a) Experiments to be performed (Any 08)

1. Study of Spectrometer (Minimum Deviation and Refractive Index and Angle of Prism).

2. Wavelength of Light by Diffraction Grating.
3. Specific Rotation by Polarimeter.
4. 'J' by Electrical Method and Specific Heat of Oil by Electrical Heating
5. Use of Wheatstone's Bridge and Post Office Box (Resistance, Specific Resistance and Temp. Coefficient of Resistance).
6. Use of Potentiometer (Principle, Comparison of e.m.f.s. of Cells, Internal Resistance of Cell and Calibration of Voltmeter with the Principle COMPULSORY and ANY ONE of the Other Three).
7. Determination of Rydberg Constant.
8. Study of Crystal Structure.
9. Energy gap of a semiconductor.
10. Wavelength of Laser Beam (He-Ne) by Diffraction Grating.

b) Demonstrations (Any 03)

- (i) Study of Photocell.
- (ii) Spectra of Ionised Gases.
- (iii) Study of Newton's Rings.
- (iv) Study of Photoelastic Bench.
- (v) Study of Para and Diamagnetism by Electromagnet.
- (vi) Hysteresis by C.R.O.
- (vii) Optical Principles of O.H.P.

6. Term-Work:

Compulsory term-work on the list of experiments written in a journal and carrying 25 marks on timely submission basis specified at the index sheet of Physics Journal.

7. Scheme of Practical Examination:

- (vii) Each candidate will be examined in one experiment from among those prescribed in the syllabus. The duration of the experiment will be two hours (with a coupling of Demonstration if any).
- (viii) The performance of the candidate in the practical examination will be assessed out of 50 marks as shown in the following scheme.

Scheme of Assessment:

(f) Connections, adjustments and observations	20 Marks
(g) Circuit Diagram, figures and tabulation	10 Marks
(h) Formula, calculations and graphs if any	10 Marks
(i) Oral	05 Marks
(j) Correct answer or appropriate result	05 Marks

Total50 Marks

- (ix) Each candidate will be jointly examined by both External and Internal Examiners.
- (x) Certain demonstrations are coupled with certain conventional experiments during the examination. Marks allotted for demonstration are 15 and marks for conventional experiments are 35. The conventional experiment is assessed out of 50 as mentioned under (iv) in the above scheme and then converted out of 35. Assessment of a demonstration is judged by answers (oral or written) given by candidate in front of the relevant demonstration setup.
- (xi) If any candidate is unable to draw a correct circuit diagram, the same may be given by the examiner on request so that the candidate may continue the experiment. However, five marks will be deducted for the same.
- (xii) While assessing, the overall performance and the ability of the candidate to handle the apparatus independently, will be considered.

8. IMPLEMENTATION STRATEGY (PLANNING):

- (iii) Theory – Lesson Plan
- (iv) Practical – Scheme of marking for T/W, Scheme of assessment for Practical Examination.

9 (a). TEXT BOOKS:

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	R.K. Gaur and S.L. Gupta	Engineering Physics	Any	1981-96 2001 Reprint 2004, 2008	Dhanpat Rai & Sons, New Delhi
2.	M.R. Shrinivasan	Physics for Engineers	Any	1976	New Age International, New Delhi
3.	P.G. Kshirsagar and M.N. Avadhunuhu	A Text Book of Engineering Physics	Any	1992 Reprint 1993 till 2005	S. Chand and Co. Ltd, New Delhi
4.	Gambhir, Durgapal and Banerjee	Introductory Physics - Vol-1,2 &3.	Any	1972	Wiley Eastern

9 (b). REFERENCE:

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	Resnik and Halliday	Physics Vol. 1 & 2	Any	1986	Wiley Eastern
2.	B.L. Theraja	Engineering Physics	Any	1962 Reprint 1974-87	S. Chand and Co. Ltd, New Delhi
3.	B.L. Theraja	Modern Physics	Any	1975, 1976,78,79,80,81,82,83.	S. Chand and Co. Ltd, New Delhi
4.	Avinash Kapoor, Partha Goswami	An Introduction to Nanophysics and Nanotechnology	Any	2012	ISBN 978-81-8487-040-4

QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-
Total	-	40	-	40	-	20

1. SUBJECT DETAILS:

Course : C/M/E/IE/PL/CH/DE Engineering

Semester : II

Duration : 16 Weeks

Subject : Chemistry-II

Code : 120010

Group : B*

Compulsory

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions & Periods per Week					No. of Papers, Duration & Marks			Scheme of Examination						Scheme L/Pr/Cr.
L	P	D	T	Cr	NP	Hrs	Mks	SSL	Theory Paper	TW	PR	Oral	Total	
2	2	-	-	4	1	3	80	20	80	25@	50**	-	175	224

3. RATIONALE:

This subject is an extension of Chemistry-I and is classified under the category of Basic Sciences. The subject intends to impart knowledge of various engineering materials, their properties, selection of material and applications in various engineering field.

4. OBJECTIVES:

After studying the subject the student will be able to

- Identify the properties of metals and non-metallic materials.
- Select materials for different engineering applications.
- Compare the effects of pollutants on environment and will be able to suggest preventive measures.
- Understand the importance of pollution free environment.

5. DETAILED CONTENTS:

SECTION-I

Chapter	Content	Marks	Hours
1.	1.0 Metallurgy : 1.1 Definition of Metallurgy 1.2 General metallurgical processes a) Concentration by Gravity Separation, Electromagnetic Separation, Froth Floatation. b) Chemical Processes - Calcination, Roasting c) Reduction – Smelting, Aluminothermic Process, Electrolysis. d) Refining – Poling, Liquation, Distillation, Electrolytic Refining 1.3 Metallurgy of iron a) Occurrence of Iron, b) Extraction of iron by Blast Furnace 1.4 Classification of steel – Based on its carbon content and its applications. 1.5 Properties of cast iron, wrought iron and steel. 1.6 Effects of elements on properties of steel. 1.7 Heat treatment of steel – Hardening tempering, annealing and normalizing	22	09
2.	2.0 Alloys : 2.1 Definition 2.2 Preparation of Alloys 2.3 Classification of Alloys 2.4 Purposes of Alloying 2.5 Properties, composition and application of following non-ferrous alloys: (i) Duralumin (ii) Magnalium (iii) Monel metal (iv) Alnico (v) Babbit metal (vi) Gun metal (vii) Brass (viii) Bronze	10	04
3.	3.0 Thermal Insulators : 3.1 Definition and characteristics of Thermal Insulators	08	03

3.2	Preparation, properties and applications of Thermocole and Glasswool.		
3.3	Properties and applications of Asbestos and Cork.		

SECTION-II

Chapter	Content	Marks	Hours
4.	4.0 Lubricants : 4.1 Definition 4.2 Functions of Lubricants 4.3 Types of lubricants 4.4 Types of lubrication a) Fluid Film Lubrication b) Boundary lubrication c) Extreme pressure lubrication 4.5 Classification of Lubricants 4.6 Characteristics of Lubricants a) Degree of acidity b) Saponification number c) Viscosity & Viscosity index d) Flash and fire point e) Pour point & Cloud point 4.7 Selection of Lubricants	18	07
5.	5.0 Polymer Chemistry: 5.1 Plastics a) Definition b) Types of plastics c) Properties of plastics d) Engineering applications of plastics 5.2 Rubber a) Natural and Synthetic Rubber b) Properties – elasticity, abrasion, resistance, Tack, Rebound, Hardness, Stress, Strain. c) Vulcanization of Rubber d) Applications of Rubber.	06	03
6.	6.0 Protective Coatings: 6.1 Purposes of applying Paints 6.2 Characteristics of good paints 6.3 Constituents of paints a) Pigments b) Vehicle c) Thinners d) Driers e) Fillers f) Plasticizers 6.4 Application of Paints 6.5 Failure of Paint Film 6.6 Varnishes 6.7 Types of Varnishes 6.8 Characteristics of Good Varnish 6.9 Applications of Varnishes 6.10 Distinction between Paints & Varnishes	06	03
7.	7.0 Environmental Chemistry: 7.1 Causes of pollution 7.2 Types of Pollution a) Air Pollution – Air Pollutants: sulphur dioxide, sulphur trioxide, carbon monoxide, nitrogen dioxide, carbon dioxide, Green House Effect, Global Warming b) Water Pollution – Sources & Effects of Water pollution c) Noise Pollution – Sources & Effects of Noise pollution	10	03

7.3	Methods of preventing: a) Air Pollution b) Water Pollution c) Noise Pollution		
7.4	Medical Waste and e-waste – their origin and disposal		

Total	Marks	Hours
	80	32
Practice Hours	=	32

5A. PRACTICE:

List of Experiments:

01– 08: Qualitative Analysis of Eight Solutions containing One Basic and One Acidic Radical listed below:

- a) **Basic Radicals:** Pb^{+2} , Cu^{+2} , Al^{+3} , Fe^{+2} , Fe^{+3} , Ca^{+2} , Ba^{+2} , Mg^{+2} , K^{+} , Na^{+} , NH_4^{+} .
- b) **Acidic Radicals:** Cl^{-} , SO_4^{-2} , CO_3^{-2} , NO_3^{-} .

09. Determination of Viscosity Index of a Lubricant.

10. Determination of Flash Point of a Lubricant using:

- a) Abel's Flash Point Apparatus
- b) Pensky Marten's Flash Point Apparatus

6. IMPLEMENTATION STRATEGY (PLANNING):

- Theory topics and practice experiments should be done simultaneously. This will help the students to understand the topics.
- Question papers for the periodical test should cover the topics which have been taught to test the understanding.

7. REFERENCE:

Sr. No.	Author	Title	Publishers & Address
1.	Jain and Jain	Chemistry of Engineering Materials	Dhanpat Rai Publishing Co. New Delhi
2.	Narkhede & Thatte	Engineering Chemistry	
3.	Mahadeokar & Dr. U. P. Kodgire	Chemistry for Engineering students	Everest Publishing House, Pune
4.	B.S. Godbole	Applied Chemistry	Satya Prakashan, New Delhi

1. SUBJECT DETAILS:

Course : PE CH IE DE /CE ME EE	Semester: I / II
	Duration : 16 Weeks
Subject : Applied Mechanics	Code : 120001
Group : C*	

2. TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Credits	Examination Scheme and Maximum Marks							
Theory Hrs Per Week	Practical Hrs Per Week		Paper			Theory Marks	Sessional Marks	Term Work	Practical /Orals	Total
		Hrs.	N/P	Mks						
3	2	5	3	1	100	80	20	50@	-	150

3. RATIONALE:

Applied Mechanics is the study of Forces and their effect on moving or stationary bodies. Also the concept of Mechanics will be useful to understand the further subjects materials & structures, analysis of structures and design.

4. OBJECTIVES:

Students will be able to:

- (1) Understand the force / force system and their effect on a body.
- (2) Apply the concept of mechanics to the real situation.
- (3) Build the pre-requisite of higher semester subject related to designs.

5. DETAILED CONTENTS:

SECTION I

Chapter	Topics	Periods	Marks
1	Introduction to Mechanics, 1.1 Mechanics definition, classification, Statics & Dynamics, Kinematics, kinetics 1.2 Fundamental units of measurements (FPS, MKS, SI), derived Units, Conversion of units, Scalars & Vectors with examples 1.3 Definition of particle, body and rigid body, mass & weight.	03	06
2	Resolution Of Forces 2.1 Concept of force, definition, unit, graphical representation of force 2.2 Concept of system of forces, non-coplanar, coplanar, concurrent, Parallel, non-concurrent & non-parallel forces. 2.3 Resolution of a force into two components along any directions. 2.4 Resolution of a force into two components at right angles to each Other by analytical method. (Applications levers, chain & links, connected bodies like trains etc.)	05	08

3	<p>Composition Of Forces</p> <p>3.1 Composition, Resultant of force 3.2 Law of parallelogram of forces, 3.3 Moment of force, couples lever arm, 3.4 Varignon's theorem 3.5 Resultant of coplanar concurrent, parallel, and non-concurrent, non parallel forces (Applications in shafts, crane, joints of trusses, etc)</p>	05	08
4	<p>Equilibrium</p> <p>4.1 Definition of equilibrant., relation between Resultant and Equilibrant, Conditions of Equilibrium, Types of Equilibrium Stable, Unstable and Neutral equilibrium 4.2 Equilibrium of coplanar concurrent forces, Lami's theorem. 4.3 Equilibrium of coplanar parallel forces & coplanar Non- concurrent Forces. 4.4 Analytical conditions of equilibrium for coplanar concurrent & Non-concurrent Forces. (Applications of crane stability, link mechanisms, inclined plane, wedges, anchor blocks for water pipe lines, balance, levers, pulley & pulley blocks) Practicals: (a) Simple roof truss. (b) Bell crank lever. (c) Levers of different types. (d) Extension of Springs. (e) Compression of springs</p>	06	10
5	<p>Beam Reactions</p> <p>5.1 Types of supports (constraints), simple, roller, hinged & fixed. 5.2 Types of Beams, simply supported, hinged & roller supported, Cantilever, Over hang Beams. 5.3 Types of Loads, Point(Concentrated) Load, Uniformly Distributed Load(U D L) 5.4 Problems on above combination of loads (Application like bearings of shafts, guy, rocker and roller supports of railway bridges,)</p>	05	08
SECTION II			
6	<p>Friction</p> <p>6.1 Definition, types of friction, Static friction, dynamic friction 6.2 Fundamental laws of static friction. Coefficient of friction. Cone of friction. Angle of friction, Angle of repose, Rolling friction 6.3 Study of inclined plane, wedge and block system, ladder friction. (Application in clutches, Brakes, Dynamometers, journals, Belt & Rope drives, stator & Rotor in electric motors, Bearings.) Practicals: (a) Friction between wooden surfaces (b) Friction between wooden surfaces and glass, metal surfaces</p>	06	10

7	<p>Centre of gravity 7.1 Center of gravity of solids, centroid of plane laminas, definition, 7.2 concept of parallel forces applied to find c,g, and centroid , centroidal/c.g. axes of a body/lamina, c.g. / centroid of basic regular Shapes. 7.3 Applications like floating bodies, dams & retaining wall sections beams columns sections (rolled steel), simple and built up sections (Applications like floating bodies, dams, retaining walls, columns etc.) Practical: (a) Centroid of Plane Laminas</p>	06	10
8	<p>Simple Lifting Machines (Application topic) 11.1 Definition : Mechanical Advantage, Velocity Ratio, Efficiency, Relation between them, Friction in machine in terms of load & Effort. 11.2 Law of Machine, Maximum M.A., Maximum efficiency, Condition for reversibility of a machine 1. Study of machines – Simple and Differential Axle & Wheel 2. Weston differential pulley block, Simple screw jack, Worm & Worm Wheel, Single & Double purchase crab winch, system Of pulleys.</p>	06	10
9	<p>Graphics Statics 12.1 Space diagram, Bows notation. 12.2 Law of Triangle of forces, Polygon of forces, Force/Vector diagram 12.3 Resultant and equilibrium of concurrent forces 12.4 Polar diagram, Funicular polygon 12.5 Resultant and equilibrium of non –concurrent and non-parallel forces 1. Applications in finding reactions of beams Stresses in simple frames</p>	06	10
Total		48	80

6. PRACTICALS:

Term Work consists of Journal containing minimum 10 experiments performed of the following in the Laboratory.

1. Extension / Compression of the spring.
2. Bell Crank Lever.
3. Two/Three Sheave Pulley Block.
4. Simple Screw Jack.
5. Single / Double Purchase Crab Winch
6. Differential Axle & Wheel.
7. Centroid Of Plane Lamina
8. Sheer Leg & Derrick Crane.
9. Resultant of Non Concurrent Non Parallel Forces.
10. Friction.

11. Jib Crane,
12. Graphic Statics.
13. Moment Of Inertia of Fly Wheel.

7. Reference Books:

Sr. No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	Dhade & Jamdar	Applied Mechanics	2 nd	2002	Central Techno Publishers, Nagpur
2.	R. S. Khurmi	Applied Mechanics	19 th	2001	S. Chand & Company Ram Nagar, New Delhi – 110 055.
3.	A. K. Tayal	Engineering Mechanics Statics & Dynamics	9 th	1998	Umesh Publications
4	Sunil M Deo	Applied Mechanics Vol. I & II	7th	2004	Nirali / Pragati Publications Mumbai
5	M D Dayal	Applied Mechanics	1 st	2000	Nandu Publishers. Chembur, Mumbai-71.
6	S S BHAVIKATTI	Applied Mechanics			Tata Mcgrew Hill

QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-
Total	-	40	-	40	-	20

1. SUBJECT DETAILS :

Courses : CE/EE/PE/CH	Semester : II
Subject: Engineering Drawing-II	Subject Code : 120015
Group :C*	Duration : 16 Weeks

2. TEACHING AND EXAMINATION SCHEME :

Teaching Scheme			Examination Scheme							
Theory Hrs Per Week	Practical Hrs per Week	Credits	Hrs	NP	Mks	Th	Sess	T/W	PR	Total
02	04	06	-	-	-	-	-	50@	50**	100

3. RATIONALE:

Engineering drawing is a language of engineers. It is classified as engineering science subject. It describes scientific facts, principles and technique of drawing in order to visualize and express the ideas and to convey the instructions through drawings without ambiguity. In engineering drawing – II students will study concept of straight lines, planes and solids in space and section of solids, development of surfaces. They are introduced to machine drawing by screw fasteners.

4. OBJECTIVES:

Engineering drawing helps in understanding design of parts, assembly, structure etc. used in engineering field. It supports technology and technical subjects. By achieving visualization and drawing skills, the student will successfully discharge his role on shop floor, design department and inspection department etc.

5. DETAILED CONTENTS :

Chapter	Content	Marks	Hours
	<u>SECTION-I</u>		
01	1.0 Projection of Straight Lines : 1.1 Projections of lines inclined to both the reference planes (no traces) (both ends of line in one quadrant only) Practice Sheet/s 1. One sheet with four problems 2. Home Assignments: Four problems in sketchbook.		04

02	2.0 Projection of Planes : 2.1 Projection of planes – regular polygons and circle. inclined to both the reference planes. - Practice Sheet/s 1. One sheet with four problems 2. Home Assignments: Four problems in sketchbook	05
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03	3.0 Projections of Solids : 3.1 Projection of solids like prisms, pyramids, cylinders and cones with axis inclined to both the reference planes. Practice Sheet/s 1. One sheet with four problems 2. Home Assignments: Four problems in sketchbook.	07
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SECTION – II

04	1. Section of Solids 4.1 Auxiliary inclined and auxiliary vertical sections of prism, pyramid, cylinder and cone 1. Projection of true shape of the sections (Solids resting on its base. Prism and cylinder with axis parallel to both reference planes.) Practice Sheet/s (i) One sheet on four problems of sections of solids (ii) Home Assignment: Four problems in sketchbook.	05
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05	Development of Lateral Surfaces of Solids 5.1 Development of lateral surfaces of prisms, pyramids, cone and cylinder 5.2 Antidevelopment - Practice Sheet/s (i) One sheet on four problems of development. (ii) Home Assignments: Four problems in sketchbook	06
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06	6.0 Thread Profiles and Screw Fasteners : 6.1 Different profiles of threads 6.2 Conventional representations of left hand – right hand threads, single and multistart square threads, external and internal threads. 1. Different types of nuts. 2. Different types of bolts. 3. Lock nuts (Castle, slotted nut, simond’s nut etc) use of plane and spring washers. Practice Sheet/s 1. One sheet with Problems on various screw fasteners to be sketched by free hand. 2. Home Assignments: Four problems in sketchbook.	05
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6.IMPLEMENTATION STRATEGY (PLANNING) :

In depth study and understanding of the subject will be implemented by adoption of the following strategy :

- i) Theory Teaching Plan
- ii) Term Work Plan for practical giving problems to draw in the class.
- iii) Home assignment to practice at home
- iv) Conduct of three periodical test
- v)Use of OHP models and charge during theory class and practical periods

6. REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	N.D.Bhatt and Panchal	Geometrical and Machine drawing	14 th	2000	Rupalee Pub.Opp. Amul Dairy, Court Rd, Anand
2.	R.K. Dhawan	Engineering drawing	2 nd	2001	S.Chand & Co.Ltd., Ram Nagar New Delhi-110 055
3.	R.K. Dhawan	Machine drawing	2 nd	2001	S.Chand & Co. Ltd ,Ram Nagar New Delhi-110 055
4.	M.L. Dabhade	Engineering Graphics	4 th	1995	Mrs.VA.Velhankar 1030, Model Colony, B-12,Akash Ganga Pune-411 016

1. Subject Details

Subjects: Workshop Practice
Course: ME/PE/CH
Course: CE/EE/IE/DE
Group: C*

Subject Code : 120009
Semester – I
Semester – II
Duration – 16 weeks

2. Teaching and Examination Scheme

Teaching Scheme		Credits	Examination Scheme and Maximum Marks							
Theory	Practical		Paper			Theory	Sessional	Term Work	OR	Total
Hrs per Week	Hrs Per Week		Hrs	NP	Mks					
01	04	05	-	-	-	-	-	50 @		50

3. Rationale

Production is a value adding activity, where raw material is converted into finished goods, by using different resources like man, machine, materials, methods etc. Handling of different tools & equipments is a part of production system. So students should be aware of methods of handling of different tools and safe practices. This subject deals with identification of tools, its applications, precautions, handling procedures, etc.

4. Objectives

The student will be able to

1. Know basic workshop processes.
2. Select right tools and right manufacturing processes for performing the job correctly.
3. Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
4. Read dimensions and be able to do marking required for making the job
5. Use different fitting tools like files, hacksaws, hammers, try square, chisel (crosscut chisel), centre punch etc and carpentry tools like cross-cut saw, jack plane, chisel, rasp file, marking gauge, mallet, scriber etc.
6. Operate, control different machines and equipments.
7. Inspect the job for specified dimensions
8. Produce jobs as per specified dimensions.
9. Adopt safety practices while working on various machines.

5. Detailed Contents

Sr.No.	Details Of Theory Contents	Period
01	CARPENTRY SHOP	
	1. Introduction.	
	2. Various types of Woods.	04
	3. Different types of Tools, Machines and Accessories.	

02	WELDING SHOP	
	1. Introduction	
	2. Types of Welding, ARC welding, Gas welding, Gas Cutting.	04
	3. Safety Precautions in Welding Safety Equipments and its use in Welding Process	
03	FITTING SHOP	
	1. Introduction	
	2. Various Marking, Measuring, Cutting, Holding and Striking tools.	04
	3. Different fitting operation like Chipping, Filing, Right Angle, Drilling, Tapping.	
	4. Working Principle of Drilling machine, Tapping dies its use.	
	5. Safety Precautions and Safety Equipments.	
04	SHEET METAL SHOP.	
	1. Introduction	
	2. Various types of Tools, Equipments and Accessories.	04
	3. Different types of operations in Sheet Metal Shop.	
	4. Soldering and Brazing.	
	5. Safety Precautions	
Total		16

Practical

Sr.No. Details of Practical Contents

01	CARPENTRY & PATTERN MAKING SHOP (Group of TWO Students)	
	1. Demonstration of different Wood Working Tools / Machines.	
	2. Demonstration of different Wood Working Processes, like Planning, Marking, Chiseling, Grooving, etc.	
	3. One Carpentry and one Pattern Making job for group of students.	
02	WELDING SHOP	
	1. Demonstration of different Welding Tools / Machines.	
	2. Demonstration on Arc Welding, Gas Welding, Gas Cutting and Rebuilding of Broken parts with Welding involving Butt and Lap joint.	
03	FITTING SHOP (Group of TWO Students)	
	1. Demonstration of different Fitting Tools and Drilling Machines and Power Tools.	
	2. Demonstration of different operations like Chipping, Filing, Drilling, Tapping, Cutting etc.	

3. Two job for a group of student involving practice of Chipping, Filing, Drilling, Tapping, Cutting and Sawing operations.

04 SHEET METAL SHOP

1. Demonstration of different Sheet Metal Tools.
2. Demonstration of different Sheet Metal Operations like Sheet Cutting, Bending, Lancing, Soldering and Brazing.

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

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

3] Journal should contain

a. Sketches of different tools used in workshop with practical applications.

b. Materials used for different job with their properties, advantages, disadvantages and applications.

c. Job/Part Drawings.

4] Journal should be certified by the lecturer incharge.

7. References

1. S.K. Hajara Chaudhary- Workshop Technology-Media Promoters and Publishers,New Delhi
2. B.S. Raghuwanshi- Workshop Technology- Dhanpat Rai and Sons, New Delhi
3. R K Jain- Production Technology- Khanna Publishers, New Delhi
4. H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING
SEMESTER : III

W. e. f.-Batch admitted in June 2012 progressively

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
3-1	Airport Engineering (120102)	----	2	-	-	-	2	03	80	20	80	-	-	-	100	A	202
3-2	Civil Engineering Drawing (120103)	----	2	-	4	-	6	04	80	20	80	25@	50**	-	175	C*	246
3-3	Construction (120104)	----	4	-	-	-	4	03	80	20	80	50@	-	-	150	C*	404
3-4	Docks & Harbor (120105)	----	2	-	-	-	2	03	80	20	80	-	-	-	100	A	202
3-5	Highway and Bridge Engineering (120106)	----	4	-	-	-	4	03	80	20	80	50@	-	-	150	C*	404
3-6	Applied Mathematics (120021)	----	3	-	-	1	4	03	80	20	80	-	-	-	100	C	404
3-7	Railway Engineering (120107)	----	2	-	-	-	2	03	80	20	80	-	-	-	100	A	202
3-8	Surveying-I (120108)	----	4	2	2	-	8	03	80	20	80	25@	50**	-	175	C*	448
	TOTAL		23	2	6	1	32	No of papers=08		160	640	150	100				
TOTAL PERIODS = 32									TOTAL MARKS = 1050								

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral , Gr-Group , B-Basic, C-Core , A-Application , M-Management

3-1. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: III
Subject: Airport Engineering.	Code : 120102
Group : A	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
2	-	-	-	2	03	80	20	80	-	-	-	100	A	202

3. RATIONALE:

Due to increasing number of infrastructural Structure the Air port Engineering has become an important topic of Civil Engineering. Also the importance of this subject is there because of increasing tourism & Commercialization

4. OBJECTIVE:

The student will be able to:

- (1) Assist in planning of airport run ways, Surface drainages, layout, etc.,
- (2) To maintain the airport civil structures.

5. DETAILED CONTENTS:

Sr.No.	Topics	Periods	Marks
SECTION -I			
1	1.0 Introduction to Airport Engineering: 1.1 Development of Air Transport in India. 1.2 Air craft classification. 1.3 Advantages of Air Transport.	(01)	(03)
2	2.0 Airport planning: 2.1 Air planning. Selection of site. 2.2 Stages of development of Airport.	(03)	(09)
3	Survey for selection of site & stages of development	(01)	(03)
4	4.0 Airport design standards: 4.1 Orientation of runways. Length of runways. 4.2 Design standards. Estimates of future traffic requirements.	(03)	(09)

5	Orientation & length of runway	(02)	(05)
- 89 -			
6	6.0 Airport terminal area & layout: 6.1 Planning. Terminal requirements. Terminal facilities. 6.2 Typical Airport Layout.	(02)	(06)
7	Terminal facilities	(02)	(05)
SECTION -II			
8	8.0 Design & types of pavement: 8.1 Types of pavement. 8.2 Design of flexible pavement. 8.3 Design of Rigid pavements. 8.4 LCN system of pavement.	(03)	(06)
9	LCN system of pavement.	(02)	(03)
10	10.0 Airport drainages. 10.1 Surface drainages. Under ground drainage. 10.2 Special features of Airport Drainage.	(02)	(06)
11	11.0 Traffic aids and Air port marking: 11.1 Traffic aids & air port marking. 11.2 Terminal area control. 11.3 Identification of runways. Lighting of runways. 11.4 Terminal Area control 11.5 Identification of Runway 11.6 Lighting of Runway	(04)	(09)
15	15.0 Accident in Air – Introduction: 15.1 Probable causes of accidents.	(02)	(06)
16	Causes of accidents	(01)	(02)
17	Navigational Aids	(02)	(04)
18	Landing Categories	(02)	(04)
Total		(32)	(80)

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Site Visit

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Rangwala	Airport Engineering			
2	S.K.Khanna M.G.Arora S.S.Jain	Airport Planning and Desing			

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II	
	Bits	Marks	Bits	Marks
1	Any 1 out of 2 a. On Ch. 2 b. On Ch. 2	24		
2	Attempt the following On Ch.1	08		
3	Attempt the following On Ch.3	08		
4			Any 1 out of 2 a. On Ch. 4 b. On Ch. 4	20
5			Attempt the following On Ch.5	10
6			Attempt the following On Ch.6	10
Total		40		40

3-2. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: III
Subject: Civil Engineering Drawing	Code : 120103
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
2	-	4	-	6	04	80	20	80	25@	50**	-	175	C*	246

3. RATIONALE:

This is core technology subject. At the end of this course a student will be able to understand the core fact, concept, principles and procedures related to civil Engineering drawing.

4. OBJECTIVE:

This will enable him to appropriately read and interpret civil Engineering drawing while supervising Civil Engineering construction in Building construction. He will also be able to prepare working drawings in design and drawing section as a draftsman and also interpret drawings for estimating while working as an estimator and later in Research and Development to prepare drawings of prototype.

5. CONTENT:

Sr.No.	Topics	Periods	Marks
1	1.0 Introduction of technical terms: 1.1 Technical terms commonly used in Civil Engineering Drawing, development of line plan in to detailed drawing. 1.2 General principles of layout, proportioning, composition, functional treatment and massing as applied to the buildings of various types.	(04)	(05)
2	Development of line Plan	(04)	(25)
3	Principal of lay out	(04)	(12)
4	4.0 Principal of planing for various types of buildings: 4.1 Chawls, Hospitals, hostels, Shops, Public Health Centers , Theatres, Suburban Post offices, Market, Holiday, Hotels, Primary Schools, Small factories, Office buildings, Scheduled banks. etc.,	(11)	(14)

5	Detailing of interior	(02)	(08)
6	Perspective View Definitions, One point Perspective and Two Point perspective	(05)	(10)
7	7.0 Proposals through local municipal and Types of drawings 7.1 Terms, FSI, TDR, fungible FSI, IOD, CC, refuge floor , concessions , compliances, occupation certificate.	(02)	(06)
Total		32	80

NOTE:

Preparing working drawing of buildings. Sketching: details of doors, windows, roofs, trusses, floors, stairs, etc,

There should be at least one sheet prepared in ink and one sheet in pencil. In addition, the term work will also consist of a journal containing information and sketches related to the syllabus.

TERM WORK :

The term work for this subject shall consist of the following drawings and sketches:

- 1 One drawing of a single storeyed residential building prepared by taking actual measurements.
- 2 Two drawings showing the details of a two storeyed Building prepared from a given line plan.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Site visits
3. Measured drawing

7. REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Malik & Meo	Civil Engineering Drawing	3 rd	1984	Asian Pub. New Delhi
2	Shah/ Kale/ Pataki	Building Drawing.	Latest	Latest	-
3	Y.S.Sane	Civil Engineering Drawing	Latest	Latest	-

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II	
	Bits	Marks	Bits	Marks
1	Any 1 out of 2 c. On Ch. 2 d. On Ch. 2	24		
2	Attempt the following On Ch.1	08		
3	Attempt the following On Ch.3	08		
4			Any 1 out of 2 c. On Ch. 4 d. On Ch. 4	20
5			Attempt the following On Ch.5	10
6			Attempt the following On Ch.6	10
Total		40		40

3-3. SUBJECT DETAILS:

Course: Civil Engineering	Semester: III
Subject: Construction	Code : 120104
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	-	-	-	4	03	80	20	80	50@	-	-	150	C*	404

3. RATIONALE:

Construction means production. Production is associated with materials & processes. A core technology subject like this therefore deals both with materials processes. In materials, the students has to learn a vast variety of materials, their identification, selection , testing, storing & use for civil engineering project. In construction, different processes play key role as far as safety, stability, economy, aesthetic sense are concerned. Working knowledge of this will enable the student to supervise and maintain better in the field of civil Engineering activities.

4. OBJECTIVES:

To provide Knowledge of various construction materials to the students.

Impart knowledge of various construction techniques and various components of Building construction.

5. CONTENT

Sr.No.	Topics	Period	Marks
SECTION I			
1	1.0 Foundation: 1.1 Empirical rules. 1.2 Spread footings for walls, columns, and piers, dampness - causes, effects and prevention. Term work Foundations	(05)	(06)
2	2.0 Brick Masonry: 2.1 Bonds - necessity and types. English and Flemish bonds for usual thickness of walls and in columns and piers. 2.2 Laying brick works, precautions to be taken. 2.3 Composite, hollow and partition walls.	(09)	(09)

	2.4 Walls at angles, opening in walls.		
	2.5 Block masonry.Types of bond.		
3	3.0 Stone Masonry:	(08)	(07)
	3.1 Classification and basis of classification such as random, uncoursed and coursed rubble etc.,		
	3.2 Block in course, Ashlar and cut stone masonry.		
	3.3 Dry stone masonry. Pitching and riveting. Scaffolding.		
	Term work		
	Types of bond.		
4	4.0 Arches and Lintels:	(04)	(08)
	4.1 Necessity and types.		
	4.2 Flat and relieving arches.		
	4.3 Centering of arches.		
	Term work		
	Types of Arches.		
5	5.0 Doors and windows.	(06)	(10)
	5.1 Functions and various types. Sizes and locations in buildings.		
	5.2 Fixtures and fastenings. Precautions in fixing.		
	5.3 Types of Doors and windows.		
	5.4 Fixtures and fastenings.		
	Term work:		
	Doors		
	Windows.		

SECTION -II

6	6.0 Floors:	(05)	(07)
	6.1 Solid ground floor. Plinth fillings. Floor finish with murum, brick - bat concrete, Indian patent stone, cement tiles,China mosaic		
	6.2 Floorings for special purposes such as factories, warehouses, stables, garages, railway platforms.		
	6.3 Upper floors: Single, double and framed floors in timber and steel.		
	Double flag stone. Filler joists and jack- arch construction.		
	6.4 Trimming at openings and construction.		
	Term work:		
	Framed or Tripled joints.		
7	7.0 Basements:	(04)	(07)
	7.1 Problems and precautions in location and constructions. Precaution of dampness and percolation.		
	7.2 Arrangement for lighting and ventilation.		
	Term work		
	Damp proof		
8	8.0 Mezzanine Floors & Lofts:	(03)	(04)
	8.1 Location and problems involved in construction.		
9	9.0 False work:	(03)	(04)
	9.1 Materials and constructions.		
	Term work:		
	1. Form work.		
	2. Scaffolding.		

10	10.0 Types of Stairs: 10.1 Selection and location of stairs, common dimension for width, rise, trade and landings. 10.2 Constructions. of timber ,stone and brick staircases. 10.3 Precaution against fire. 10.4 Location of lift wells, iron, R.C.C. cantilever and slab type stair case. Term work Types of Stairs.	(08)	(06)
11	11.0 Roofs : 11.1 Flat and pitched roofs, slopes of pitched roofs construction details - hips, valleys, ridges, eaves and barge boards, gables, etc.,. 11.2 Leak proofing at junctions. Term work Roofs.	(03)	(04)
12	12.0 Roof Covering: 12.1 Tiles, G.I. sheets, asbestos and asphalt sheets. 12.2 Constructions of flat roofs, drainage of roofs: Gutters , down take pipes etc.,. 12.3 Types of water proofing and their applications.	(03)	(04)
13	13.0 Pointing & Plastering: 13.1 Necessity and types, methods of providing pointing and plastering. Term work. Pointing.	(03)	(04)
Total		64	80

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Explanation with models
3. Preparation of sketches, charts
4. Site visits

7 . REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Rangwala	Construction	Latest	2003	Charotar Pub.Co. Anand
2	M.M.Goyal	Handbook of Building Construction	1 st	2003	Saurabh Goyal , Faridabad
3	Peurifoy & L	Construction Planning, Equipment & Method	4 th	1979	McGraw Hill
4	Sushil Kumar	Building Construction	10 th	1984	Standard Pub. Delhi

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II	
	Bits	Marks	Bits	Marks
1	Any 1 out of 2 e. On Ch. 2 f. On Ch. 2	24		
2	Attempt the following On Ch.1	08		
3	Attempt the following On Ch.3	08		
4			Any 1 out of 2 e. On Ch. 4 f. On Ch. 4	20
5			Attempt the following On Ch.5	10
6			Attempt the following On Ch.6	10
Total		40		40

3-4. SUBJECT DETAILS :

Course : Civil Engineering	Semester : III
Subject : Docks & Harbor	Code : 120105
Group : A	Duration:16 weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
2	-	-	-	2	03	80	20	80	-	-	-	100	A	202

3. RATIONALE

With major trust on infrastructure, more and more docks and harbours are planned while ones upgraded. This can be one of specialized area for civil engineers.

4. OBJECTIVE

To make aware the student basics about docks and harbours. Types, components and terminology.

5. CONTEXT

SN.	Topics	Periods	Marks
	1.0 Harbours :		
1.	1.1 Types of harbours such as natural and artificial harbours, size of harbours	04	10
	2.0 Tides, wind and waves :		
	2.1 Littoral drift and its prevention		
	2.2 Different types of tides		
	2.3 Tidal range, wind and waves		
2.	2.4 Height of waves	07	17
	2.5 Wave action, wind rise and Beaufort scale		
	2.6 Breakwaters : Classification of breakwaters		
	2.7 Methods of construction of breakwaters		
	2.8 Sainflond's theory of wave action and air breakwaters		
	3.0 Dock :		
3.	3.1 Different types of docks including dry docks, repair docks, open berths, shape of docks and basins	05	13
	3.2 Fundamental aspects of design and constructions		
	3.3 Methods of docking		
	4.0 Dock entrance and entrance locks :		
4.	4.1 Lock, gates, caissons for dock entrance and their operation	05	12
	4.2 Design and construction of quay walls		

SN.	Topics	Periods	Marks
	4.3 Jetties and wharves		
	4.4 Transit sheds and warehouse, cold storage		
	5.0 Dredging.		
5.	5.1 Types of dredgers	03	08
	5.2 Their methods of working		
	6.0 Navigational Aids :		
	6.1 Light houses		
6.	6.2 Beacons	04	10
	6.3 Floating signals		
	6.4 Buoys		
	6.5 Fenders		
	7.0 Maintenance of dock and harbours :		
	7.1 Maintenance of buildings		
	7.2 Maintenance of lock gates etc.		
7.	7.3 Surveys related to docks and harbours	04	10
	7.4 Hydrographic and topographic surveys		
	7.5 Soil investigation		
	7.6 Hydraulic models		
	Total	32	80

Term Work :

This will consist of a report on the visit to docks. In addition, a project of modest scope will be done by students. This will include design and drawings.

There will be a practical examination consisting of sketching and oral based on project prepared as above.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visit to one nearby Port.

7. REFERENCE BOOKS

SN.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	Rangwala	Docks & Harbour	Latest	Latest	-

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II	
	Bits	Marks	Bits	Marks
1	Any 1 out of 2 g. On Ch. 2 h. On Ch. 2	24		
2	Attempt the following On Ch.1	08		
3	Attempt the following On Ch.3	08		
4			Any 1 out of 2 g. On Ch. 4 h. On Ch. 4	20
5			Attempt the following On Ch.5	10
6			Attempt the following On Ch.6	10
Total		40		40

3-5. SUBJECT DETAILS:

Course : Civil Engineering	Semester: III
Subject :-Highway & Bridge Engineering	Code : 120106
Group : C*	Duration : 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	-	-	-	4	03	80	20	80	50@	-	-	150	C*	404

3. Rationale:

This is a technology subject, which is intended to teach students, facts, concepts, principles, procedure of a typical medium size transportation engg. system . It aims at providing knowledge of means of communication like Roads and Bridges.

4. Objective:

(Roads / Bridges / Railways) Students can use this knowledge in:

- Collection of data.
- Preparing working drawings.
- Plan, execute, supervise & maintain the system.
- Understanding required quality of road materials.

5. DETAILED CONTENTS :

Sr.No. Topics Periods Marks

SECTION -I

1	1.0 Roads: (a) Geometrics : 1.1 Alignment of Roads factors influencing the selection of Alignment, Obligatory points. 1.2 Gradients. Curves; horizontal, vertical, transition. Super-elevation, widening of roads on the curves. Grade compensation on curves, camber of roads, sight distance. (b) Surveys: Reconnaissance survey; Preliminary survey and location surveys. Information to be collected. Preparation of road, railway and bridge schemes. 1.3 Structure of road : 1.4 Width of road, structure of roads; function of various components. Materials used in road construction; soil, murum, stone, sand, cement, bituminous material. Characteristics,	07	08
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specific uses in road construction. Requirement of good materials. Important test on various materials.

1.5 Earthwork for road :

Cutting and embankment. Balancing of earthwork. Borrow pits, lead, lift. Spoil banks. Consolidation, roller used for consolidation, their comparative advantages and disadvantages. Earth Moving Equipments:

With Blades Bulldozers, Scraper, Grader, Loader, Ripper
With buckets Power shovel, Back Hoe, Dragline, Clam shell type of bucket, Trenching and dredging machinery
Maintenance of Construction Equipments

1.6 Road surfaces: Rigid and flexible pavements.

2	Expansion joint in concrete roads	02	03
3	3.0 Water bound Macadam road:	06	07
	3.1 Macadam and construction. Selection of road metal for macadam roads.		
	3.2 Collecting, stacking and placing the metal on the road.		
	3.3 Rolling, precautions to be taken during rolling, effect of improper rolling.		
	3.4 Defects developed in W.B.M. roads – ruts, potholes and corrugations, causes and their prevention.		
	3.5 Maintenance, current and special repairs of W. B. M. roads.		
4	Bituminous road cross section:	06	07
	Different ways in which tars and asphalts can be used in road construction. Surface dressings, cold and hot surface dressing, seal coat.		
	Grouting :		
	Full grouting and semi grouting. Premix carpet construction. Bituminous concrete, Sheet asphalt constructions. Maintenance.		
5	Trapezoidal drain section:	03	04
	Drainage:		
	Surface and subsurface drainage for roads.		
6	All paved type acute road junction:	07	08
	Paved roads using stone blocks, stone sets, timber blocks, etc. Special use of paved roads. Comparison of different types, procedures of construction.		
	Island type acute junction		
	Clover leaf type junction		
	T- Junction of roads		
	Multiple junction		
7	Arboriculture	01	03

SECTION –II

Bridges

1	Cross section of a bridge:	12	15
	Introduction, necessity, requirements of bridges. Component parts of bridges, their function and		

requirements. Alignments, selection, of site for a bridge.

Hydrology:

Water way, Linear water way, afflux, scour depth
(No numerical problems)

Economical span, free board, clearances.

Loading :

Dead loads, live loads - class AA, Class A, Class B loading,
impact factor and list of other loads.

(Only basic concept, no calculations.)

2	<p>Slab culvert:</p> <p>(i) Culverts - Slab, box, pipe and arched culverts. (ii) Difference between deck and trough bridges.</p> <p>Temporary and permanent, submersible and non- submersible bridges.</p> <p>(iii) Varieties like cantilever, simple suspension, masonry arched, bow string girder, bascule, traverse, lift , floating, transporter, R.C.C. open spandrel arched, R.C.C. filled spandrel arched, prestressed concrete bridges.</p> <p>Sub - structure :</p> <p>Abutment, pier, wing wall and their types. Selection of foundations for different bridges. Approaches and river training works.</p> <p>Super structure:</p> <p>Factors to be considered for selecting the type of bridge super structure - Solid and open floor. Bearings and hinges for steel bridges. Maintenance of bridges.</p>	08	10
3	<p>Pipe culvert Steel rigid frame bridge Deck bridge Through bridge Suspension bridge</p>	08	10
4	<p>Cause ways - High level, low level and flush cause ways. Trestles Floating bridge</p>	04	05
Total		64	80

Term Work:

The term work shall comprise of sketch book containing sketches from amongst the following:

- (a) Roads: 15 Sketches.
- (b) Bridges: 15 Sketches.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visits

7. REFERENCE BOOKS :

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Birdi & Ahuja	Roads, Railways & Bridges.	7 th	1982	-
2	Khanna & Justo	Highway Engineering	Latest	Latest	Standard Book House, New Delhi
3	Bindra S.I.	Bridge Engineering	2 nd	1976	Dhanpatrai & Sons New Delhi
4	N.L.Arora	Transportation Engineering	Latest	Latest	-

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II	
	Bits	Marks	Bits	Marks
1	Any 1 out of 2 i. On Ch. 2 j. On Ch. 2	24		
2	Attempt the following On Ch.1	08		
3	Attempt the following On Ch.3	08		
4			Any 1 out of 2 i. On Ch. 4 j. On Ch. 4	20
5			Attempt the following On Ch.5	10
6			Attempt the following On Ch.6	10
Total		40		40

3.6. SUBJECT DETAILS:-

Program: CE	SEMESTER: III
Weeks	Duration: 16
Course: Applied mathematics	Code: 120021
Group: C (Core)	Optional

2. TEACHING AND EXAMINATION SCHEME:-

Scheme of instruction & Periods Per Week					Theory Paper duration & marks			Scheme of Examination						Gr	Scheme L/Pr/Cr
L	P	D	T	Cr	Np	Hrs	Mks	SSL	Theory Paper	T/W	PR	OR	Total		
3	0	-	1	4	1	3	80	20	80	--	--	--	100	C	404

3. RATIONALE:-

Applied Mathematics is classified as Basic Science subject which intends to teach students the facts concepts and principles of Mathematics those can be applied to solve problem in Chemical/Civil/Mechanical/Electrical/Plastic Engineering.

4. OBJECTIVES:-

Students should be able to

1. Understand applications of derivatives in different areas
2. Understand Integral calculus and its various applications.

5. DETAILED CONTENTS:-

Section –I

Theory Contents:	Hours	Marks
1. Integration	20	24
1.1 Definition of integration as anti-derivative		
1.2 Integration of standard functions		
1.3 Integration of sum and difference of two or more functions		
1.4 Method of integration		
a) Substitution b) Partial fraction c) Trigonometric transformation		
d) Part's Method		
1.5 Definite Integration		
a) Using properties b) Mean Value c) Root mean square value		
d) Reduction Formula		
1.6. Application of Integration		
a) Area		
b) Volume		
c) Center of Gravity		
d) Moment of inertia		
e) Rectification		

2. Probability **12**
16

- 2.1 Definition of random experiments, Sample space
- 2.2 Event, occurrence of event, types of event .
- 2.3 Definition of probability, addition and multiplication theory of probability
- 2.4 Probability of Normal, Binomial , Poisson's distribution

Total **32**

40

Section-II

3. Differential Equations: **20**
24

- 3.1 Order and degree
- 3.2 Formation of differential equation.
- 3.3 Variable separable
- 3.4 Reducible to variable separable
- 3.5 Homogeneous
- 3.6 Non Homogeneous.
- 3.7 Linear form
- 3.8 Nonlinear form
- 3.9 Applications of Differential Equations.

4. Numerical Methods **12**
16

- 4.1 Newton Raphson , Bisection, Regulafalsi method
- 4.2 Solving simultaneous equation with 2 and 3 variables
- 4.3 Gauss elimination method, iterative methods – Gauss seidal and jacobi's methods

Total **32**

40

6. Implementation Strategy(planning): Conducting lectures as per lesson plan and conducting tutorial in the same class room.

7. Reference Books:

Sr. No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	Shri. S.P. Deshpande	Calculus for Polytechnics			Pune Vidyarthi Graha Prakashan Pune-30
2.	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics			Nirali Prakashan Mumbai
3.	Dr. B.S. Grewal	Higher Engineering Mathematics			Khanna Publishers 2/B, Delhi-6
4.	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics			Pune Vidyarthigraha Prakashan, Pune-411030
5.	S.S.Sastry	Introductory methods			Prentice Hall of

		of Numerical analysis			India –New Delhi
6.	M.K.Jain	Numerical method for Scientific and engineering computation			Wiley estern

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

3-7. SUBJECT DETAILS:

Course : Civil Engineering	Semester: III
Subject : Railway Engineering	Code : 120107
Group : A	Duration : 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
2	-	-	-	2	03	80	20	80	-	-	-	100	A	202

3. Rationale:

This is a technology subject, which is intended to teach students, facts, concepts, principles, procedure of a typical medium size transportation engg. system . It aims at providing knowledge of means of communication like Roads, Railways and Bridges.

4. Objective:

(Roads / Bridges / Railways) Students can use this knowledge in:

- Collection of data.
- Preparing working drawings.
- Plan, execute, supervise & maintain the system.
- Understanding required quality of road materials.

5. DETAILED CONTENTS :

Hrs Mks

Section-I

1	1.0 Permanent way section for single line in cutting: Requirements, components and their functions	05	13
	1.1 Rail gauges in India : Broad gauge, metre gauge and narrow gauge. Standard dimension for Indian Railways, speed restrictions, standard cross sections of rails, embankments and cuttings.		
	1.2 Permanent way: Requirements , components and their functions:		
	1.3 (A) Rails: Standard section used on Indian Railways, their relative merits and demerits.		
2	Flat footed section of rail	02	07

3	<p>3.0 Fish plates and fish bolts: 3.1 Rail joints. Fish plates _ common types. Expansion of rails, welding of rails. 3.2 Rail chair with fasteners 3.3 Bearing plates with fasteners 3.4 Spikes and Rail anchors</p>	04	11
4	<p>4.0 Wooden , C.I. , Steel, and R.C.C. sleepers: Standard types; timber, cast iron, steel, R.C.C. and prestressed concrete. Longitudinal and transverse sleepers. Relative merits and demerits, fastenings for sleepers - chairs, bearing plates, wooden and metal keys, spikes , bolts, creep and anti- creepers.</p>	03	09
Section – II			
5	<p>5.0 Marshalling yard: Stations and yards. Selection of site. Junctions, terminal and wayside stations. Good yards, marshalling yard, loco sheds. Station machinery, various sidings and platforms. Island platform. Level crossings. Lay out of a single line station with a crossing loop.</p> <p>5.1 Points and crossings: Description of split switch turns out. Number of crossings. Curve lead, switch lead, lead of crossing, cross over. Diamond crossing, triangles, ladder tracks, gauntlet tracks. Traps. (No calculations.)</p> <p>5.2 Ballast : Function of ballast, essential requirements, and different materials used such as stone, sand, earth, etc. Relative merits and demerits. Loco shade Left hand turn out</p>	08	18
6	<p>6.0 Mono rails, 6.1 Metro rails 6.2 Elevated rails</p>	10	22
Total		32	80

Term Work:

The term work shall comprise of sketch book containing sketches from amongst the following:

- (a) Railways: 15 Sketches.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visits

7. REFERENCE BOOKS :

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Birdi & Ahuja	Roads, Railways & Bridges.	7 th	1982	-
2	N.L.Arora	Transportation Engineering	Latest	Latest	-

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

3-8. SUBJECT DETAILS:

Course: Civil Engineering	Semester: III
Subject: Surveying -I	Code : 120108
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination					Gr	Scheme L/P/Cr	
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	4	-		8	03	80	50	50	25@		50**	175	C*	448

3. RATIONALE:

This is core technology subject which is intended to teach the students core facts , concepts, principles procedures in surveying and levelling. With this knowledge and skill, he will be able to choose appropriate surveying and levelling methods depending upon requirement to carry out survey work in Building Construction system, Transportation Engineering system , Environmental Engineering system and Irrigation Engineering system for investigation of projects before and during execution of work , while serving as investigator for design department, supervisor on the site of work, draftsman in the drawing office and estimator in the estimating office.

4. OBJECTIVES:

To acquaint students with principles and methods of different types of survey.

To train them to carry out levelling independently on the field.

To develop ability to apply surveying knowledge to various problems on site related to survey.

5. CONTENT:

Sr.No.	Topics	Period	Marks
SECTION - I			
1	1.0 Introduction and types of survey: 1.1 Scope of surveying and their purpose. 1.2 General principles of surveying: Scales and representative fraction.	(04)	(05)
2	2.0 Chain Survey: 2.1 Obstacles in chaining, ranging rods, pegs, arrows, etc., 2.2. Ranging and chaining lines, line ranger sites use. Offset rods, its use. 2.3 Round optical square and Indian optical square and cross staff: Use and adjustments. 2.4 Tie lines and check lines.	(13)	(17)

	2.5 Errors in chaining, locating details, recording in field book, plotting the survey, conventional signs		
3	3.0 Chain and Compass Surveying:	(15)	(18)
	3.1 Magnetic and true meridians, magnetic declination variation, prismatic compass, surveyor's compass and trough compass,		
	3.2 Structures, use and adjustments, included angles, different types of bearings, local attraction, principles of traverse surveying.		
	3.3 Closed & open traverse with prismatic compass. Graphical method of plotting closed traverse survey.		

SECTION -II

4	4.0 Methods of levelling:	(18)	(22)
	4.1 Parts of Dumpy level and its telescope, line of collimation, plane of collimation, bubble tube and radius of curvature, focusing, parallax, bench marks, use of dumpy level, temporary adjustments, permanent adjustments (only introduction)		
	4.2 Recording in level books, rise and fall method, and collimation plane method.		
	4.3 Methods of levelling for longitudinal and cross sections, precautions in levelling, sources of errors in leveling, permissible errors, plotting.		
5	5.0 Types of Levelling:	(06)	(08)
	5.1 Automatic level, construction, special features, use, temporary and permanent adjustments.		
	5.2 Reciprocal level, correction for curvature and refraction		
6	6.0 Contouring survey:	(06)	(07)
	6.1 Methods of contouring, interpolation of contours, use of contours, Topo sheets and their reading.		
7	8.0 Planimeter:	(02)	(03)
	8.1 Parts, their functions, and use in measurements of areas Demonstration of Digital planimeter		
	Total	64	80

PRACTICAL:

The practical work will consist of field exercise based on all the topics.

TERM WORKS:

The term work will consist of drawing sheets (together with field book) as per detailed mentioned below:

- | | |
|---------------------------------|-----------|
| 1. Conventional Signs | One sheet |
| 2. Chain and Cross staff survey | One sheet |
| 3. Chain and compass survey | One sheet |
| 4. Profile leveling | One sheet |
| 5. Contouring | One sheet |

PROJECT : The project will consist of

1. Profile Levelling for 750m, with offsets at every 15m interval and 3m on either side
2. Contour Survey for plot of 25x25 meters

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Preparation of Drawings
3. Use of modern machineries
4. Use of Visual Aids

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Purnima BC	Surveying-I Vol –I & II	11 th	1988	Laxmi Pub New Delhi
2	Kanetkar & Kulkarni	Surveying and leveling Part-I & Part-II	23 rd	1993	Vidyarthi Griha, Pune
3	Hussain Nagaraj & Gajare V.S.	Surveying	4 th	1981	S.Chand Co.
4	Basak N.N.	Surveying & Levelling	2 nd	1986	

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING
SEMESTER : IV
progressively

W. e. f.-Batch admitted in June 2012

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr	
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total			
4-1	Advance Surveying (120109)	----	--	4	--	--	4	-	-	-	-	50@	50**	--	100	A	044	
4-2	Auto CAD (120110)	----	2	4	-	-	6	-	-	-	-	50@	50**	-	100	A	246	
4-3	Con. Technology & RCC Structures (120111)	----	3	2	--	--	5	03	80	20	80	25@	--	50**	175	A*	325	
4-4	Fluid Mechanics (120112)	----	4	2	-	-	6	03	80	20	80	25@	--	50**	175	C*	426	
4-5	Materials and structures (120113)	120001	4	2	-	-	6	03	80	20	80	25@	--	--	125	C*	426	
4-6	Surveying-II (120114)	120108	4	2	2	-	8	03	80	20	80	25@	50**	--	175	C*	448	
4-7	Use of Computer in Civil Engineering (120115)	----	2	4	-	-	6	-	-	-	-	50@	50**	-	100	A	246	
	TOTAL		19	20	2	-	41	No of papers=04		80	320	250	200	100	950			
TOTAL PERIODS = 41										TOTAL MARKS = 950								

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practic al , OR – Oral , Gr- Group , B-Basic, C-Core , A-Application , M-Management

4-1. SUBJECT DETAILS:

Course: Civil Engineering	Semester: IV
Subject: Advance Surveying	Code : 120109
Group : A	Duration: 16 Weeks. Optional

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination					Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	Total		
-	4	-	-	4	-	-	-	-	50@	50**	100	A	044

3. RATIONALE:

This is advance technology subject which is intended to teach the students applications of core facts , concepts, principles procedures they have studied in surveying and leveling. In search of precision and accuracy surveyor has to use more precise instruments like Total Station. With this knowledge and skill, he will be able to choose appropriate surveying and leveling methods depending upon requirement to carry out survey work in Building Construction system, Transportation Engineering system , Environmental Engineering system and Irrigation Engineering system for investigation of projects before and during execution of work , while serving as investigator for design department, supervisor on the site of work, draftsman in the drawing office and estimator in the estimating office.

4. OBJECTIVES:

1. To provide in- depth knowledge of various survey that are required with the use of Total Station.
2. To develop ability to apply surveying knowledge to various problems on site related to survey using Total Station

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods
	SECTION -I	
1	Introduction of Total Station Different parts of the Total Station, temporary adjustments, centering, leveling, different uses of the Total Station, survey station description by codes, instrument station entry, data retrieval, field generated graphics, data transfer etc.	(04)
2	Point Measurement The measurement of an unlimited number of points	(02)
3	Contour map : Preparing the contour map of a given area, calculating the instrument station, along with the orientation of the horizontal circle from measurements to at least two points, the co-ordinates, which are known.	(08)
4	Tie distance Computing slope distance, horizontal distance and azimuth of two target points measured on line, selected from the memory or entered using the keypad.	(04)

5	Stake out Calculating the required elements to stakeout points from co-ordinates or manually entered angles, horizontal distance and heights.	(08)
6	Cogo Creating, editing and examine points, lines, splines, polygons, text and alignments	(04)
7	Remote height Calculation of the height difference h between the ground point and the high point.	(02)
SECTION-II		
Total		32
8	Area plan Computing the area of a given plot automatically and display after the boundary points are entered sequentially in the clockwise direction	(08)
9	Road design and stake out Using straight line, arc, spiral and point to edit the plane and height design values of road. deciding the positions of mid line, border line and slope border according to the chainages on the road.	(08)
10	Earthwork calculations Drawing the longitudinal and traverses section to form the basis for the detailed planning and stake out of communication routes (e. g. roads), for the calculation of fill and for the best possible accommodation of the routes to the topography. Calculate quantities to a base datum, or between surfaces, height differences, etc	(08)
11	Setting out facilitates easy setting out or checking of lines for buildings, straight sections of road, simple excavation etc.	(08)
Total		32

Practical:

The practical work will consist of field exercise involving the use of Total Station

Term work:

1. Minimum 10 experiments to be submitted with the output of Total Station

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Use of Visual Aids
3. Sketches
4. Use of advance machineries

7. REFERENCE BOOKS:

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Trimble	User Manual M3 Total Station			
2	B.C. Punmia	Surveying Vol. III	Latest	Latest	-

4.2 SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
	Duration: 16 Weeks.
Subject: AUTOCAD	Code : 120110
Group : A	Optional

2. TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Credits	Examination Scheme and Maximum Marks							
Theory Hrs Per Wk.	Practical Hrs. Per Wk.		Paper			TH Reduced to	Sessional Marks	T/W	Practical	Total
		Hrs.	N/P	Mks						
2	4	6	--	--	--	--	--	50@	50**	100

3. RATIONALE:

This is application level subject which is intended to teach the students to draft core facts , concepts, principles procedures in civil engineering drawing with AutoCAD. With this knowledge and skill, he will be able draw appropriate drawing depending upon requirement to carry out work in Building Construction system, Transportation Engineering system, Environmental Engineering system and Irrigation Engineering system for drawing the outline of the projects before and during execution of work , while serving as investigator for design department, supervisor on the site of work, draftsman in the drawing office and estimator in the estimating office.

4. OBJECTIVES:

1. To provide in- depth knowledge of various drawing commands to develop the complex drawing with ease.
2. To develop ability to read and understand various drawings on site related to civil engineering.

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods
1	Introduction to AutoCAD Concept and terminology, introducing different features, program operation, opening, closing and creating an drawing, different units selections etc.	(04)
2	Drawing commands Basics drawing commands to draw primitives like line, point, arc, circle, poly line, donut, hatch, etc.	(04)
3	Insert Commands Inserting or creating a block, defining, creating and managing attributes, linking of drawing etc.	(06)
4	Annotate Commands Dimensioning, leaders, tables, markup etc.	(04)
5	Modify Commands Move, copy, rotate, mirror, scale, stretch, trim, fillet, array	(06)
6	Layers Creating and modifying layers, matching layers, changing layers, on/off layers etc.	(06)
Total		32

Practical:

The practical work will consist of exercise involving the use of various commands mentioned above to create the drawings starting with the line and finalizing a detailed Plan, Elevation and section of a Residential Building.

Term work:

1. Line plan (minimum six building)
2. Plan, Elevation and section of a Residential Building.

6. IMPLEMENTATION STRATEGY (PLANNING) :

5. Teaching Plan
6. Use of Visual Aids

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Autodesk	Autocad Reference Manual 2004	2004	2004	Autodesk online
2	Autodesk	Autocad Reference Manual	2013	2013	Autodesk online

4-3. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
Subject: Concrete Technology & R.C.C. Structures	Code : 120111
Group : A*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
3	2	--	--	5	03	80	20	80	25@	--	50**	175	A*	325

3. Rationale:

At the completion of teaching-learning process for syllabus of the Subject, the student will be able to:

- (1) Clear idea of types of concrete (plain & reinforced)
- (2) Understand the role of various ingredients of concrete, properties of concrete.
- (3) Implement design mix and control the same at the site.
- (4) Arrive at section by working stress method.

4. Objective:

To make students understand concrete as a material, its making, types and use, besides having knowledge of its mix-design. Working stress method is also supplemented to serve as prerequisite for Inplant training and limit state design.

5. Content

Section -I

Sr. No	Topics	Period	Marks
1	1.0 Review of materials for cement concrete:	(03)	(05)
	1.1 Cement: Test as per I.S.S. such as fineness test, normal consistency of standard cement paste, initial and final setting time test, soundness test, compressive strength test. Different types of special cements and their uses, storing of cement.		
	1.2 Aggregates: Classification, specifications and test such as (i) Sieve analysis of coarse and fine aggregate, (ii) specific gravity, water absorption, natural moisture content of fine and coarse aggregate, (v) determination of percentage of fine and coarse aggregate for maximum dry compacted unit weight.		
	1.3 Admixtures: Classification and uses.		
2	2.0 Preparation of concrete:	(03)	(05)
	2.1 Introduction: Governing proportioning of concrete such as strength and durability, workability of concrete, water cement ratio, tests of measure workability such as slump, compaction factor test and V-B test, factors influencing workability. Ordinary concrete and controlled concrete, preliminary test, work test, water cement ratio for different conditions of climate.		
	2.2 Concrete mix design – Methods		

	(1) Method of arbitrary proportioning		
	(2) Method of trial mixes		
	(3) Minimum voids method		
	(4) Fineness modulus method		
	(5) Road Note No.4(U.K.method)		
	(6) A.C.I.method		
3	3.0 Batching of materials :	(02)	(04)
	3.1 Weigh batching, volume batching, estimating quantities, mixing of concrete Hand mixing and machine mixing		
4	4.0 Placing of concrete:	(02)	(03)
	4.1 Various methods of placing, compaction and curing, steps to ensure good results from vibration of concrete, surface finishing.		
5	5.0 Tests on concrete as per I.S.S.:	(02)	(03)
	5.1 Elements of Non-destructive testing of concrete.		
6	6.0 Factors affecting quality of concrete :	(03)	(05)
	6.1 Factors such as fineness of fine aggregate, water-cement ratio, compaction curing, age, fatigue and impact, temperature		
7	7.0 Special properties of concrete :	(03)	(05)
	7.1 Shrinking of concrete		
	7.2 Modulus of elasticity of concrete and permissible stresses in concrete, plastic flow or creep of concrete		
8	8.0 Quality control of concrete:	(03)	(05)
	8.1 Purpose of control, measurement viability		
	8.2 Development of quality control: practical requirement of quality control		
	8.3 Effect of control in reducing variations in concrete strength		
	8.4 Statistical measures of variation, minimum cube strength.		
9	9.0 Form work for concrete construction:	(03)	(05)
	9.1 Materials for formwork,(No problem on design of form work)		
	9.2 Form work for columns, column footings, beams, slab, walls, retaining walls, staircase and circular tanks		
	9.3 Removal of form work.		

Section -II

10	10.0 Elementary study of prestressed concrete:	(01)	(02)
	10.1 General requirements of concrete used in prestressed concrete works.		
11	11.0 Special concrete :	(02)	(04)
	11.1 Air- entrained concrete		
	11.2 Lightweight Concrete		
	11.3 Heavy concrete		
	11.4 Fibre reinforced concrete		
12	12.0 Precast concrete products:	(01)	(02)
	12.1 Types, method of casting, uses.		

13	13.0 Machinery for execution of concrete works:	(02)	(03)
	13.1 Plant for handling cement and aggregates , conveyors and elevators, cranes and grabs ,lorries and wagons etc.,		
	13.2 Machinery for mixing and transporting concrete, concrete mixers of various types, barrows, dumpers and lorries , elevating towers and chutes, overhead cable ways, belt conveyors etc.,		
	13.3 Machinery for compaction of concrete, internal vibrators, external vibrators, vibrating tables, surface vibrators.		
	13.4 Maintenance of construction equipments.		
14	14. 0 Reinforcement:	(02)	(03)
	14.1 Steel as reinforcement types of reinforcement		
	14.2 M.S.torsteel, high tensile steel.		
15	15.0 R.C.C.:	(02)	(03)
	15.1 Advantages of R.C.C. over other structural materials.		
16	16.0 Load :	(01)	(02)
	16.1 Loads on structures, Indian standards (related)		
17	17.0 Working stress:	(05)	(08)
	17.1 Method for design of R.C.C. structures reinforced concrete beams of rectangular section with tension reinforcement		
	17.2 Neutral axis, Moment of resistance, percentage of steel.		
	17.3 Economic or balanced section.		
	17.4 Effect of variation in percentage of steel on neutral axis and moment of resistance.		
	17.5 Design of section for B.M. - a culvert lab, a cantilever, lintel, verandah roof.		
18	18. 0 Design of slabs:	(03)	(05)
	18.1 Simply supported or continuous in one direction.		
	18.2 Arrangement of reinforcement cantilever balcony slab		
	18.3 Simple supported four sides with corner free		
19	19.0 R.C.beams :	(03)	(05)
	19.1 Reinforced for tension as well as compression.		
	19.2 Steel beam theory and caution in its indiscriminate application.		
20	20.0 Shear and B.M.:	(02)	(03)
	20.1 R.C.C. beams. Bent up bars and stirrups. Design of shear reinforcement.		
Total		48	80

Term work:

The term work shall comprise exercises from amongst the following:

- (A)
- (1) To determine the fine silt in fine aggregate by field method.
 - (2) To study adulteration in cement (Field test)
 - (3) To study effect of water- cement ratio on strength of concrete.
 - (4) Effect of compaction.
 - (5) Curing of concrete.
 - (6) Air entrained concrete.
 - (7) Flexural test on concrete.
 - (8) To study the effect of admixtures.
 - (9) Effect of specimen size on compressive strength.
 - (10) Bond and anchorage.

- (11) Concrete mix design.
- (12) Fineness modulus of coarse and fine aggregates.
- (13) Compaction factor test.
- (14) Rebound hammer test.

(B) The students should prepare a sketchbook only for formwork for different structural concrete elements (10 sketches).

6. IMPLEMENTATION STRATEGY (PLANNING) :

- 1. Teaching Plan
- 2. Site Visits

7. REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	S.Ramamruthan	Design of RCC Structures	15 th	2002	Dhanpatrai Pub.Co. New Delhi
2	M.S.Shetty	Concrete Technology	11 th	2000	S.Chand & Co,New Delhi
3	M.Y.Sabnis	Mix Design Made Easy	1 st	2004	ACC Ltd
4	A.M.Neville	Properties of Concrete	4 th	1996	ELBS England
5	ACC- RCD	Concrete Mix Design	1 st	1993	ACC RDD Thane
					- 76 -
Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
6	V.Lshah/ S.R.Karve	Illustrated Reinforced Concrete Design	1 st	1996	Structures Publishers, Pune
7	ISI	Handbook of Concrete Mixture	1 st	1982	ISI
8	BIS 2000	Plain & Reinforced Concrete Code of Practice	3 rd	2000	BIS
9	P.Kumar Mehta P.M.Monteiro	Concrete Microstructure Properties & Materials	1 st	1997	ICI Madras
10	Bryant Mather Celik Ozyildrim	Concrete Premier	5 th	2002	IC-ACI

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

4-4.SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
Subject: Fluid Mechanics.	Code : 120112
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	2	-	-	6	03	80	20	80	25@	--	50**	175	C*	426

3. RATIONALE:

This subject, being an Engineering science subject, is intended to teach the students, the principles and procedures of Fluid Mechanics which will enable him to apply this knowledge for planning, designing, supervising, executing and maintaining the Civil Engineering Structures

4. OBJECTIVE:

Objective of teaching this subject to the students of Civil Engineering is to

- Enable them to understand and estimate the various forces exerted by the fluid surrounding structure, and
- Apply various relevant theorems etc.,

5. DETAILED CONTENT:

Sr. No.	Topics	Periods	Marks
<i>SECTION -I</i>			
1	1.0 General : 1.1 Elementary knowledge of fluids and their properties with particular reference to water. 1.2 Specific weight and specific gravity.	(04)	(05)
2	2.0 Hydrostatics: 2.1 Fluid pressure, pressure at a point in a liquid, static head and pressure head. 2.2 Gauge and absolute pressures, negative head.	(04)	(05)
3	3.0 Pressure gauges: 3.1 Piezometer tubes, differential gauges, dial gauges. 3.2 Total pressure and the center of pressure for a plane surface immersed in a liquid. 3.3 Lock gates and water pressure on dam walls.	(04)	(05)
4	4.0 Hydro Kinematics: 4.1 Kinetic head. 4.2 Total energy of flowing water. 4.3 Bernoulli's theorem. 4.4 Venturimeter.	(04)	(05)

5	5.0 Sharp edge Orifice: 5.1 Co-efficient of contraction, velocity and discharge, orifice plate. 5.2 Time of emptying a tank through a small orifice. 5.3 Large rectangular orifices submerged and partially submerged large rectangular orifices. 5.4 Application in actual practice.	(08)	(10)
6	6.0 Notches & weirs: 6.1 Triangular, rectangular and trapezoidal notches; velocity of approach, Cippolette weir, Francis' and Bazin's formulae for rectangular weirs, calibration of notches. 6.2 Reservoirs with rectangular weirs, submerged weir, broad crested weir, ogee weir and its use, siphon spillway. (No calculations for ogee weir and siphon spillway). 6.3 Application in actual practice.	(08)	(10)
<i>SECTION –II</i>			
7	7.0 Flow through pipes: 7.1 Darcy's formula and chezy's formula for loss of frictional head in long pipes. 7.2 Losses due to sudden enlargement and sudden contraction, at entrance to a pipe, at exit, in a bent pipe, due to obstruction to flow. 7.3 External and internal cylindrical mouth pieces. 7.4 Total energy line and Hydraulic gradient line force on a bent pipe carrying a liquid. 7.5 Water hammer, its effect and use. 7.6 Flow through nozzles. 7.7 Siphon. 7.8 Pipes connected in series and parallel, boosting with a pump.	(11)	(14)
8	8.0 Flow in open channels: 8.1 Chezy's and Manning's formulae for a uniform and steady flow in open channel. 8.2 Rectangular and trapezoidal shapes of channels, economic section, most efficient sections (rectangular and trapezoidal shapes only). 8.3 Hydraulic jump (no calculations) and its use. 8.4 Measurement of flow by pitot tube, current meter, venturiflume, floats, chemical methods.	(11)	(14)
9	9.0 Pumps: 9.1 Description and uses of the following types: 9.2 Reciprocating pump, air vessel; centrifugal pump, priming or centrifugal pump, deep well turbine pump, air lift pump, simple examples on capacity and power.	(10)	(12)
Total		(64)	(80)

TERM WORK:

The term work shall consist of a journal recording the description, observation and conclusions of laboratory exercises based on the theoretical study prescribed above, in respect of at least six of the following.

- (i) Bernoulli's theorem.
- (ii) Time of emptying a tank through a small sharp edged orifice.
- (iii) Determination of co-efficient of an orifice.
- (iv) Determination of co-efficient of discharge of an external or internal cylindrical mouthpiece running full.
- (v) Calibration of a rectangular notch or triangular notch
 - (vi) Measurement of velocity by any one of the following methods.
 - Current meter
 - Pilot tube
 - Orifice meter.
 - (vii) Study of flow in an open channel.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan

7. REFERENCE BOOKS :

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Modi & Seth	Fluid Mechanics & Hydraulic Machinery	5 th	1992	Standard Book House,
2	Jagdish Lal	Fluid Mechanics & Hydraulic Machinery	9 th	1987	Metropolitan Book New Delhi
3	A.K.Mohanty	Fluid Mechanics	2 nd	2002	Prentice Hill of India Pvt. Ltd .New Delhi

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

4-5. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
Subject: Materials & Structures	Code : 120113
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	2	-	-	6	03	80	20	80	25@	--	--	125	C*	426

3. RATIONALE:

After knowing the concept of force system this subject intends to teach about the materials strength by using force concept as a tool, with reference to material behaviour for

- (1) Direct load- uniaxial, biaxial & triaxial stress system
- (2) Transverse load- bending slope & Deflection, Shear force & B.M.
- (3) Shear load in torsion

4. OBJECTIVE:

The student will be able to

- (1) Explain (a) Stress, strain & Stress systems.
- (2) Categories the loads & structure which will receive various types of loads.
- (3) Draw S.F. & B.M. diagrams for given loads on beams and calculate slope and deflection.

5. DETAILED CONTENT:

SR.NO.	TOPICS	PERIODS	MARKS
	SECTION I		
1,	<i>STRESS & STRAIN</i> 1.1 Definition of rigid body, plastic body and elasticity 1.2 Definition of strain, stress, modulus of elasticity 1.3 Classification of stress, strain. 1.4 Deformation of body due to axial load 1.5 Deformation of body of varying c/s due to axial load, max. stress and min. stress induced 1.6 Stresses in bars of composite section. 1.7 Shear stress, complementary shear stress, state of simple shear, modulus of rigidity. <i>Practical</i> 1.Study of Universal Testing Machine (U T M) 2.Tension test on Mild Steel bar (M S) 3.Shear test on Mild Steel bar (M S)	10	12
2	<i>ELASTIC CONSTANTS</i> 2.1 Definition of lateral strain, Poisson's ratio. 2.2 Change in lateral dimensions 2.3 Volumetric strain due to axial force and change in	06	08

	volume		
	2.4 Bi axial and Tri axial stresses and volumetric strain		
	2.5 Definition of Bulk Modulus, change in volume		
	2.6 Relation between Modulus of Elasticity Modulus of Rigidity and Bulk Modulus.		
3	<i>STRAIN ENERGY</i>	04	05
	3.1 Types of loading - gradual, sudden & Impact load		
	3.2 Definition of strain energy, modulus of resilience and proof resilience.		
	3.3 Comparison of stresses due to gradual load, sudden load and impact load. Instantaneous stress induced in the body		
	3.4 Strain energy stored due to gradual, sudden & impact load in the body.		
	<i>Practical</i>		
	Impact test on mild steel, brass, copper and cast iron.		
4	<i>PRINCIPAL PLANES AND STRESSES</i>	08	10
	4.1 Stresses on oblique plane i.e. normal stress and tangential stress		
	4.2 Definition of principal planes and principal stresses		
	4.3 Principal planes and principal stresses due to Biaxial stress system (Analytical and graphical method)		
	4.4 Principal plane and principal stresses due to complex stress system (Analytical and graphical method)		
5	<i>MOMENT OF INERTIA</i>	04	05
	5.1 Concept of moment of inertia M.I. of plane areas such as rectangle, triangle, circle, semicircle and quarter circle		
	5.2 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.		
	SECTION II		
6	<i>SHEAR FORCE & BENDING MOMENT DIAGRAMS</i>	10	12
	6.1 Definition of Shear Force and Bending Moment, relation between SF & BM and Load.		
	6.2 SF & BM Diagram for Simply supported, cantilever, and Over Hang beams subjected to combination of Point Load, Uniformly Distributed Load. (Analytical & Graphical Methods, No Problems on graphical method to be asked in theory exams).		
	6.3 Maximum SF and BM and their positions, Point of contraflexure		
7	<i>BENDING STRESSES IN BEAMS</i>	06	08
	7.1 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 of Flitched Beam		

	Sections.		
	7.2 Application of theory of bending to Symmetrical and Unsymmetrical Beam Sections.		
	Practical		
	1. Bending test on timber.		
	2. Bending test on floor tiles.		
8	SHEARING STRESSES IN BEAMS	04	05
	8.1 Shear stress equation, meaning of terms in equation, shear stress distribution for rectangular, hollow rectangular, angle section, channel sections, circular sections and T-sections		
	8.2 Relation between max. Shear stress and average shear stress.		
9	TORSION	06	08
	9.1 Definition of torsion, theory of pure torsion, Assumptions, equation of torsion, angle of twist, torsional rigidity, polar section modulus, ,		
	9.2 Torque transmitted by shaft		
	9.3 Strength of shaft and stiffness of shaft		
	9.4 Power transmitted by the shaft		
10	DIRECT AND BENDING STRESSES.	06	07
	10.1 Concept of direct (concentric) and eccentric load.		
	10.2 Uniaxial and Biaxial bending of short compression member.		
	10.3 Stress distribution across the section, resultant stress, condition for no tension, middle third rule, core of the section.		
		Total	64 80

Term work shall consist of practical (minimum of 10) on following:

Part I: (Minimum one from each)

- a) Cement
 - i) Fineness,
 - ii) Adulteration,
 - iii) Consistency
 - iv) Initial & final setting time
- b) Sand (fine aggregates)
 - i) Voids,
 - ii) Silt content
 - iii) Bulking
 - iv) Fineness modulus
- c) Metal (coarse aggregates)
 - i) Fineness modulus

Part II: (Minimum Three)

- 1) Types of Beams.(moment of inertia)
- 2) Tension test on standard specimen.
- 3) Shear test on standard specimen.
- 4) Bend test on bars and flats.
- 5) Transverse test on beam.

Part III: (Compulsory)

Students shall solve 4 problems on S.F., B.M. and Mohr's Stress Circle each and submit with the Term work at the end of Journal.

6. IMPLEMENTING STRATEGY (PLANNING):

1. Teaching / Lesson Plan
2. Models
3. Power Point Presentations

7. REFERENCE BOOKS :

SR. NO	AUTHOR	TITLE	EDITION	PUBLISHER ADDRESS
1	Khurmi R.S.	Strength of Materials	LATEST	S.Chand & Co.
2	Ramamurtham	Strength of Materials	LATEST	Dhanpatrai & Co.
3	S S Bhavikatti	Strength of Materials	LATEST	Vikas Publishing
4	Rajput	Strength of Materials	LATEST	S.Chand & Co.
5	Sunil M Deo	Strength of Materials	LATEST	Pragati / Nirali Prakashan

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

4-6. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
Subject: Surveying - II.	Code : 120114
Group : C*	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
4	2	2	-	8	03	80	20	80	25@	50**	--	175	C*	448

3. RATIONALE:

This is core technology subject which is intended to teach the students core facts , concepts, principles procedures in surveying and leveling. With this knowledge and skill, he will be able to choose appropriate surveying and leveling methods depending upon requirement to carry out survey work in Building Construction system, Transportation Engineering system , Environmental Engineering system and Irrigation Engineering system for investigation of projects before and during execution of work , while serving as investigator for design department, supervisor on the site of work, draftsman in the drawing office and estimator in the estimating office.

4. OBJECTIVES:

To provide in- depth knowledge of various survey. To develop ability to apply surveying knowledge to various problems on site related to survey.

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
SECTION -I			
1	Introduction of Theodolite:	(01)	(02)
2	2.0 Classification of Theodolite: <u>2.1 Transit and non- transit type, Vernier Theodolite, one sec. Theodolite.</u>	(04)	(05)
3	3.0 Introduction to one second Theodolite: <u>3.1 Use and application</u>	(04)	(05)
4	Temporary & Adjustment of Theodolite	(05)	(06)
5	5.0 Precautions : 5.1 Precautions required in angles with Theodolite, accuracy of work	(05)	(06)
6	6.0 Traversing : 6.1 Relation of included angles and bearings, latitudes and departure	(05)	(06)
7	7.0 Computation: 7.1 Reduction and tabulation of co-ordinates, checks, plotting of co-ordinates, balancing the traverse, closing error and its adjustments.	(08)	(10)

- 7.2 Sources of errors, permissible errors.
- 7.3 The use of Theodolite as levelling instrument.
- 7.4 Its use for setting out curves.

SECTION-II

8	8.0 Trigonometrically levelling: 8.2 Principles of tacheometric surveying. 8.3 Types of tachometers, use of anallatic lens, methods, of tacheometric, its use for traversing and contouring, degree of accuracy, Fixed Hair method, Problems on Line of sight Horizontal and staff held vertical and line of sight inclined and staff held vertical 8.4 Tacheometric tables, computations, movable hairs and tangential method.(no questions to be asked)	(15)	(18)
9	9.0 Plane Table Surveying: 9.1 Plane table, its use with sight vane and telescope, Equipments used in plane table surveying, orientation, Magnetic needle method, back sight method of orientation	(05)	(06)
10	10.0 Methods of Plane Table Survey 10.1 Radiation Method 10.2 Intersection Method 10.3 Resection Method 10.4 Traversing Method 10.4 Two point and three point problem	(05)	(06)
11	11.0 Curves : 11.1 Necessity of curves, (as on roads, railways, etc.). 11.2 Types of curves like simple, compound, reverse, transition and vertical curves, radius and degree of curve. 11.3 Various component parts of a simple circular curve like tangents, versed sine of curve, apex distance, tangent distance, length of curve, degree of curve, angle of intersection, long chord, normal and sub-chords, etc. 11.4 Simple methods of setting out curves. (No Numericals on setting of curves)	(07)	(10)
Total		64	80

Practical:

The practical work will consist of field exercise involving the use of instruments mentioned above.

Term work:

- (i) Theodolite traverse survey .. One sheet
- (ii) Plane table survey .. (Field work only)
- (iii) Journal consisting all the experiments

PROJECT : Theodolite Traversing project with at least 5 sided traverse and calculating the related data for traverse as per Gale's Traverse Table

6. IMPLEMENTATION STRATEGY (PLANNING) :

7. Teaching Plan

8. Use of Visual Aids
9. Sketches
10. Use of advance machineries

7. REFERENCE BOOKS :

Sr.No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Kanitkar & Kulkarni	Surveying I & II	Latest	Latest	-
2	Punmia	Surveying I & II	Latest	Latest	-
3	Shah, Mahabal, Klohature	Surveying I & II	Latest	Latest	-
4	Amarjeet Agarwala	Surveying & levelling	Latest	Latest	-

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

4-7. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: IV
Subject: Use of Computer in Civil Engineering.	Code : 120115
Group :A	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
2	4	-	-	6	-	-	-	-	50@	50**	-	100	A	246

3. Rationale:

This subject is intended to teach the students about the advance development of Computer applications.

4. Objectives:

Students will be able to:

- (1) Understand the applications of computer.
- (2) Do project works in Construction projects.
- (3) Draw flow charts in the computer.

5. Contents:

Sr. No.	Topics	Periods
1	1.0 Introduction: 1.1 Introduction to Computers and information technology. 1.2 Recent Developments. Computer as a tool to perform various functions.	04
2	2.0 Project process in Civil Engineering: 2.1 Various project delivery systems and their functions 2.2 Input output model of functions.	04
3	3.0 Various applications of computer and their uses related to Civil Engineering for example- M.S.Office,M.S. Access etc.	10
4	4.0 Software packages pertaining to Civil Engineering : 4.1 Their utility, cost, hard ware requirements 4.2 Functions performed i.e., input and out put 4.3 Limitations and approximate cost.	10
5	5.0 Introduction of Internet use of it and importance of use for Civil Engineering	04
	Total	32

* The subject has only Practical examination of 50 marks.

Term work:

Preparing six assignments based on various application of Computer Software related to Civil Engineering.

List of Practicals:

1. Introduction of Computers
2. Use of M.S.Office and Assignments on M.S.Word
3. Introduction of M.S.Excel and assignment on M.S.Excel
4. Graph Preparation with M.S.Excel
5. Power Point Presentation
6. Introduction of Internet and listening few Web Sites related to Civil Engineering
7. Introduction of various software related to Civil Engineering

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Computer practicals
2. Demo of few softwares

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Linda I.O` Leary	Computing Essentials	Latest	-	Tata McGraw Hill

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING

SEMESTER : V

w.e.f. - Batch admitted in June, 2012 (progressively)

Duration of Training : 24 weeks

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Examination					Gr	Cr
			Weekly Report	Quiz Test	Training Report	OR	Total		
5.1	INPLANT TRAINING-I (120155)	--	50@	50@	50**	50**	200	A*	15
TOTAL CREDITS = 15			TOTAL MARKS = 200						

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral , Gr - Group ,
B-Basic, C-Core , A-Application , M-Management

HEAD OF DEPARTMENT

PRINCIPAL

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE: CIVIL ENGINEERING
SEMESTER: VI

W. e. f.-Batch admitted in June 2012 progressively

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr		
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total				
6-1	Elective-I (Any one) i) Building Maintenance Repairs & Services (120116)	----	5	--	--	-	5	03	80	20	80	50@	--	--	150	A*	505		
	ii) Construction Management (120130)	120104	3	--	2	-	5	03	80	20	80	50@	--	--	150	M*	325		
6-2#	Environmental Engineering-I (120118)	----	3	2	--	-	5	03	80	20	80	50@	--	50**	200	C*	325		
6-3	Design Practice of Steel Structures (120117)	----	3	--	4	-	7	03	80	20	80	50@	--	50**	200	A	347		
6-4	Mass Rapid Transport Systems (120120)	120106	2	--	--	-	2	03	80	20	80	--	--	--	100	A	202		
6-5	Mechanics of Structures (120121)	120113	4	--	--	-	4	03	80	20	80	--	--	--	100	C*	404		
6-6#	Quantity Survey Est. & Valuation (120122)	----	3	4	--	-	7	03	80	20	80	50@	--	50**	200	A*	347		
6-7	Stress Management (120025)	----	--	2	--	-	2	--	--	--	--	--	--	--	--	M	022		
	TOTAL		18	8	6		32	No of papers =06		120	480	200		150	950				
TOTAL PERIODS = 32									TOTAL MARKS = 950										

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period, P-Practical period, D- Drawing Practice Period, T-Tutorial, Cr-Credit, SSL-Sessional, TW- Term work, PR- Practical, OR – Oral, Gr- Group, B-Basic, C-Core, A-Application, M-Management

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

DISCIPLINE: CIVIL ENGINEERING
SEMESTER: VII

W. e. f.-Batch admitted in June 2012 progressively

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr	Scheme L/P/Cr
			L	P	D	T	Cr	Hrs	Mks	SSL	Paper	T/W	PR	OR	Total		
7-1#	Civil Engineering Project (120123)	\$	--	7	--	-	7	--	---	--	--	50@	--	50**	100	A*	077
7-2#	Design Practice of RCC Structure (120124)	120111	3	--	4	-	7	03	80	20	80	50@	--	50**	200	C*	347
7-3	Engineering Geology (120125)	----	3	--	--	-	3	03	80	20	80	--	--	--	100	C	303
7-4#	Environmental Engineering-II (120126)	120118	3	2	--	-	5	03	80	20	80	50@	--	50**	200	A*	325
7-5#	Elective-II (Any one) i) Water Resource Engineering (120127)	120112	4	--	2	-	6	03	80	20	80	50@	--	50**	200	A*	426
	ii) Environmental Pollution & Control (120119)	120118	4	--	2	-	6	03	80	20	80	50@	--	50**	200	A*	426
7-6#	Project Engineering , Management & CA (120128)	120122	4	2	--	-	6	03	80	20	80	50@	--	50**	200	M*	426
7-7#	Soil Mechanics & Foundation Engineering (120129)	----	4	2	--	-	6	03	80	20	80	50@	--	50**	200	A*	426
	TOTAL		21	13	6	-	40	No of papers=06		120	480	300		300	1200		
TOTAL PERIODS = 40							TOTAL MARKS = 1200										

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

\$ All compulsory subjects up to sixth semester with term granted, L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral , Gr- Group , B-Basic, C-Core , A-Application , M-Management

PRINCIPAL

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

DISCIPLINE : CIVIL ENGINEERING

SEMESTER : VIII

w.e.f.- Batch admitted in June, 2012 (progressively)

Duration of Training : 24 weeks

Sr. No.	Subject Name & Code	Prerequisite Sub Code	Scheme of Examination				Gr	Cr	
			Weekly Report	Quiz Test	Training Report	OR			Total
5.1	# INPLANT TRAINING-II (120188)	120155	50@	50@	50**	50**	200	A*	15
TOTAL CREDITS = 15			TOTAL MARKS = 200 (Converted to 100 for Award of Diploma)						

* Compulsory, # Award Winning, ** Assessed by Internal Examiner and External Examiner jointly, @ Assessed by Internal Examiner only

L-Lecture Period , P-Practical period , D- Drawing Practice Period , T-Tutorial, Cr-Credit , SSL-Sessional, TW- Term work, PR- Practical , OR – Oral ,
Gr- Group , B-Basic, C-Core , A-Application , M-Management

HEAD OF DEPARTMENT

PRINCIPAL

1. SUBJECT DETAILS:

Course: Civil Engineering	Semester: VI
Subject: Building Maintenance, Repairs and Services	Code : 120116
Group : A*	.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
5	-	-	-	5	3	80	20	80	50@	-	--	150	A*	505

3. RATIONALE:

This subject is from engineering science group intended to teach the students about the safety, precautions and repairs of any construction system.

4. OBJECTIVE:

At some point of time, every building needs maintenance related repair to enhance its service life. Due to lack of maintenance and maintenance related repairs collapse of old buildings are on rise. After study of this subject, the students will be able to

1. understand the routine, incidental, periodic and service contract maintenance Works of HVAC System, external and internal electrical system, emergency power generation, fire fighting system, fire detection & alarm and Plumbing System
2. identify, evaluate scientifically the root cause of decay / deterioration, plan and implement maintenance related repair work
3. develop the skill of proper supervision and correct use of materials for effective maintenance related repair work

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
	Section – I		
	1.0 Introduction to maintenance and repairs	4	03
	1.1 Types of maintenance: Routine maintenance, incidental maintenance, periodic maintenance, service contract maintenance		
	1.2 Legislation and bye-laws related to building maintenance and repair		
	1.3 Scope of maintenance: Structural Stability, water tightness and durability		
2	2.0 Common problems in building structures	4	03
	2.1 Statutory requirements: Structural audit and revelation in structural audit		

Sr. No.	Topics	Periods	Marks
	2.4 Common problem in buildings: Leakage, dampness, RCC deterioration, façade deterioration		
3	3.0 Factors affecting durability and diagnosis 3.1 Causes that leads to distress in buildings: In-built factors, damage, environmental impact 3.2 Defects in building structures: Design, material and construction 3.3 Damages to structures: Overloading, earthquake, fire, accidental catastrophe 3.4 Deterioration: Corrosion, carbonation, chloride, sulphate attack, AA reaction 3.5 Effects of defects, damage and deterioration: Leakage, settlement, deflection, spalling / Delamination, disintegration, cracking, scaling 3.6 Non Destructive Tests (NDT): Need for testing, NDT on concrete, partially destructive tests, selection of NDT method, test requirements, number of tests necessary for various test methods, interpretation of NDT results	8	07
4	4.0 Planning repair 4.1 Factors making repair work successful 4.2 Financial planning 4.3 Fund mobilization 4.4 Execution of repair work: Pre-repair planning, Appointment process of contractor 4.5 Some Dos & Don's in planning and execution of repair work	4	03
5	5.0 Specifications for repair work 5.1 Essential parameters / properties of repair materials 5.1 Selection of materials for proper and effective repair 5.3 Materials for repairs: Rust passivators, antirust coatings, polymer modified mortar / concrete, superfluid microconcrete, fibre composite, surface coat / paint, grouts, cathodic protection 5.4 Testing of repair materials	6	06
6	6.0 Methodology and execution of repair work 6.1 Surface based repair: Reinforcement cover restoration, façade restoration, surface protection 6.2 Strengthening technique: Shear strengthening, compression strength enhancement, flexural strengthening 6.4 Tools, tackles and machineries 6.3 Placement methods: Dry packing, form and cast in place, form and pump, grouted preplaced aggregate, dry / wet mix shotcrete, full depth repair, hand applied, special techniques 6.4 Safety at repair site	8	10
7	7.0 Waterproofing 7.1 Diagnostic techniques for post construction seepage / leakage maladies, reasons for failure of existing waterproofing 7.2 Frequency of checking and maintenance of wet locations in buildings 7.3 Methods of waterproofing: Conventional and non-conventional waterproofing of locations like toilet, basement, terrace,	6	08

Sr. No.	Topics	Periods	Marks
	overhead / underground tanks, rising dampness and osmosis in flooring, expansion joint treatment.		
	Section – II		
8	8.0 Introductions to Building services:	4	3
	8.1 Class and type of building, services needed by various kinds of building.		
9	9.0 Light and electricity :	4	3
	9.1 Requirements as per zoning rules, brief calculation, planning and designing.		
	9.2 Basic consideration / area wise		
	9.3 Type of panels, cables		
	9.4 General guideline about LT and HT		
	9.5 Motor type		
10	10.0 Ventilation: & Artificial Ventilation:	6	06
	10.1 Requirements as per zoning rules, brief planning and designing.		
	10.2 Air conditioning systems, types, provisional needed at various stages of building construction.		
	10.3 Type of Air-conditioning		
	10.4 General guideline about AC equipments and space planning		
11	11.0 Water and drainage lines:	8	08
	11.1 Size of water connection, procedure, follow-up, water distribution system, wing type /loop type, concealment / ducting / open.		
	11.2 Type of materials for pipelines.		
	11.3 Size and type of overhead tank.		
	11.4 Plumbing systems, construction aspects, connection to municipal underground system or septic tank, sanitary ware and material for various pipelines and connections.		
	11.5 Provision at various stages of building construction.		
	11.6 Guideline on Gravity and Hydro pneumatic system		
	11.7 Types of Pumps		
12	12.0 Fire Protection:	4	5
	12.1 Design for fire proofing, materials, fire- escape routes and provision.		
	12.2 Insurance for fire hazard.		
	12.3 General guideline on CFO norms.		
	12.4 Type of Fire Pumps		
	12.5 General knowledge of Sprinkler and Hydrant system		
	12.6 Fire alarm, public address system		
13	13.0 Acoustics:	4	4
	13.1 Design for acoustics, materials and their placement.		
	13.2 Type of acoustic insulation and equipment		
	13.3 Guideline on room acoustic, roof acoustic, duct acoustic etc.		
14	13.0 Vertical circulation:	4	5
	13.1 Staircases and lifts.		
	13.2 Requirement provisions for lift erection. Parts of lift systems.		

Sr. No.	Topics	Periods	Marks
	13.3 Provision and power requirements.		
	13.4 Relevant zoning rules.		
	13.5 Lift types		
	13.6 Lifts consideration		
15	15.0 Gas system:	3	3
	15.1 Necessity, application and advantages.		
	15.2 Services and distribution piping		
16	16.0 Security system:	3	3
	16.1 Necessity, systems, manual or otherwise, advantages and cost.		
	16.2 CCTV and Security system.		
	TOTAL	80	80

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Site Visits
3. Technical Films
4. Guest lectures

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	R.N.Raikar	Technology of Building Repairs	1 st	1973	SDCPL Mumbai
2	Chudley	Building Maintenance	Latest	Latest	-
3	Neveille	Building Service Engg	Latest	Latest	Wiley Eastern Ltd
4	Dr. Fixit Institute & A. K. Singh	Planning Repairs for CHS Buildings	2011	2011	Dr. Fixit Institute of Structural Protection and Rehabilitation

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: VI
Subject: Design Practice of Steel Structures.	Code: 120117
Group: A	.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	-	4	-	7	3	80	20	80	50@	-	50**	200	A	347

3. RATIONALE:

The extensive use of Steel in a variety of structural members has necessitated a proper understanding of the design in structural members by the structural engineer. Rapid development in the any & design procedures has taken place therefore changes are to be made in this particular subject accordingly. In depth study of the subject shall help diploma students to be aware of recent developments / trends in design procedures and be able to design the structural components & to read and understand design and drawings of some special structures.

4. OBJECTIVES:

Students will be able to:

- (1) Understand & estimate the Dead load, Live load & Wind load on structures as per IS 875.
- (2) Calculate the stresses for the worst combination of load.
- (3) Use the IS 800 for standard specifications & Design requirements for structures & its components.
- (4) Design the elementary Steel structural members by **working stress method**.
- (5) Design the roof truss and Flooring system
- (6) Prepare the detailed drawings.

5. DETAILED CONTENTS:

Sr. No.	Topics SECTION –I	Period	Marks
1	Introduction. 1.0 Loads on Structures 1.01 Dead loads: Estimation of self-weight-loads of different components of a structure like roofing materials, purlins, trusses, floors, etc., 1.02 Live loads: For roof trusses and floors of buildings as per IS- 875 1.04 Wind loads: For roof trusses building frames as per IS –875. 1.1 Permissible stresses 1.11 Structural steel conforming to IS-226 & IS-2062 1.12 Stresses in structural steel components 1.13 Stresses in structural Fasteners Rivets Bolts & Welds 1.2 Design philosophies 1.21 Working stress method 1.22 Limit state method	06	10

	1.3 Standard Steel Sections & Use of codes. 1.31 Standard Steel Plate Sections, Angle Sections, T-Sections, I-Sections & C- Sections as per IS Specifications. 1.32 Use of IS-800 and IS-875 & Steel Tables.		
2	2.0 Design of Riveted & Welded Joints. 2.1 Types of Rivets & Joints 2.2 Failure types of Riveted Joints, Strength of a Joint 2.3 Types of Welds & Joints 2.4 Failure types of Welded Joints, Strength of a Joint 2.5 Design of different types of Joints as applied to its use in structures.	06	10
3	3.0 Design of tension and compression members: 3.1 Design for axial loading, members of roof trusses and bridges, 3.2 Permissible values of slenderness ratios 3.3 Reversal of stresses due to wind loads 3.4 Selection of sections from steel table.	06	10
4	4.0 Axially loaded columns 4.1 Different end conditions, effective length 4.2 Strength of simple and compound columns 4.3 Design of simple columns using standard rolled I sections with or without plates. Necessity of lacing or battening For compound columns for trusses, bridges and buildings. requirements as per IS-800(No design).	06	10
SECTION -II			
5	5.0 Column Bases 5.1 Design of Slab base & Gusseted base 5.2 Plain concrete footing for axially loaded columns bases	06	10
6	6.0 Design of beams 6.1 Laterally restrained simple beams & built-up beams using combination of standard steel sections. 6.2 Design of section symmetrical about principal axes for bending Moment & Check for shear force and deflection. 6.3 Arrangement of main beams and secondary beams. 6.4 Introduction to Plate girders of uniform section, components of plate girder and their functions.	10	16
7	7.0 Design of Beam & Column connections 7.1 Beam to Beam, Beam to Column connections 7.2 Design of Framed Connection 7.3 Design of Seated Connection (only unstiffened)	08	14
Total		48	80

Note:

Use of I.S. Codes (IS- 800, 1984 and IS-875, Part III-1987) ,Specifications, tables and handbooks to be explained to the students to make them conversant with their use and to enable them to use at the time of examination.

TERM WORK:

The term work shall comprise exercises from amongst the following.

Group A: Design of a simple roof truss.

Group B: (a) Design of simple floor system of steel joists consisting of main and secondary beams, simply supported at the ends. Beam to beam and Beam to column connection for shear only.

(b) Design of axially loaded steel column and column footing.

Above drawing sheets be accompanied by a brief report incorporating estimation of loads, design of members, stress diagrams of frames, sketches of connections of members, layouts etc., wherever necessary.

c) **Sketch book:**

Students shall prepare a sketch book containing following free-hand Sketches.

- (1) Atypical joint of a roof truss showing connection of members, Purlin, cleat, J-bolt and roofing sheets.
- (2) Beam to beam connection.
- (3) Beam to column connection.
- (4) Slab base of a steel column.
- (5) Gusseted base of a steel column.
- (6) Grillage foundation.
- (7) Method for column splicing.
- (8) Two methods of bracing in compound columns.
- (9) Arrangement of axial load members with double angle section with tacking rivets.
- (10) Cross section of a welded or riveted plate girder

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Site Visit

7. REFERENCE BOOKS :

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Vazirani & ratwani	Design of Steel Structures	Revised	Latest	Khanna Pub. New Delhi
2	Duggal	Design of Steel Structures	Revised	Latest	Tata McGraw Hill Pub. Co. (P) Ltd
3.	S.Ramamruthan	Design of Steel Structures	Revised	Latest	Dhanpatrai Pub.Co. Pvt.Ltd
4.	M.M.Malhotra	Design of Steel Structures	Revised	Latest	Jain Brothers New Delhi
5.	L.S.Negi	Design of Steel Structures	Revised	Latest	Tata McGraw Hill New Delhi
6.	Ram Chandra	Design of Steel Structures Vol- I & II	Revised	Latest	Standard Books House New Delhi
7.	F.W.Lambert	Structural Steel Work	2 nd	1977	ELBS Publishing

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 4 out of 6	16	-	-	Any 1 out of 2	04
2.	Any 1 out of 2	12	-	-	Any 2 out of 4	16
3.	Any 1 out of 2	12	-	-		
4.	-	-	Any 4 out of 6	16	-	-
5.	-	-	Any 1 out of 2	12	-	-
6.	-	-	Any 1 out of 2	12	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VI
Subject: #Environmental Engineering I	Code : 120118
Group : C*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	-	2	-	5	3	80	20	80	50@	-	50**	200	C*	325

3. RATIONALE:

The subject gives the students the awareness of plumbing & other features which are important aspects of Public Health.

4. OBJECTIVES:

Students will be able to:

- (1) Understand the fresh water supply system, raw water resources.
- (2) Understand the water various different treatment required to purify the water and their suitabilities.
- (3) Understand the Plumbing system and flow of water.
- (4) Prepare the plumbing maintenance plan.

5. DETAILED CONTENTS:

Sr. No	Topics Section I	Period	Marks
1.	Introduction 1.1 Importance and necessity for Planned Water Supply scheme. 1.2 Planning, execution and pricing of Municipal Water Supplies	01	02
2	Demand of Water 2.1 Various types of water demands 2.2 Per Capita Demand, Factors affecting per capita demand, Variations in demand, Design periods, Population forecasting and methods of population forecasting, Arithmetic Mean, Geometric Mean, Incremental Increase, Decrease rate of growth, Simple graphical, comparative graphical, Master plan or Zoning and apportionment method.	04	8
3	Sources of water 3.1 Surface, subsurface sources	05	08

	3.2 Intakes, Definition, factors governing location of an intake 3.3 wet intake tower, dry intake tower, River intake, Canal Intake, etc		
4	Quality of Water 4.1 Characteristics of Water, physical, chemical and biological. 4.2 Physical characteristic, Turbidity, color, taste and odours, Temperature and specific conductivity, their determination and significance. 4.3 Chemical Characteristic, Total solids and suspended solids, pH value, Hardness', Chloride content, Nitrogen content, Metal and other substances, Dissolved gases, BOD and their determination 4.4 Biological Characteristics, Aerobic, anaerobic and facultative bacterias, Pathogens and non pathogens, Coliforms, E-coli, MPN and their methods of determining. 4.5 Water borne diseases and their control. 4.6 Quality standards for Municipal Water Supplies.	08	12
5	Purification of water 5.1 various methods of purification of water adopted 5.2 Screenings, Coarse and fine screens 5.3 Plain Sedimentation, Theory of Sedimentation, Sedimentation tanks, Horizontal Flow, Vertical Flow 5.4 Sedimentation Aided with Co-agulation, Chemicals used for coagulation and their comparison 5.4 Coagulation sedimentation plant (Clariflocculator), its working, , floc formation and sludge removal 5.5 Laboratory experiment for determination of optimum dosage of coagulants (Jar Test)	06	10
Section II			
6	Purification of water 6.1 Filtration, theory of filtration, Filter materials, types of filters and their classification as slow, rapid and pressure filters 6.2 Slow sand filters, Construction, Operation and Claeinig, Rate of filtration, Efficiency and performance 6.3 Rapid Gravity filters, Construction, Working and Cleaning, Back washing, Operational Troubles in Rapid Gravity filters like formation of mud balls, Cracking of filters etc, rate of filtration, Efficiency and performance, Comparison of Slow and Rapid sand filters 6.4 Pressure Filters, Construction, Working and operation, rate of filtration, Efficiency,	06	10
7	Purification of water 7.1 Disinfection, Minor methods like boiling, treatment with excess lime, ozone, iodine and bromine, ultra violet rays, potassium permanganate, silver (Electra Katadyn process) 7.2 Chlorination, Doses of chlorine, Types of Chlorination, Pre, post, Double, Break point, Super, and Dechlorination. 7.3 Testing of Residual Chlorine	06	10

8	Water Softening 8.1 Necessity, Temporary Hardness, Permanent Hardness 8.2 Methods of removing Temporary Hardness, Boiling, Addition of Lime, etc 8.3 Methods of removing Permanent Hardness, Lime Soda Process, Base Exchange Process (Zeolite Process), Demineralisation Process	05	08
9	Miscellaneous Treatment 9.1 Removal of Color, Odour and Taste, Aeration, Methods of Aeration, Treatment with Activated Carbon, Treatment with Copper Sulphate, Treatment with Oxidising Agents, 9.2 Removal of Salt and Dissolved Solids, Desalination Process Necessity	03	04
10	Distribution System 10.1 Necessity, Requirements of good distribution system 10.2 Layouts of Distribution System, Dead End system, Grid Iron system, Ring system, Radial system. 10.3 Methods of Distribution of Water, Gravitational System, Pumping System, pressure in the distribution system 10.3 Distribution Reservoirs, Surface, Elevated, Stand Pipes	03	04
11	Plumbing Systems 11.1 The house water connection, various parts, ferrule, goose neck, service pipe, stop cock, water meter, etc.	01	04
	Total	48	80

TERM WORK:

- Various chemical tests on water.
- The students should prepare a sketch book containing 20 sketches on the topic mentioned in the syllabus.
- This will consist of a report on the visit to the water treatment plant.
- There will be practical examination consisting of sketching and oral based on the term work.

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Visit to water treatment plant
3. Slide show

7. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	S.K. Garg	Water Supply & Sanitary Engineering.	3 rd	1984	Khanna Publisher New Delhi
2	Gharpure V.N.	Water Supply & Sanitary Engineering	5 th	1986	Engg. Books Pub.Co. Pune
3	Deodhar/ Pachauri/ Gokhale	Environment Engineering Systems	1 st	1997	Vrinda Publication Jalgaon
4	K.N.Duggal	Elements of Environmental Engineering	6 th	2002	S.Chand & Co. New Delhi

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : CE	Semester: VI
Subject : Construction Management	Code : 120130
Group : M*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	--	2	-	5	3	80	20	80	50@	--	--	150	M*	325

3. RATIONALE:

Construction management is study of tools and techniques to manage various resources at construction site including work study, labor welfare, construction safety and material management.

4. OBJECTIVES:

Students will be able to:

- (1) Understand the various aspects such as agencies, labor and material management.
- (2) Apply the principles of management to do needful site planning and solve problems
- (3) Build the better pre-requisite of higher semester subject related to project engineering and contract administration.

5. DETAILED CONTENTS:

SECTION I

Chapter	Topics	Periods	Marks
1	Introduction to Management and Construction management 1.1 Management art or science, principles of management 1.2 Resources at construction project site 1.3 Definition of construction management 1.4 Objects and Functions of Construction Management 1.5 Need and Scope of Construction Management	03	06

2	Resources at Construction Project Site 2.1 Men Money Material Space 2.2 Optimum use of resources 2.3 Schedules : Construction schedule, Material schedule, Manpower Schedule	05	08
3	Site Layout	05	08
	3.1 Aspects to be considered planning site layout 3.2 Construction site layout for one project 3.3 Periodic review and modification of site layout		
4	Material Management 4.1 Classification and codification of materials 4.2 ABC analysis of materials 4.3 Inventory of materials 4.4 Aspects while ordering and receiving materials : local taxes Unloading 4.5 Precautions while storing materials 4.6 Consumption, issue and role of store keeper. 4.7 Stores Organization and Stores Management	06	10
5	Work Study and Productivity at Construction Site 5.1 Introduction 5.2 Work study and Productivity 5.3 Purpose of this study 5.4 Work measurement and time study 5.5 Comparison – Method study and time study 5.6 Flow process charts 5.7 Operational Analysis 5.8 Economy in Construction	05	08
	SECTION II		

6	<p>Civil Engineering Agencies –Scope and Functions</p> <p>6.1 Broad Categories</p> <p>6.2 Planners</p> <p>6.3 Builders</p> <p>6.4 P.W.D and C.P.W.D Chart</p> <p>6.5 Organizational Charts</p> <p>6.6 Functions of Various Personnel</p> <p>6.7 Chief Engineer, Executive Engineer, Assistant Engineer Junior Engineer</p> <p>6.8 Architect to Government</p> <p>6.9 Contracting Firms and Types</p> <p>6.10 Proprietorship, Partnership , Private ltd and Ltd Companies</p>	06	10
7	<p>Labor And Personnel Management</p> <p>7.1 Labor in Construction Industry</p> <p>7.2 Types of labor</p> <p>7.3 Unskilled, semi skilled, Skilled labor</p> <p>7.4 Mode of Employment of labor</p> <p>7.5 Gang Employment and Trade workers</p> <p>7.6 Floating labor</p> <p>7.7 Effective Communication</p> <p>7.8 Welfare of labor</p> <p>7.9 Industrial Psychology</p>	06	10
8	<p>Civil Engineering Management and Organization</p> <p>8.1 Nature of Civil engineering works and management desired</p> <p>8.2 Principal Characteristics</p> <p>8.3 Each structure is unique, Built in situ and commissioned</p> <p>8.4 Co-ordination of various agencies</p> <p>8.5 Types of organization</p> <p>8.6 Line and functional organizations</p> <p>8.7 Line and staff organization</p>	06	10

9	Effective supervision, safety ,Administration and Acts	06	10
	9.1 Necessary precautions at the site		
	9.2 Typical problems at construction sites and their solution		
	9.3 Safety in civil engineering works		
	9.4 Site management, Daily report , communication with HO.		
	9.5 Workman’s Compensation act		
	9.6 Minimum wages act		
	9.7 Car policy		
	9.9 Drawings, advance copies and GFC drawings etc		
	9.10 Completion of works		
Total	48	80	

PRACTICALS AND TERM WORK:

Term Work consists of the following:

- Visit to three construction project sites
- Writing report in brief on above visits
- Developing daily report format
- Developing site layout for various phases of construction project.
- Writing critical notes on various acts.

6 IMPLEMENTATION STRATEGIES (PLANNING):

1. Teaching Plan
2. Visit to site
3. Slide show

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	TTTI Madras	Elements Of Construction Management	2 nd	1983	Oxford University Press , Madras
2.	K N Vaid	Construction Safety and Management	1st	1988	NICMAR Publication
3.	K K Chitkara	Construction Project Management	1 st	1999	Tata McGraw Hill

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS :

COURSE: Civil Engineering

SEMESTER: VI

SUBJECT: **Mass Rapid Transport Systems**

CODE: 120120

Group : A

2. TEACHING & EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
2	--	--	-	2	3	80	20	80	--	--	--	100	A	202

3.0 RATIONALE

This subject intends to give knowledge and awareness of various types of rail and bus rapid and other transportation systems adopted worldwide particularly developed and developing countries.

4.0 OBJECTIVE

To make student aware and understand various terms and new systems related to MRTS (Mass Rapid Transport Systems).

5.0 DETAILED CONTENTS

SN.	Contents	Hours	Mrks
Section-I			
1.	Present scenario of transportation systems	02	05
2.	Need of MRTS in metro and mega cities	02	05
3.	Metro rails and mono-rails	06	16
4.	BRTS. Bus rapid transport systems, concept	02	05
5.	Infrastructure related to MRTS	04	09
Section-II			
6.	Project management of MRTS projects, feasibility, safety	10	20
7.	New modes like skywalks, station traffic control systems	02	10
8.	Linkages, Trans harbour links, links road, FOBs, common ticketing, point to point services	02	05
9.	Govt. initiatives for private sector to participate in MRTS and projects	02	05
Total		32	80

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Industrial Visits

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Vazirani N N	Transportation Engineering	3 rd	1977	Khanna Publisher
2	Popacostas C S`	Transportation Engg and planning	3 rd	2008	Prentice Hall of India

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course: Civil Engineering.

Semester: VI

Subject: **Mechanics of Structures**

Code : 120121

Group: C*

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
4	--	--	-	4	3	80	20	80	--	--	--	100	C*	404

3. RATIONALE:

Subject is a pre-requirement to the design subjects of Civil Engineering Structures. The understanding of behaviors of various structural elements like beams, columns, slabs, etc., under the load conditions are essential.

4. OBJECTIVES:

Students will be able to:

- 1) Analyse the structure for Flexure, shear, deflection, etc.
- 2) Analysis the stability conditions of water and earth retaining structures.
- 3) Compare and distinguish between elastic and plastic (inelastic) methods of analysis in structures and introductory knowledge of plastic analysis.

5. DETAILED CONTENTS:

SN	Topics	Periods	Marks
	SECTION -I		
1	1.0 Columns & Struts 1.1 Definition, types of end conditions for column, classification of column, 1.2 Buckling of axially loaded compression member, effective length, radius of gyration, slenderness ratio 1.3 Euler's theory and Rankine's theory assumptions, buckling loads, factor of safety, safe load application of Rankine's and Euler theory, designing solid circular or hollow circular sections	8	10
2	2.0 Stresses in plane (pin jointed) frames 2.1 Introduction, Types of frames, perfect and imperfect frames, relation between joint and member, condition for perfect frame. 2.2 Analysis of Forces in perfect frames 2.3 Method of joints, Methods of sections. Graphical method	8	10

SN	Topics	Periods	Marks
3	3.0 Dams and Retaining Walls: Water retaining structures: 3.1 Rectangular dams. Trapezoidal dams having water face vertical as well as battered. 3.2 Stability conditions of a dam section 3.3 Minimum base width of a dam. Maximum height of a dam. 3.4 Earth retaining masonry structures. 3.5 Application only of Rankine's theory of earth pressure. Active and passive earth pressure. Earth Retaining walls: 3.6 With earth retaining face vertical or battered. (No surcharge to be considered in all these cases). 3.7 Stability conditions of retaining walls. 3.8 Minimum depth of foundation by Rankine's theory.	8	10
4	4.0 Plastic Theory : 4.1 Introduction to advanced developments in 'Structural Engineering analyses such as plastic theory, Limit design. 4.2 Elastic load and Collapse load, Yield(collapse) stress distribution across the section, formation of plastic hinge, load factor, plastic moment in a section, 4.3 Equal area axis, plastic section modulus, shape factor of sections used in structures. 4.4 Application of plastic theory to simply supported beams, propped cantilevers, fixed beams, simple problems.	8	10
<u>SECTION – II</u>			
5	5.0 Slope and deflection : 5.1 Introduction, Relation between slope, deflection and radius of curvature. Slope and deflection at a point in a beam. 5.2 Macaulay's method for combination of loads in beams. 5.3 Moment area method for slope and deflection.	6	10
6	6.0 Fixed beams : 6.1 Introduction, Advantages of fixed beams. 6.2 Fix end moments for fixed beam with (a) point load, (b) UDL over whole / partial span, (c) Combination of loads. 6.3 Bending moment and Shear force diagrams 6.4 Application to R.C.C. beams.	8	10
7	7.0 Continuous beams : 7.1 Introduction, Clapeyron's theorem of three moments, proof. 7.2 Application of theorem to continuous beams for combination of loads with a) simply supported ends b) fixed end supports c) end span overhanging. 7.3 Bending moment and Shear force diagrams	8	10
8	8.0 Moment Distribution Method 8.1 Introduction. Sign conventions, Carry over factor, Stiffness factor and Distribution factor. 8.2 Application of moment distribution method to various types of Continuous beams. 8.3 Application to the symmetrical non-sway portal frames	10	10
TOTAL		64	80

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Lectures are conducted as per teaching plan and tutorials in the class.

7. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	R.S. Khurmi	Theory Of Structures	Revised	Latest	S.Chand & Co. New Delhi
2	R.S. Priyani	Theory Of Structures	-do -	- do -	-
3	Vazirani & Ratwani	Analysis of Structures Vol. II	-do -	- do -	Khanna Publishers New Delhi
4	S. B. Junnerkar & Advi	Mechanics of Structures	-do -	- do -	Charotar Pub. House
5	S. Ramamrutam	Theory of Structures	-do -	- do -	Dhanpat Rai Publishing New Delhi

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course: Civil Engineering.	Semester: VI
Subject: #Quantity Surveying Estimating & Valuation.	Code : 120122
Group : A*	

TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	4	--	-	7	3	80	20	80	50@	--	50**	200	A*	347

3. RATIONALE:

This subject has a strong linkage with proper supervision of construction work mainly because of its relation to work specifications and planning and execution of site activities like stacking of material, ordering of equipment and materials, arranging for skilled and semiskilled labour needed on site, preparing bills for payment of work already completed etc.. The subject of estimating and costing is therefore very important as far its strong relevance to the actual job of a site supervisor engineer is concerned.

4. OBJECTIVE:

Students will be able to:

- (1) Prepare the quantity & cost Estimate.
- (2) Analyse the rates.
- (3) Write the specifications.
- (4) Check the quality as per laid specifications.

5. DETAILED CONTENTS:

Sr. No.	Topics SECTION - I	Periods	Marks
1	1.0 Types of Estimates: 1.1 Approximate and detailed. 1.2 Necessity and use of Approximate estimate. 1.3 Methods of approximate costing for various Civil Engineering works like building, roads, bridges, water supply and sanitary engineering and irrigation.	05	10
2	2.0 Detailed Estimates: 2.1 Detailed estimate; necessity and use. 2.2 Prerequisites for preparing a detailed estimate. 2.3 Units of measurements. Number, length, area and volume.	10	20
3	3.0 Mode of Measurement as per IS 1200: 3.1 Consideration underlying the selection of a unit for any item. 3.2 Standard modes of measurement, as per IS 1200.	05	04
4	4.0 General Principles of working out quantity: 4.1 Taking out quantities (P.W.D. method).	02	06
	SECTION - II		

5	5.0 Knowledge of Measurement and Abstract sheets: 5.1 Measurements sheets, abstract sheets: 5.2 Methods of writing, measurements of items. Abstract and bill of quantities.	05	08
6	6.0 Specifications and conditions: 6.1 Definition and purpose. 6.2 Principles of writing specifications. 6.3 Standard specification and Hand book specification of important items.	05	10
7	7.0 Rate analysis: 7.1 Definition. 7.2 Factors affecting the cost per unit of items such as materials, transport, labour, equipment etc, Schedule of rates. 7.3 Lump sum provisions, contingencies, job items. Overhead costs. 7.4 Rate analysis for important items of work of Civil Engineering.	10	11
8	8.0 Valuation and Depreciation: 8.1 Value and valuation. 8.2 Book value, Market value. 8.3 Salvage value and scrap value. 8.4 Reproduction cost. 8.5 Capitalized value. Year's purchase. 8.6 Gross yield, outgoings, net yield. Land and land tenures. 8.7 Valuation of property from life and yield.	06	11
	Total	48	80

Term work:

The term work shall comprise exercise from amongst the following:

- A Taking out quantities and preparing estimates of
- 1 Single storied residential building (preferably with pitch roof And flat roof) (R.C.C.Structure)
 - 2 Preparing detailed estimates of a new WBM road.
 - 3 Preparing detailed estimates (any two of the following)
 - a) Load bearing structures
 - b) Septic tank.
 - c) Pipe culvert
 - d) Slab culvert
 - e) Percolation tank- earth work.
- B Analysis of rate of any two items from each of the above estimates.
- C Valuation report (Rental method valuation)

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Site Visits

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	B.N. Datta	Estimating & Costing	16 th	1980	S.Datta & Co. Lucknow
2	M. Chakraborti	Estimating & Costing	10 th	1980	M. Chakraborti Calcutta
3	S.C.Rangawala	Estimating & Costing	14 th	2012	Charotar
4	G.S.Birdi	Estimating & Costing	Latest	2014	Dhanpat Rai
5	Gangrade	Estimating & Costing	1 st	2013	S. Chand

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 4 out of 6	16	-	-	Any 1 out of 2	04
2.	Any 1 out of 2	12	-	-	Any 2 out of 4	16
3.	Any 1 out of 2	12	-	-		
4.	-	-	Any 4 out of 6	16	-	-
5.	-	-	Any 1 out of 2	12	-	-
6.	-	-	Any 1 out of 2	12	-	-

1.0 SUBJECT DETAILS:

Course: C/ME/EE/IE/P/CH/DE	Semester: VI
Subject: Stress Management	Code: 120025
Group: M	

2.0 TEACHING AND EXAMINATION SCHEME:

Teaching Scheme				Exam Scheme & Maximum Marks							
TH	T	PR	CR	PAPER HRS.	TH	No. of paper	SSL	PR	OR	TW	TOTAL
-	-	02	02	-	-	-	-	-	--	-	-

3.0 RATIONALE:

This subject is designed to provide overview of Yoga, Meditation, Art of Living, Stress Management and Spiritual Power in human being as support Engineer to achieve Auxiliary skill.

4.0 OBJECTIVES:

Students will be able to

1. Gain knowledge about the basic technique and practice of yoga, including instruction in Breath control, meditation, and physical postures.
2. Develop physical competency and mental concentration.
3. Gain an intellectual and theoretical understanding of the principles embodied in the Yoga Sutras,
4. Increase efficiency, concentration, inner power and enhance the spiritual power for improving Learning Skill.

5.0 CONTENTS:

Hrs.

1. HISTORICAL BACKGROUND AND YOGA

10 LEARNING

- i) Yoga in Vedas
- ii) Yoga and its Principles
- iii) Consciousness
- iv) Yoga approach and Scientific view
- v) Pranayama: Breath Control, Breath and Postures, Rhythmic Breathing
- vi) Controlling the Body, Mechanism of Body: Kriyas and its high Therapeutic value.
- vii) Body as understood in its frame work systems and structure: Asanas – Cultural and Relaxation
- viii) Muscles strength, Muscular coordination strength of Immune system
- ix) Relation and Reflection techniques Shavasana – Shakshi Bhavanam.
- x) Bandhas and Mudras.
- xi) Depth of perception and expansion of awareness
- xii) Gross level – Muscular stretches
- xiii) Subtle level – Respiration changes and normalizing breath

Asanas -

2. MEDITATION AND ITS TECHNIQUES:

10

Meditative postures and kinds of Meditation

Bodily Benefits – Lower Blood Pressure ,lowers the levels of blood lactate, improves the immune system, increases body vitality, controls insomnia and increases overall health of the body

Violence Free Society – Meditation develops happiness, contentment and calmness. When increasing number of people practice meditation, it has a calming effect on the environment. This is a potent way to achieve a violence free society.

Mental Benefits – Emotional stability, anxiety decreases, anger reduces, happiness increases, and intuition develops clarity and peace of mind, induces ability to focus, and reduces tension and fear.

Value Based Society – The effects of meditation include happiness, respect for the environment and others, appreciation of diversity in nature, a strong sense of social values. These qualities an individual level, helps develop a value based social system.

Spiritual Growth – Consciousness evolves, meditation brings harmony in creation, personal transformation, realization of SELF

Trusting, Happy and Content Society – These are the objectives of any society. Meditation empowers a society to achieve these qualities.

3. ART OF LIVING 08

1. Sudarshan Kriya
2. Life Skills
3. Ancient Wisdom
4. Practical knowledge to deal with the daily challenges of life
5. Interactive exercises
6. Dealing with your emotions
7. Improving Communication skills and Relationship

4. STRESS MANAGEMENT FOR STUDENTS 04

Stress management techniques:

1. Time management techniques
2. Organization techniques
3. Create a study environment
4. Memorization techniques
5. Be an Optimist
6. Sleep Well
7. Study Techniques

6. IMPLEMENTATION STRATEGY AND PRACTICE SKILL

1. The students will be performing practice sessions covering above topics.
2. Live demonstration along with content delivery sessions will be conducted.
3. The lecture room/ Hall separately will be assigned batchwise as per Time Table for Male (Boys) and Female(Girls) as where an applicable depending upon relevant topics.
4. The materials/ Items required example Yoga Matt/ Chatai/corresponding matt / towels / chadar are to be brought by students only for particular topics.

7.0 BOOK LIST:-

1. The Yoga Sutra of Patanjali M.R.Yardi, Bhandarkar Oriental Research Institute, Pune
2. Indian Philosophy by Dr. S. Radhakrishnan
3. Introduction to Indian Philosophy by Dutta & Chatterji
4. Outlines of Indian Philosophy by Hiriyanna.

8.0 Book for reference

1. The Yoga system of Patanjali, James, Houghton , wood.
2. Yoga a sutras of Patanjali – Sadhana pada with Exposition of Vyasa
3. Light of Yoga (on Yama – Niyama) by B.K.S. Iyenger, Iyenger Institute Pune
4. Hatha Yoga Pradeepika – Yogi Swatmarama
5. Science of Yoga by I.K.Taimini

9.0 WEB REFERENCES:

1. <http://www.artofliving.org>
2. <http://www.bkwsu.org>
3. <http://www.theyogainstitute.org>
4. <http://www.managingstress.com>

The above subject will be taken by concerned expert in the field/ relevant to performance / performing practices, 02 credits are equivalent to (02 hours) practice session. Attendance and performance is mandatory for granting the term and earning the credits as per attendance rule.

1. SUBJECT DETAILS :

Course : Diploma in Civil Engineering	Semester : VII
Subject: # Civil Engineering Project	Code: 120123
Group: A*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
0	7	-	-	7	-	--	--	--	50@	-	50**	100	A*	077

3. RATIONALE:

The purpose of introducing Project is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics selected and group discussion are planned in a semester so that there will be increased participation of students in learning process. It will enhance the co-ordination abilities in a student and the capability to work in a team.

4. OBJECTIVES:

After developing a project the students will be able to:

1. Acquire information from different sources and through literature survey and identify thrust areas
2. Prepare proposal for project
3. Prepare notes for given topic.
4. Present given topic in a seminar.
5. Interact with peers to share thoughts.
6. To present the work at various milestones achieved.
7. To write the Project Report

The project work aspect of learning has objective to inculcate all the cognitive skills amongst students such as : Knowledge Comprehension, Application, Analysis, Synthesis, Problem Solving, Evaluation, Psychomotor Skills, learning to learn skills, Communiation Skills, Interpretation Skills and Affective domain like Attitude and Values.

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject: #Design Practice of R.C.C. Structures.	Code: 120124
Group : C*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	-	4	-	7	3	80	20	80	50@	-	50**	200	C*	347

3. RATIONALE:

Concrete and Reinforced Concrete are the most popular construction material. The design of reinforced cement concrete is a major step before construction. The knowledge of this subject will enable the students to design the R.C.C. structural elements and to prepare the detailed drawing.

4. OBJECTIVES:

After the completion of teaching learning process for syllabus of the subject, the students will be able to :

1. Compute the dead load and live load on the structures.
2. Analyses the structural elements for the internal stresses.
3. Design the structural elements for collapse, serviceability and durability.
4. Reinforcement detailing and drawings.

5. DETAILED CONTENTS:

Sr.No.	Topics	Period	Marks
	SECTION-I		
1	1.0: Introduction to Limit State Method of Design: 1.1 Introduction to design methods, limit state method, working stress method, properties of materials, grades of concrete, reinforcing steel 1.2 Characteristic Strength of Materials, Characteristic Loads, Design values of materials and loads, Partial safety factors for materials and loads, 1.3 Loading on structures as per IS 875(Part 1 and 2) : 1987 1.4 Safety and serviceability requirements, Types of limit states 1.5 Environmental Exposure Conditions, Minimum Cement Content, Maximum Water - Cement Ratio, Minimum Grade of Concrete for Different Exposures, Nominal Cover to	3	5

Sr.No.	Topics	Period	Marks
	Meet Durability Requirements		
2	2.0 Limit State of Collapse : Flexure: 2.1 Assumptions, design, stress block parameters, Idealized stress – strain curves, Limiting values neutral axis depth, 2.2 Modes of failure, under reinforced, over reinforced and balance section, Neutral axis, 2.3 Moment of resistance of singly reinforced rectangular section, design of singly reinforced section, 2.4 Requirements regarding spacing of reinforcement, minimum and maximum reinforcement, lapping of reinforcement.	6	8
3	3.0 Limit State of Collapse : Flexure: 3.1 Moment of resistance of doubly reinforced rectangular section, design of doubly reinforced section,	4	8
4	4.0 Limit State of Collapse : Flexure: 4.1 Effective width of flange, Moment of resistance of singly reinforced flanged section (T and L), design of singly reinforced flanged section (T and L) section, 4.2 Requirements regarding spacing of reinforcement, minimum and maximum reinforcement, lapping of reinforcement.	6	8
5	5.0 Limit State of Collapse : Shear 5.1 Nominal Shear Stress, Design Shear Strength of Concrete, Design of shear - reinforcement, bent - up bars, stirrups, Minimum Shear Reinforcement, Detailing.	2	5
6	6.0 Limit State of Collapse : Bond & Anchorage : 6.1 Development of Stress in Reinforcement, Development Length of Bars, Design bond stress, Anchoring Reinforcing Bars, Anchorage value of standard hooks and bends, lapping of bars.	2	4
7	7.0 Limit state of serviceability: 7.1 Control of Deflection, Basic and modified values of span to depth ratio to satisfy deflection limit. 7.2 Crack control in design (No calculation of crack width)	1	2
	SECTION-II		
8	8.0 Design of slab (LSM): 8.1 Classification of slab, effective span, 8.2 Design and detailing of One-way slab, 8.3 Design and detailing of one way continuous slab (B.M and S.F. calculation from IS – B.M. & S.F. Coefficients), 8.4 Design and detailing of Two way slab with corner free.	4	7

Sr.No.	Topics	Period	Marks
	8.5 Design and detailing of dog-legged stair case.		
9	9.0 Design of beam (LSM): 8.1 Beam Sizing, computation of loads, analysis, design of simply supported beams, drawing and detailing, 8.2 Computation of loads on lintel, design of lintel, drawing and detailing.	4	7
10	10.0 Column (WSM): 10.1 Definition, classification - Short and Slender Columns, unsupported length, effective length, slenderness limit, 10.2 Minimum cover, requirement governing reinforcement and detailing, 10.3 Transverse reinforcement, Transverse reinforcement design, Arrangement of transverse reinforcement, Helical reinforcement, 10.4 Design of axially loaded square, rectangular and circular columns by WSM (No design for increased load on the column on the strength of the helical reinforcement).	4	6
11	11.0 Footing: 10.1 SBC and Size of isolated square and rectangular footing, edge thickness, Moments and Forces, Critical section for BM, Shear, Two way shear and development length, 11.2 Design of isolated footing (LSM), footing, design for flexure and shear. (No sloped footing).	4	8
12	12.0 Retaining wall : 12.1 Design of retaining wall, dimensioning of Tee shaped cantilever retaining wall level top (no surcharge and design of stem only. (Stability check is excluded).	4	8
13	13.0 Pre-stressed Concrete: 12.1 General principles, Concentric and eccentric tendons, Parabolic tendons (No design) 12.2 Pre-tensioning and post tensioning, Freyssinet system, Magnel Blaton System, Gifford Udall System	4	4
	Total	48	80

Term work:

The term work shall comprise of exercises from amongst the following containing journal (containing design calculations) and Minimum 4 drawing sheets – Half Imperial size).

1. General notes
2. Design and detailing of R.C.C. beam,
3. Design and detailing of Slabs (simply supported one way and continuous).
4. Design and detailing of an axially loaded R. C. Column and column footing.
5. Design and detailing of a simple R.C. dog legged staircase

6. Design and detailing of R.C. Cantilever retaining wall retaining earth level to the top.
7. Introduction to Ductile detailing as per IS 13920 : 1993

There will be an oral examination on the above term work, at the end of the term.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Use of visual aids

7. REFERENCE BOOKS :

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	S. Ramamurtham	Design of RCC Structure	10 th	1985	Dhanpat Rai & Sons
2	Shah & Kale	RCC Theory & Design	Latest	Latest	-
3	Dayaratnam P.	Design of RCC Structures	2 nd	1996	Tata McGraw Hill New Delhi
4	Ramchandra	Design of R.C.Structures	-	1985	Dhanpatrai & Sons Co.
5	S. Ramarutam	Prestressed Concrete	2 nd	1985	Dhanpatrai & Sons Co.
6	N. Krishna Raju	Prestressed Concrete	3rd	1995	Tata McGraw Hill

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 4 out of 6	16	-	-	Any 1 out of 2	04
2.	Any 1 out of 2	12	-	-	Any 2 out of 4	16
3.	Any 1 out of 2	12	-	-		
4.	-	-	Any 4 out of 6	16	-	-
5.	-	-	Any 1 out of 2	12	-	-
6.	-	-	Any 1 out of 2	12	-	-

1. SUBJECT DETAILS:

Course: Civil Engineering

Semester: VII

Subject: **Engineering Geology**

Code: 120125

Group : C

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	-	-	-	3	3	80	20	80	--	-	--	100	C	303

3. RATIONALE

This subject intended to teach the student the basics about Engineering Geology.

4. OBJECTIVE

The students will enable to identify type of rock encountered in foundation strata at site, interpret soil investigation report and understand nature properties and SBC of rock.

5. DETAILED CONTENT

SN.	Topics	Periods	Marks
1.	1.0 General : 1.1 Brief history of formation of earth and earth crust 1.2 Relationship of geology to Civil Engineering (Introduction)	06	04
2.	2.0 Physical Geology : 2.1 Natural agencies such as wind, running water, sub surface water, lakes, oceans, glaciers, organisms, volcanoes, earth quakes, etc. taking part in changing the surface of the earth	06	15
3.	3.0 Structural Geology : 3.1 Faults, folds, anticlines, synoclines, domes, etc.	06	15
4.	4.0 Mineralogy, Petrology and Economic Geology : 4.1 Study of minerals 4.2 Study of rocks 4.3 Economic mineral deposits 4.4 Outlines of Indian stratigraphy	06	06
SECTION 2			
5.	5.0 Engineering Geology : 5.1 Earthquakes 5.2 Geological investigations 5.3 Geology of dam sites, reservoirs, roads, bridge sites	04 04	08 08

	and tunnels (broad out lines)	06	08
	5.4 General : Stability of hills slopes, landslides, their causes and precautions against them	06	08
	5.5 Improvement of site	04	08
	Total	48	80

Term Work :

1. Study of different types of rock samples
2. Sketches of different types of rock and strata

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Site Visit

7. REFERENCE BOOKS

SN.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	Parbin Singh	Engineering & General Geology	Latest	Latest	-
2.	R. B. Gupte	Engineering Geology	Latest	Latest	-

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject: #Environmental Engineering II	Code : 120126
Group : A*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
3	2	-	-	5	3	80	20	80	50@	-	50**	200	A*	325

3. RATIONALE:

Wastewater treatment process, the goal of primary, secondary and tertiary effluent treatment is to reduce or remove organic matter, solids, nutrients, disease-causing organisms and other pollutants from the treated wastewater before it is discharged to a body of water. In addition to disinfectants, other chemicals are sometimes added during the treatment process to help settle out or strip out nutrients including phosphorus or nitrogen. Therefore its essential to make the awareness of wastewater treatment process and other aspects of wastewater before it is discharged to a body of water

4. OBJECTIVES:

Students will be able to understand

- (1) Various primary, secondary and Tertiary treatments
- (2) Effluent discharge standards
- (3) All the processes from collection, conveyance till safe disposal of sewage

5. DETAILED CONTENTS:

Sr. No	Topics	Hours	Marks
1	SECTION-I 1.0 Introduction	02	04
	1.1 Sanitation, importance of sanitation, principles of sanitation 1.2 Definition of technical terms like bacteria, refuse, sewerage, sewer, garbage, sewage, sullage, storm water.		
2	2.0 Collection and Conveyance of Refuse : 2.1 Methods of carrying refuse, conservancy and water carriage system 2.2 Systems of sewerage, separate, combine and partially separate system 2.3 selection of system of sewerage	04	08

	2.4 Refuse collection patterns		
3	3.0 Quantity of Sewage 3.1 Dry weather flow, storm flow, 3.2 Construction of sewers, materials of sewers, shapes of sewers, joints in sewers, laying and testing of sewers ventilation of sewers, cleaning and maintenance of sewers, surface drains. (No numerical on design of sewers)	06	10
4	4.0 Sewer Appurtenances 4.1 Catch basins and clean outs 4.2 Drop manholes 4.3 flushing tanks, grease and oil traps 4.4 Types of traps, Flushing cisterns etc. 4.5 inlets, inverted siphon, lampholes, manholes, etc.	06	08
5	5.0 House Drainage 5.1 traps, classification of traps, Requirements of good traps, 5.2 Sanitary fittings 5.3 system of Plumbing, single stack, one pipe, two pipe, one pipe partially ventilated.	06	10
	SECTION-II		
6	6.0 Quantity of Sewage: 6.1 Analysis of sewage 6.2 Physical tests like colour, taste and odour, temperature, turbidity 6.3 Chemical tests like chlorine, fats grease and oil, nitrogen, oxygen, pH value, total solids, 6.4 Bacteriological tests 6.5 Natural methods of sewage disposal by dilution and by land treatment. 6.6 Self purification of natural waters 6.7 Sewage sickness	04	08
7	7.0 Treatment of sewage 7.1 Primary Treatment, secondary treatment and disinfection 7.2 Primary treatment, screening, disposal of screenings, grit chambers, detritus tank, plain sedimentation tanks, classification of sedimentation tanks 7.3 Filtration of sewage, contact beds, intermittent sand filters, trickling filters, miscellaneous filters, 7.4 Activated Sludge Process, methods of aeration, sludge bulking,	08	16
8	8.0 Sludge Disposal 8.1 Methods of sludge disposal like land disposal, distribution	06	10

	by pipe line, drying on drying beds, dumping into the sea, heat drying, incineration, lagooning or ponding, press and vacuum filters, digestion followed by drying, sludge gas		
9	9.0 Miscellaneous Treatment 9.1 Cesspool, chlorination of sewage, imhoff tanks, oxidation ponds, septic tanks, 9.2 night disposal without water carriage like aqua privy, bore hole privy etc.	06	6
	Total	48	80

TERM WORK

- The students should prepare a sketch book containing 20 sketches on the topic mentioned in the syllabus.
- This will consists of a report on the visit to the Sewerage treatment plant.
- There will be practical examination consisting of sketching and oral based on the term work.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Visit to sewage treatment plant
3. Slide show

7. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	S.K. Garg	Water Supply & Sanitary Engineering.	3 rd	1984	Khanna Publisher New Delhi
2	Gharpure V.N.	Water Supply & Sanitary Engineering	5 th	1986	Engg. Books Pub.Co. Pune
3	Deodhar/Pachauri/ Gokhale	Environment Engineering Systems	1 st	1997	Vrinda Publication Jalgaon
4	K.N.Duggal	Elements of Environmental Engineering	6 th	2002	S.Chand & Co. New Delhi
5	S.C.Rangwala	Water Supply & Sanitary Engineering	14 th	1999	Charotar

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject: # Water Resource Engineering	Code : 120127
Group : A*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
4	-	2	-	6	3	80	20	80	50@	-	50**	200	A*	426

3. RATIONALE:

There are three sectors, Agricultural, Manufacturing and Service Sector. With globalization through India, Agricultural sector is the major and plays vital role in the economy of the country. Civil Engineer must possess basic knowledge of this subject.

4. OBJECTIVE:

This subject is intended to teach the student fact, concepts principles and procedure for medium size irrigation projects.

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
	SECTION-I		
1	1.0 Importance of Irrigation: 1.1 Irrigation : Definition, necessity, advantages and disadvantages, classification of irrigation systems, Methods of Irrigation.	06	10
2	2.0 Soil Water Plant Relationship 2.1 Water Holding Holding Capacity of soil, Classification of soil water,	02	04
3.	Hydrology and Ground water Hydrology 3.1 Hydrological Cycle, Precipitation, Measurement of precipitation, Methods of calculating average depth of Rainfall of Rainfall over an area, Arithmetic mean, Isohyetal and Thiesson's Polygon method 3.2 Runoff, Factors affecting Runoff, Hydrograph, Unit Hydrograph. 3.3 Definitions of aquifer, aquiclude, aquifuge, aquitard 3.4 Types of Aquifers, Confined, Semi-confined, Unconfined and Perched aquifers	10	12

	3.5 Wells , definitions, types, open wells, bore holes, Strainer type tube wells, Cavity type tube wells and Slotted type tube wells		
4	4.0 Water Requirements of Crops 4.1 Crops, their seasons, duty and delta, factors affecting duty of water, kor watering, kor period, kor depth, time factor, capacity factor, cumec day, relation between duty and delta 4.2 Methods of Improving Duty of water, Commands areas and Intensity of Irrigation, Consumptive use of water, Assessment of Irrigation water. 4.3 Problems on estimation of demand of water for a given Crop pattern, calculating reservoir capacity, design discharge etc	10	09
5	5.0 Reservoir Planning 5.1 Introduction, Classification of reservoirs, factors governing selection of site for reservoir 5.2 Zones of Storage in Reservoir, Useful storage, Dead storage, Surcharge storage, Bank Storage, Valley storage 5.3 Apportionment of total cost of a Multipurpose Reservoir, Equal apportionment method, Use of Facilities method, Alternative Justifiable expenditure method, Remaining Benefits method. 5.4 Measures to Reduce Evaporation Losses in Reservoirs 5.5 Control of Sedimentation of Reservoirs	04	05
	SECTION-II		
6	6.0 Dams 6.1 Classification of Dams based on Function, Hydraulic Design, Materials of Construction, Structural Behavior. 6.2 Factors affecting Selection of type of Dam, Site selection for Dam. 6.3 Salient features of Important Dams of India (Students to prepare a report of the same, No questions to be asked) 6.4 Forces acting on Gravity Dam 6.5 Theoretical and Practical profile of Gravity Dam 6.6 Openings in Dams, Waterways and Galleries, Classification of Galleries, Foundation gallery, Drainage gallery, Gate gallery, Grouting gallery, Inspection gallery 6.7 Adits, Vaults and Shafts	06	08
7	7.0 Embankment Dams		
	7.1 Definition and types of Earth Dams, Rolled fill, Hydraulic fill and semi-hydraulic fill dam 7.2 Causes of Failure of Earthen Dams, Hydraulic, Seepage and Structural failures, piping and sloughing failure	06	07

	7.3 Component parts of a Earthen Dam in Cross Section and their functions		
8	8.0 Spillways and Energy Dissipators 8.1 Definition, Essential requirements of a spillway 8.2 Classification of Spillways 8.3 Free overfall or straight drop spillway, ogee spillway, Chute or open channel or trough spillway. 8.4 Side channel spillway, shaft or morning glory spillway, Conduit or tunnel spillway, and siphon spillway 8.5 Definition of Energy dissipators, its functions.	06	07
9	9.0 Canals 9.1 Definition, Classification based on source of supply, function, discharge and relative importance, alignment, financial output, soil through which it is constructed, 9.2 Alignment of canal, factors affecting the alignment. Inundation canal (No problems to be asked on design of Canal) 9.3 Lining of Canal, advantages of lining, requirements of lining, and various types of lining 9.4 Fall and Escapes, Definition Diversion Head Works 9.5 Weir and Barrages, definition and types 9.6 Diversion Head Works, its component parts like Divide wall, Fish ladder, Silt excluder, under sluices, head regulator, guide bunds, marginal bunds, approach channel etc 9.7. Bandhara Irrigation 9.8 layout, selection of site for Bandhara 9.9 Phad and Block System of Irrigation	10	12
10	10.0 Cross Drainage Works 10.1 definition, types, aqueduct, siphon aqueduct, super passage, level crossing, inlet or inlet and outlet	04	06
	Total	64	80

TERM WORK:

Term work will consist of a set of 4-6 drawings (Imperial size) on irrigation structures like canals, earthen dams, spillways, cross drainage works, diversion head works etc.

Detailed design of structures like storage dams, weirs and cross drainage works are not expected from students; such details may be supplied to students.

There will be a practical examination consisting of sketching and oral based on the drawings prepared as above.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Site visits
3. Use of audio visual aids/ models

7. REFERENCE BOOKS:

Sr. No	Author	Title	Publisher
1	S.K Garg.	Irrigation Engineering & Hydraulics Structures	Khanna Publications
2	Priyani	Irrigation Engineering	Charotar Publications
3	B.C. Punmia.	Irrigation Engineering & Hydraulic Structures	Laxmi Publications
4	Dr.P.N.Modi	Irrigation Water Resources & Water Power Engg	Standard Book House
5	Muzumdar	Irrigation Engg	Tata McGraw Hill
6	A.Benani	Irrigation Engg	Aoften Michlow Ltd Israel
7	R.K.Sharma T.K.Sharma	Irrigaiton Engg.	S. Chand

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject: # Environmental Pollution & Control	Code : 120119
Group : A*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
4	-	2	-	6	3	80	20	80	50@	-	50**	200	A*	426

3. RATIONALE:

With globalization through India all the sector have tremendous growth with respect to the advancement in the technology. With this advanced technologies the pollution has also been observed to be propagated with the higher speeds. Therefore the need of sustainable development cropped up. Before moving ahead to the sustainable development Civil Engineer must possess basic knowledge of various environmental pollutions and the different acts and bodies governing the same.

4. OBJECTIVE:

This subject is intended to teach the student fact, concepts principles and procedure different pollutions and their control measures.

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
	SECTION-I		
1	Environmental Pollution Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution(D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards	10	14
2	Soil WasteManagement: Causes, Effects and Control Measures of Urban and Industrial Wastes – Role of anIndividual in Prevention of Pollution – Pollution Case Studies – disaster Management:-	10	14

	Floods, Earthquake,Cyclone and Landslides. Field Study of Local Polluted Site – Urban/Rural/Industrial/Agricultural		
3.	SOCIAL ISSUES AND THE ENVIRONMENT From Unsustainable To Sustainable Development – Urban Problems Related To energy – Water conservation, Rain Water Harvesting, Watershed Management – Resettlement and Rehabilitation of People,Its Problems and Concerns, Case Studies	12	12
	Section-II		
4	Environmental Ethics:- Issues and Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer De pletion, Nuclear Accidents and Holocaust,Case Studies – Wasteland Reclamation – Consumerism and Waste Products – .	12	14
5	Environment ProductionAct – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues Involved in enforcement of EnvironmentalLegislation – Public Awareness	10	14
6.	Water Resources:- Use and Over Utilization of Surface and Exploitation,Environmental Effects of Extracting and Using Mineral Resources,	10	12
	Total	64	80

TERM WORK:

Term work will consist of case studies of Environmental pollution and Practical based on measurement of pollution level.

6. IMPLEMENTATION STRATEGY (PLANNING) :

4. Teaching Plan
5. Site visits
6. Use of audio visual aids/ models

7. REFERENCE BOOKS:

Sr.No	Author	Title	Publisher
1	Masters, G.M	Introduction to Environmental Engineering and Science	Pearson
2	Townsend C., Harper, J. and Begon, M	Essentials of Ecology”, Blackwell Science	Blackwell Science,
3	Miller, T.G. Jr	Environmental Science	Wadsworth Pub. Co
4	Trivedi, R.K., and Goel, P.K	Introduction to Air Pollution	Techno- Science Publications.

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject: #Project Engineering Management & Contract Administration	Code: 120128
Grade : M*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
4	2	-	-	6	3	80	20	80	50@	-	50**	200	M*	426

3. RATIONALE:

- (1) This subject intends to equip the students with concept and principles of project planning and scheduling. It also intend to prepare the students use various methods for project planning and scheduling.
- (2) Any organisation promoting development of project has to deal with method of execution, technology of construction and management of people in the organisation. This course describes method of executing works and administration of contract.

4. OBJECTIVE:

- (1) To make student understand project, its parameters, tools and methods of planning scheduling and controlling project.
- (2) To make student methods of executing works, contract and its administration. Construction safety, arbitration are included to enable him to deal various situations at the projects.

5. DETAILED CONTENT:

Sr. No	Section-I	Marks	Hours
1.	Planning <ul style="list-style-type: none">• Necessity of Planning• Types of Planning : Strategic & Practical Planning, Long Range, Intermediate Range, Short Range Planning• Planning by Management level• Pre-tender, Post-tender Pre-construction and Detailed Construction Planning	04	03
2.	Planning Tools & Techniques <ul style="list-style-type: none">• Bar & Milestone Charts, CPM, PERT, LOB	03	02
3.	Network Techniques <ul style="list-style-type: none">• Brief Historical Development, basic elements of network• Event activity, simple logics of network• AOE and AON network, their construction	08	09

Sr. No	Section-I	Marks	Hours
	<ul style="list-style-type: none"> • Probable errors of network • Analysis of network • Critical event, critical path and semi-critical path • Overlapping relationships : Start to start, finish to start and finish to finish relationship • Non-critical activity, float, types of floats • Practical applications of network, compression, decompression, activity utility, time cost trade off 		
4.	Resource Problems <ul style="list-style-type: none"> • Resource allocation, resource smothering, resource leveling, (resource constraint related problems) • Multi project scheduling, time chainage chart histograms • Cost optimization 	06	06
5.	Updating plans, calendaring networks	04	02
6.	PERT <ul style="list-style-type: none"> • Concept of GERT, VERT, etc. 	05	04
7.	Project plans, schedules, budgets, master network. Multi project management	05	02
8.	Use of project management software, concurrent engineering	03	02
9.	Quality control, assurance, TQM, ISO	02	02
	Total	40	32

SECTION II

Chapter	Contents	Marks	Hours
1.0	Different methods of executing works	02	02
2.0	Prequalification and Contracts <ul style="list-style-type: none"> 2.1 Introduction, Invitation of Tenders 2.2 Tender Notices, Tender Documents 2.3 Earnest Money 2.4 Security Deposit 2.5 Preparing & Submitting Tender 2.6 Scrutiny Analysis, Comparative, Weighted Rating 2.7 Acceptance of Tenders 2.8 L.O.I., W.O. and Contract Document 	10	05
3.2	Different types of Contract	03	03

Chapter	Contents	Marks	Hours
	3.1 Lump-Sum, Item Rate, Percentage Rate, Cost Plus Percentage, B.O.T. 3.2 Labour material and sub-contract for services contract		
4.0	Conditions of Contract 4.1 Importance of conditions of contract 4.2 Price adjustment clause 4.3 General conditions such as time limit, extra items, payments to the contractors 4.4 Suspension of work 4.5 Termination of contract 4.6 Liquidated damages, disputes and arbitration 4.7 Various bank guarantees and bonds 4.8 Arbitration Act, 1996, Techno legal arbitration	08	05
5.0	5.0 Contract Act and Important Section	05	04
6.0	6.0 Interpretation of contract 6.1 Delay, Damages, clause in contract 6.2 Various types of disputes and claims 6.3 Alternate dispute resolution mechanism, legal implications	03	02
7.0	7.0 Pitfalls in construction contract	02	03
8.0	8.0 Construction safety, accidents, rate 8.1 Causes of accidents 8.2 Methods to prevent accidents 8.3 Insurance Policy, CAR Policy	03	04
9.0	9.0 Organization Setup and HRD	02	02
10.0	10.0 Civil contractors statutory requirements	02	02
	Total	40	32

Term work:

- CPM & Bar chart preparation
- Use of software (relevant to project management)
- Seminar based on syllabus topics
- Preparing Tender Document
- Notice Inviting Tender
- Comparative Statement and Analysis of Bids

6.0 IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan

2. Case Studies

3. Presentations

7. REFERENCE BOOKS :

SN.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	K. K. Chitkora	Construction Project Planning	1 st	1999	Tata-McGraw Hill Publication, New Delhi
2.	Antill & Woodhead	Critical Path Methods in Construction Practice	Latest	-	John Wiley
3.	Harvis R. B.	Procedure & Arrow Networking Techniques	Latest	-	John Wiley
4.	Peurifoy R.L.	Construction Planning, Equipment & Methods	II	1970	McGraw Hill, Tokyo
5.	Prof. Subhash Patil	Administration of Engineering Contracts	I	1997	3, Nirmal Soc., Gokuldhm, Goregaon (E)
6.	P.M. Deshpande S. V. Joshi	Guide for Drafting Construction Contract & Tendering	I	1997	Hindustan Mudranalay, Pune

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-

1. SUBJECT DETAILS:

Course : Civil Engineering	Semester: VII
Subject : #Soil Mechanics & Foundation Engineering	Code : 120129
Group: A*	

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks		Scheme of Examination						Gr	Scheme L/P/Cr
L	P	D	T	Cr	Hrs	Mks	SSL	Paper	TW	PR	OR	Total		
4	2	-	-	6	3	80	20	80	50@	-	50**	200	A*	426

3. RATIONALE:

This core technology subject intended to teach the students concepts, principles and procedures of Soil Mechanics and Foundation Engineering.

4. OBJECTIVE:

The student will enable him to carry out soil investigations as investigator, supervision of earth work & foundation construction as supervisor and apply this knowledge for planning, designing, supervision, executing and maintaining the Civil Engineering projects.

5. DETAILED CONTENT:

Sr. No.	Topics	Periods	Marks
	<u>SECTION-1</u>		
1	1.0 Introduction, Soil properties and their relationship: 1.1 Weight and volume relationship. 1.2 Other fundamental relationships.	08	10
2	2.0 Consistency of soil: 2.1 Atterberg's limits; their determination.	08	10
3	3.0 Mechanical Analysis: 3.1 Sieve analysis, sedimentation analysis by pipette method and hydrometer method. 3.2 Interpretation of result. 3.3 Classification of soil as per ISS.	08	10

4	4.0 Permeability: 4.1 Darcy's law. 4.2 Factors affecting permeability. 4.3 Methods of measuring permeability, Permeameter.	08	10
	SECTION- II		
5	5.0 Shear strength: 5.1 Introduction to the theory of shear strength of soils. 5.2 Different tests (Direct shear test, unconfined compression test, tri axial test, vane shear test). 5.3 Stability of slopes. Slip circle analysis	06	10
6	6.0 Compaction , Consolidation , Settlement: 6.1 Introduction to the theory of compaction and mechanism of consolidation. 6.2 Standard Proctor and Modified Proctor tests, Field density determinations. 6.3 Consolidation test - determination of coefficients of (i) Consolidation (ii) Compressibility (iii) Volume compressibility. Compression index, Pre compressed pressure.	08	12
7	7.0 Bearing Capacity: 7.1 Shallow and Deep foundations, Pressure bulb. 7.2 Plate load test. - Merits and demerits, effect of size of foundation on bearing capacity and $c-\phi$ soils. 7.3 Improving the bearing capacity.	10	12
8	8.0 Earth Pressure: 8.1 Introduction to theories of earth pressure. 8.2 Effects of back- fill on retaining walls.	08	06
	Total	64	80

Term Work:

The term work shall comprise any six exercises from among the following.

- 1 Determination of specific gravity.
- 2 Sieve Analysis.
- 3 Atterberg's limits.
- 4 Standard Proctor compaction test.
- 5 Modified Proctor compaction test.

- 6 Determination of Permeability.
- 7 Direct Shear test.
- 8 Unconfined Compression test.
- 9 California bearing test.
- 10 Determination of field density.

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Use of visual aids
3. Site visits

7. REFERENCE BOOKS:

Sr.No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	B.C.Punmia	Soil Mechanics & Foundation Engineering.	4 th	1977	Standard Book House, New Delhi
2	Arora	Soil Mechanics & Foundation Engineering	Latest	Latest	-
3	S.K.Garg	Soil Mechanics & Foundation Engineering	Latest	Latest	-
4	S.D.Pathak	Geotechnical Engineering	Latest	1982	T.T.T.I, Bhopal

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 3 out of 5	12	-	-	Any 2 out of 3	06
2.	Any 2 out of 4	12	-	-	Any 2 out of 3	08
3.	Any 2 out of 3	16	-	-	Any 1 out of 2	06
4.	-	-	Any 3 out of 5	12	-	-
5.	-	-	Any 2 out of 4	12	-	-
6.	-	-	Any 2 out of 3	16	-	-