



Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
Vile Parle (West), Mumbai-400 056



Department of **CIVIL ENGINEERING**
Three Years Full Time Diploma with Inplant Training

CURRICULUM
Semester Pattern
(Effective from June' 2016)





Shri Vile Parle Kelavani Mandal`s
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Natakar Ram Ganesh Gadkari Marg,

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CURRICULUM

**THREE YEARS FULL TIME DIPLOMA COURSE
WITH INPLANT TRAINING
IN
CIVIL ENGINEERING
(Aided Semester Pattern)**

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 Maharashtra State 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 03 Year with Inplant Training) w.e.f. June 2016
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 Civil Engineering Department is having mission of tuning students into Engineers, Technologist, Managers & Administrators. Besides teaching, 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 spread over 3 years i.e. VI semesters, 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 and Transportation Engineering. At fourth & fifth semester subjects like water Resource Engineering, Environmental Engineering, Design Practice of RCC Structures, Geotechnical Engineering, Project Engineering Management and Contract Administration are taught before they proceed to final semester i.e. VI semester Inplant Training. Subjects of futuristic areas like MRTS, Building Maintenance Repairs & Services, Urban Renewal are also offered. Subjects are duly classified into Basic, Core, Application & Management & also as compulsory, optional, & award winning subjects. There is structured program of briefing the students at various levels i.e. at the beginning of I semester to know about registration of subjects under MPE&CS & before proceeding for Inplant Training to understand do's & don'ts to be observed during the training. 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
- Compete for admission to courses for higher studies

PRACTICAL TRAINING:

The students receive institutional training for the first five semesters. In the VI semester they undergo Inplant 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.

CIVIL ENGINEERING DEPARTMENT

VISION

TO IMPART NEED BASED EDUCATION AND TRAINING IN CIVIL ENGINEERING.

MISSION

M-CE1: Develop proficient civil engineers by imparting quality education and training, by offering well-designed curriculum.

M-CE2: Provide quality teaching to assimilate classroom teaching and field practice.

M-CE3: Develop and sustain environment to facilitate activities for updating students, faculty and facilities.

PEO (PROGRAMME EDUCATIONAL OBJECTIVES)

After completing the programme successfully, candidates will be able to;

PEO1- Work as Junior Engineer in both public and private sector.

PEO2- Work in consulting organisation for design work.

PEO3- Start his/her enterprise as civil contractor.

PEO4- Get eligibility and to compete for further higher studies

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: To develop the students to cater the need of Civil Engineering industry.

PSO2: To compete for higher studies with need based curriculum.

PROGRAM OUTCOMES (POs): CIVIL ENGINEERING

PO1: Basic knowledge:

Students will be able to apply knowledge of basic mathematics, science and engineering to solve the civil engineering problems.

PO2: Discipline knowledge:

Students will be able to apply discipline - specific knowledge to solve core and applied civil engineering problems.

PO3: Experiments and practice:

Students will be able to plan and perform experiments and practices and to use the results to solve civil engineering problems.

PO4: Engineering Tools:

Students will be able to apply appropriate technologies and tools of civil engineering with an understanding of the limitations.

PO5: The engineer and society:

Students will be able to demonstrate knowledge to assess structural health, safety, legal and cultural issues and the consequent responsibilities relevant to civil engineering practice.

PO6: Environment and sustainability:

Students will be able to understand the impact of the civil engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

PO7: Ethics:

Students will be able to apply ethical principles and commit to professional ethics and responsibilities and norms of the civil engineering practice.

PO8: Individual and team work:

Students will be able to function effectively as an individual, and as a member or leader in diverse / multidisciplinary teams.

PO9: Communication:

Students will be able to communicate and present effectively.

PO10: Life-long learning:

Students will be able to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.



Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively

SEMESTER-I

Sr. No.	Course Name & Code	Prerequisite Course. Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
1	Applied Chemistry (160007)		4	2			6	3	100	30	70	25@	50**		175	B*	426
2	Basic Mathematics(160002)		3	0		1	4	3	100	30	70	25@			125	B*	314
3	Engineering Drawing (160100)		2		4		6	3	100	30	70	50@		50**	200	C*	246
4	Development of Life Skills (160006)		2	0		1	3	-	-	-	-	50@		50**	100	B*	213
5	Applied Mechanics (160001)		3	2		1	6	3	100	30	70	50@			150	C*	336
6	Workshop Practice 160010)		1	4			5					50@		--	50	C*	145
7	Environmental Studies(160009)		2				2					50@			50	B*	202
	Total		17	9	4	3	32	Total Paper = 04		120	280	300	50	100	850		

*: Compulsory,@: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management , # Diploma Award winning courses

Head of Department

Principal

1. COURSE DETAILS:

Program: CE (C101)	Semester: I
Course: Applied Chemistry	Group : B*
Course Code : 160007	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Gr p	Scheme
L	P	D	T	CR	Hrs	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/C R
4	2	-	-	6	3	100	30	70	25@	50**	---	175	B*	426

3. COURSE OBJECTIVES:

- To introduce the fundamental principles of chemistry like structure of atom, electrochemistry which will enable the students to understand the other core technological subjects of different branches.
- To impart knowledge of different engineering materials – metallic and non-metallic.
- To understand the significance of hardness of water, pH, corrosion and lubrication.

4. COURSE OUTCOMES:

C101.1	Predict the chemical and physical properties of different elements and write the correct names and formulae of different compounds.
C101.2	Understand the concept of electrochemical processes.
C101.3	Select appropriate material- metallic, non-metallic, lubricants for different engineering applications.
C101.4	Identify the type of corrosion and select an appropriate method to reduce it.
C101.5	Analyse water sample and predict its suitability for various processes.
C101.6	To develop skills of measuring volumes, concentration of solutions and identify the dissolved solute in a given solution.

5. CONTENTS:

SECTION-I			
SR. NO.	TOPICS	PERIODS	MARKS
1	1.0 Structure of Atom: 1.1 Structure of atom- Classical Model 1.2 Structure of atom- Modern picture 1.3 Bohr's Theory and Quantum Numbers 1.4 Rules for distribution of electrons in an atom 1.5 Electronic configuration of first twenty elements 1.6 Nuclear stability and Numerical problems based on	12	20

	it Chemical Bonding		
2	2.0 Electrochemistry : 2.1 Arrhenius' theory, Degree of ionization 2.2 Mechanism of electrolysis 2.3 Faraday's Laws of Electrolysis and Numerical problems based on it. 2.4 Applications of electrolysis 2.5 Cells and Batteries – classification Primary cell (Daniel cell), Secondary cell (Lead Acid Storage cell) Solar cells – advantages, disadvantages	10	16
3	3.0 Metals and Alloys : 3.1 Characteristics of Metals 3.2 General Metallurgical processes 3.3 Physical properties and applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Ag and Si. 3.4 Alloys – Preparation, purposes, classification 3.5 Composition, properties and application of Duralumin, Magnalium, Monel Metal, Alnico, Gun metal, Brass, Bronze, Babbit metal and Ferrous alloys.	10	14
	SECTION-II		
4	4.0 Water and pH: 4.1 Physical and chemical characteristics of water. 4.2 Hardness of water a) Causes and Types of Hardness b) Disadvantages of hard water – (Domestic and Industrial) c) Degree of Hardness and numerical problems based on it. 4.3 pH a) Concept of pH, Applications of pH and numerical problems based on it.	08	12
5	5.0 Corrosion and Protective Coatings: Corrosion: 5.1 Types of Corrosion 5.2 Mechanism of Corrosion 5.3 Factors affecting corrosion 5.4 Methods of prevention of corrosion. 5.5 Methods of applying Metal coatings. Protective Coatings: 5.6 Paints – Characteristics of good paints, constituents and failure of paint film.	10	16

	Varnishes – Types, characteristics and constituents of good varnish.		
6	6.0 Lubricants : 6.1 Definition 6.2 Functions of Lubricants 6.3 Theories of lubrication 6.4 Classification and characteristics of Lubricants 6.5 Selection of Lubricants for different machines	06	10
7	7.0 Non-Metallic Engineering Materials: 7.1 Polymers Plastic – Definition, types, properties and application 7.2 Rubber – Types, properties and applications 7.3 Vulcanization of Rubber. Thermal Insulators – Definition, characteristics, preparation, properties and applications of thermocole and glasswool	8	12
	TOTAL	64	100

6. PRACTICE:

List of Experiments:

01– 04: 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

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 [$\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$]

05- 06: Determination of:

a) Hardness of water

i) EDTA method

ii) Soap Solution method

b) Chloride content in water

07. Determination of pH of different solutions.

08– 13: Qualitative Analysis of **Five 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^+ .

b) **Acidic Radicals:** Cl^- , SO_4^{-2} , CO_3^{-2} , NO_3^- .

14. Determination of Viscosity Index of a Lubricant.

15. Determination of Flash Point of a Lubricant using:

a) Abel's Flash Point Apparatus

b) Pensky Marten's Flash Point Apparatus

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

7. 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.

8. REFERENCE:

Sr. No.	Author	Title	Publishers & Address
1.	Jain and Jain	Chemistry of Engineering Materials	DhanpatRai 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	SatyaPrakashan, New Delhi
5.	Rao A.A.	Polytechnic Chemistry	New Age International 2007
6.	Shete S.D.	Applied Chemistry	S. Chand & Company
7.	Dara S.S.	A Text Book of Engineering Chemistry	S. Chand & Company, New Delhi-2008

9. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C102)	Semester: I
Course: Basic Mathematics	Group : B*
Course Code : 160002	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
3	-	-	1	4	3	100	30	70	25@	-	-	125	B*	314	

3. COURSE OBJECTIVES:

To provide the knowledge of basic mathematical skills of Algebra, Trigonometry & Co-ordinate geometry applied to solve the engineering problems.

4. COURSE OUTCOMES: At the end of the course the students will be able to

C102.1	Apply the binomial theorem, and partial fractions in relevant engineering topics.
C102.2	Solve Determinant and matrix based problems.
C102.3	Solve problems on Trigonometry using the identities and concept of compound angles, allied angles, and multiple angles.
C102.4	Construct the equation of a straight line and circle in various forms.

5. CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
A	ALGEBRA		
1	PARTIAL FRACTIONS 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	04	10
2	DETERMINANTS 2.1 Definition and expansion of 2nd and 3rd order determinant 2.2 Cramer's rule to solve equations in 2 and 3 unknowns 2.3 Properties of determinant and solving problems	03	06
3	LOGARITHM 3.1 Introduction & Definition 3.2 Laws of Logarithm with proof	03	06

	3.3 Change of Base 3.4 Numerical Problems		
4	MATRICES 3.1 Definition of a matrix of order $m \times n$ 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 ad joint method 3.5 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion methods	8	16
5	BINOMIAL THEOREM 5.1 Definition of combination 5.2 Expansion 5.3 Middle term 5.4 Independent term 5.5 Approximate value	06	12
	SECTION-II		
B	TRIGONOMETRY		
6	TRIGONOMETRY 6.1 Trigonometric ratios of allied compound and sub-multiple angles 6.2 Factorization and de-factorization formulae. 6.3 Inverse trigonometric functions , principle value 6.4 Properties of the triangle 6.5 Solution of triangle	12	26
C	CO-ORDINATE GEOMETRY		
7	STRAIGHT LINE 7.1 Slope and intercept of straight line 7.2 Equation of straight line - Slope point form - Slope intercept form - Two point form - Intercept form - Normal form 7.3 Intersection of two lines, angle, condition of parallel and perpendicular lines 7.4 Length of perpendicular from a point on the line 7.5 Perpendicular distance between two parallel lines	06	12
8	CIRCLE 8.1 Equation of circle - Centre radius form	06	12

	- Diameter form - Intercept form 8.2 General equation of circle 8.3 Tangent line and normal line		
	TOTAL	48	100

6. TERM WORK:

One assignment on each topic consisting of problems covering all varieties, continuously assessed by teacher & submitted by student at the end of term.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Tutorials
3. Assignments

8. REFERENCE BOOKS:

S. N.	Author	Title	Edition	Publisher & Address
1	Shri. S.P.Deshpande	Calculus for Polytechnics	Latest	Pune VidyarthiGrahaPrakashan Pune-30
2	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics	Latest	NiraliPrakashan Mumbai
3	Dr. B.S. Grewal	Higher Engineering Mathematics	Latest	Khanna Publishers 2/B, Delhi-6
4	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics	Latest	Pune VidyarthigrahaPrakashan, Pune-30

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (103)	Semester: I
Course: Engineering Drawing	Group : C*
Course Code : 160100	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	C R	Hour s	Mark s	SS L	Pape r	T/W	PR	Oral s	Tot al		L/P/CR
2	-	4	-	6	3	100	30	70	50 @		50**	200	C*	246

3. OBJECTIVES:

- i.To impart and inculcate proper understanding of the theory of projection.
- ii.To improve the visualization skills.
- iii. To enable the students with various concepts like dimensioning, conventions and standards.
- iv.To develop understanding and competency for drawing projections of planes and solids.

4.COURSE OUTCOMES:

After successful completion of this course student will be able to:

1. Comprehend general projection theory, with emphasis on orthographic projection to represent three-dimensional objects in two-dimensional non sectional and sectional views.
2. Plan and prepare neat isometric drawings of regular planes and solids.
3. Demonstrate and draw various engineering curves.
4. Plan and prepare neat orthographic drawings of regular planes and solids kept at different positions.
5. Identify and freehand sketch various fasteners.

5. DETAILED CONTENT:

Chapter	Content	Hours	Marks
	SECTION-I		
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 (lettering and numbering for term work or assignment) 1.3 Concept of principle planes and quadrants	02	-

	1.4 I and III angle method of projections		
02	2.0 Orthographic Views : 2.1 Projections of various objects having flat and curved surfaces using 1 st and 3 rd angle projection method. 2.2 Conversion of pictorial views in to non-sectional orthographic views. The objects may have slots, holes cavities etc. 2.3 Conversion of Pictorial View in Sectional Orthographic: 2.4 Conversion of pictorial views with cutting plane into sectional orthographic projection (full section only)	08	20
03	3.0 Engineering Curves: 3.1 Ellipse: Oblong, arcs of circle and concentric circle method. 3.2 Parabola: Eccentricity and rectangular methods. 3.3 Hyperbola : Eccentricity and rectangular methods.	05	20
04	4.0 Projection of Planes : 4.1 Projection of planes – regular polygons and circle. inclined to one reference plane.	03	10
SECTION-II			
05	5.0 Isometric Views and Projections: 5.1 Isometric Views and Projections of linear and curvilinear features.	06	20
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.	06	20
07	7.0 Projections of Solids : 7.1 Projection of solids like prisms, pyramids, cylinders and cones with axis inclined to one reference plane.	04	10
	Total	32	100

6. PRACTICE:

1. A2 size sheet to be drawn containing four problems on letter lines and dimensioning techniques.
2. One sheet with non sectional orthographic views for the objects with curvilinear features.

3. One sheet with sectional orthographic views four problems on sheet (full section plane).
4. Home Assignments: One sheet containing two problems non sectional & two problems.
5. Sectional orthographic.
6. One sheet with four problems on Ellipse Parabola and Hyperbola.
7. One sheet with four problems on Projection of planes.
8. Home Assignments: Four problems in sketchbook on curves & Projection of planes.
9. One sheet with four problems on Isometric view having linear and curvilinear features.
10. Home Assignments: One sheet containing four problems on Isometric view.
11. One sheet with Problems on various screw fasteners to be sketched by free hand.
12. One sheet with four problems on Projection of solids
13. Home Assignments: Four problems in sketchbook on projection of solids.

7. 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 Two periodical test
- v) Use of OHP models and charge during theory class and practical periods

8. REFERENCE BOOKS:

Sr.No.	Author	Title	Edition	Year of Publication	Publishers & Address
1.	N.D. Bhatt and Panchal	Engineering Drawing	53 rd	2014	Rupalee Pub. Opp. Amul Dairy, Court Rd, Anand
2.	N.H. Dubey	Engineering drawing	14 th	2016	S.Chand & Co. Ltd., Ram Nagar New Delhi-110 055
3.	M.L. Dabhade	Engineering Graphics	8 th	2012	Mrs.VA.Velhankar 1030,ModelColony, B-12,AkashGanga Pune-411016
4.	R.K. Dhawan	Engineering drawing	8 th	2010	S.Chand & Co. Ltd ,Ram Nagar

9. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any one out of Two (20 marks each)	20			Any one out of Two (10 marks each)	15
2.	Any 2 out of 3 (10 marks each)	20			Any 2 out of 3 (04 marks each)	08
3.	Any 1 out of 2 (10 marks each)	10			Any 1 out of 2 (07 marks each)	07
4.			Any one out of Two (20 marks each)	20		
5.			Any 4 out of 6 (05 marks each)	20		
6.			Any 1 out of 2 (10 marks each)	10		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C104)	Semester: I/II
Course: Development of Life Skills	Group : B*
Course Code : 160006	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
2	-	-	1	3	--	--	--	--	50@	---	50**	100	B*	213

3. COURSE OBJECTIVES:

Life skills include psycho-social competencies and interpersonal skills that help people make informed decisions, solve problems, think critically and creatively, communicate effectively, build healthy relationships, empathize with others, and cope with others in a healthy and productive manner. It enables us to translate knowledge, attitudes and values into actual abilities. Children learn Life Skills from parents, teachers and significant others who act as their role models. They gradually learn to use a particular skill effectively in diverse situation to cope with challenges of life.

4. COURSE OUTCOMES:

C101.1	Face the challenges of the new millennium, ruled by globalization and real life difficulties of new era.
C101.2	Apply various Life Skills different spheres of professional life and to enhance their ability to contribute as youth force.
C101.3	Learn to make maximum use of time for more creative and constructive work.
C101.4	Understand their social responsibility of the and enhance their positive and healthy behaviour.

5. CONTENTS:

SR. NO.	TOPICS	PERIODS	MARKS
1	<u>Personality Development</u> 1.1Introduction, 1.2Determinants of Personality- biological, Psychological and socio- cultural factors. 1.3Areas of Personality development, 1.4 self-analysis,	02	07

2	<u>Time Management</u> 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	<u>Stress Management</u> 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	<u>Problem Solving and Decision Making</u> <u>Problem Solving</u> 4.1 Definition, 4.2 Steps in Problem Solving 4.3 Factors Influencing Problem Solving <u>Decision Making</u> 4.4 Definition Process, Need Consequences, 4.5 Models of Decision Making 4.6 Goal Setting	03	07
5	<u>Memory and Cognition</u> 5.1 Basic concept of memory 5.2 Dual store Memory Model 5.2 Short term Memory 5.4 Working memory , 5.5 Long term memory	02	07
6	Motivation 6.1 Introduction to Motivation 6.2 Self- Motivation , 6.3 Theories of Motivation Paints – Characteristics of good paints, constituents and failure of paint film. Varnishes – Types, characteristics and constituents of good varnish.	02	07
7	Creativity and Innovation 7.1 Nature and Meaning of Creativity and innovation 7.2 Barriers to Creativity and Innovation 7.3 Attitude & Aptitude	03	08
8	8.0 Conflict Management 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	9.0 SWOT Analysis	02	07

	9.1 Concept of SWOT 9.2 Scope of SWOT, 9.3 SWOT as decision making tool , 9.4 How to go about SWOT		
10	Health 10.1 Health management 10.2 Food , Exercise and Rest 10.3 Body Observation 10.4 Addictions	02	07
11	Group discussion & Interview techniques 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	Body language 12.1 Importance of Body language 12.2 Eye contact , Gestures , Postures 12.3 Facial expressions, Dress/ appearance	02	07
13	Team Building 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	Task Management 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
TOTAL		32	100

Reference Books:

Name of book	Author	Publication
Life Skills Training for Positive Behaviour	Nair. A. Radhakrishnan,	Rajiv Gandhi National Institute of Youth Development, Tamil Nadu
Personality Development,	Hurlock, B. Elizabeth	Tata McGraw Hill Publishing Company Limited, New Delhi. 2007
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

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. Define stress; enlist your Stressors and Stress-busters .
4. Explain the Functioning of memory and organization of knowledge.
5. What are the things that motivate you (Friendliness, Warmth, Honesty, Appreciation and Things that Demotivate you (Rejection , Criticism, Fear of failure , insult)
6. What are the things you would do, if you have only One week to live.
7. Enlist at least ten reasons of personal and interpersonal conflict.
8. Make a general purpose SWOT analysis to discover your strengths and learning areas and on the basis of that decide a career
9. Enlist the types of Interview with Do's and Don'ts Of Interview
10. Explain the Importance of Body language for interview life.
11. Define Task, enlist the characteristics of task.

Note:

- Every student has to write minimum ten assignments.
- Teacher will do necessary changes in the assignments as per requirement.

1. COURSE DETAILS:

Program :CE(C105)	Semester: I
Course: Applied Mechanics	Group: C*
Course Code:160001	Duration:16 Weeks

1. TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Cr	Examination Scheme and Maximum Marks							
Theory Hours/Week	Practical Hours/Week	Tutorial		Paper			Theory Marks	SSL Marks	Term Work	Practical /Orals	Total
				Hrs	N/P	Marks					
3	2	1	6	3	1	100	70	30	50@	-	150

2. COURSE OBJECTIVES:

Applied Mechanics course 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 subject's materials & structures, analysis of structures and design.

3. COURSE OUTCOMES:

C205.1	Define and classify force & its systems.
C205.2	State and explain principles of resultant and equilibrium of system of forces.
C205.3	Calculate resultant and equilibrium of system of forces analytically and graphically.
C205.4	Understand, apply and calculate force systems to friction, centroid and for beam reactions.
C205.5	Define understand apply and calculate laws of simple lifting machines.

4.DETAILED CONTENT

Chapter	Topics	Periods	Marks
	Section-I		
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	05

2	<p>Resolution of Forces</p> <p>2.1 Concept of force, definition, unit, graphical representation of force</p> <p>2.2 Concept of system of forces, non-coplanar, coplanar, concurrent, Parallel, non-concurrent & non-parallel forces.</p> <p>2.3 Resolution of a force into two components along any directions.</p> <p>2.4 Resolution of a force into two component straight angles to each other by analytical method.</p> <p>(Applications levers, chain & links, Connected bodies like trains etc.)</p>	05	10
3	<p>Composition Of Forces</p> <p>3.1 Composition, Resultant of force</p> <p>3.2 Law of parallelogram of forces,</p> <p>3.3 Moment of force, couples lever arm,</p> <p>3.4 Varignon's theorem</p> <p>3.5 Resultant of coplanar concurrent, parallel, and non-concurrent, non-parallel forces</p> <p>(Applications in shafts, crane, joints of trusses, etc)</p>	05	10
4	<p>Equilibrium</p> <p>4.1 Definition of equilibrium., relation between Resultant and Equilibrant, Conditions of Equilibrium, Types of Equilibrium Stable, Unstable and Neutral equilibrium</p> <p>4.2 Equilibrium of coplanar concurrent forces, Lami's theorem.</p> <p>4.3 Equilibrium of coplanar parallel forces & coplanar Non-concurrent Forces.</p> <p>4.4 Analytical conditions of equilibrium for coplanar concurrent & Non-concurrent Forces.</p> <p>(Applications of crane stability, link mechanisms, inclined plane, wedges, anchor blocks for water pipelines, balance, levers, pulley & pulley blocks)</p> <p>Practicals:</p> <p>(a) Simple roof truss.</p> <p>(b) Bell crank lever.</p> <p>(c) Levers of different types.</p> <p>(d) Extension of springs.</p> <p>(e) Compression of springs</p>	07	15

5	<p>Beam Reactions</p> <p>5.1 Types of supports (constraints), simple, roller, hinged & fixed.</p> <p>5.2 Types of Beams, simply supported, hinged & roller supported, Cantilever, Overhang Beams.</p> <p>5.3 Types of Loads, Point (Concentrated) Load, Uniformly Distributed Load (UDL)</p> <p>5.4 Problems on above combination of loads (Application like bearings of shafts, guy, rocker and roller supports of railway bridges.)</p>	04	10
SECTION-II			
6	<p>Friction</p> <p>6.1 Definition, types of friction, Static friction, dynamic friction Fundamental laws of static friction, Coefficient of friction, Cone of friction, Angle of friction, Angle of repose, Rolling friction</p> <p>6.4 Study of inclined plane, wedge and block system, ladder friction.</p> <p>(Application in clutches, Brakes, Dynamometers, journals, Belt & Rope drives, stator & Rotor in electric motors, Bearings.)</p> <p>Practicals: (a) Friction between wooden surfaces, Friction between wooden surfaces and glass, metal surfaces</p>	05	12
7	<p>Centre of gravity</p> <p>7.1 Center of gravity of solids, centroid of plane laminas, definition,</p> <p>7.2 Concept of parallel forces applied to find c.g, and centroid, centroid /c.g. axes of a body / lamina, c.g. / centroid of basic regular Shapes. (Applications like floating bodies, dams & retaining wall sections, beams, columns sections (rolled steel), simple and built up sections)</p> <p>Practical: (a)Centroid of Plane Laminas</p>	07	14

8	Simple Lifting Machines (Application topic) 8.1 Definition: Mechanical Advantage, Velocity Ratio, Efficiency, Relation between them, Friction in machine in terms of load & Effort. 8.2 Law of Machine, Maximum M.A., Maximum efficiency, Condition for reversibility of a machine 8.3 Study of machines –Simple and Differential Axle & Wheel, Weston differential pulley block, Simple screw jack, Worm & Worm Wheel, Single & Double purchase crab winch, system of pulleys.	06	12
9	Graphics Statics 9.1 Space diagram, Bows notation. 9.2 Law of Triangle of forces, Polygon of forces, Force / Vector diagram 9.3 Resultant and equilibrium of concurrent forces 9.4 Polar diagram, Funicular polygon 9.5 Resultant and equilibrium of non-concurrent and non-parallel forces (Applications in finding reactions of beams, Stresses in simple frames)	06	12
TOTAL		48	100

5. 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.

6.Reference Books:

Sr. No.	Author	Title	Edition	Year of Publicatio	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&CompanyRamNagar,New Delhi-110055.
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 /PragatiPublications
5	M D Dayal	Applied Mechanics	1 st	2000	NanduPublishers.Che mbur,Mumbai-71.
6	SSBHAVIKATTI	Applied Mechanics			Tata Mcgraw Hill

7.Question Paper Pattern:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C106)	Semester: I
Course: Workshop Practice	Group : C*
Course Code : 160010	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
1	4	-	-	5	-	--	--	--	50@	-	--	50	C*	145	

3. COURSE OBJECTIVES:

The students will be able to:

1. Know safety precautions while working on various machines.
2. Understand, select and use of various tools and equipments in fitting, carpentry, welding and plumbing.
3. Read and interpret job drawing.
4. Operate, control different machines and equipments.
5. Inspect the job for specified dimensions
6. Produce jobs as per specified dimensions.

4. COURSE OUTCOMES: At the end of the course the students will be able to

107.1	Identify various marking, measuring, holding, striking and cutting tools & equipments.
107.2	Explain various manufacturing processes for industrial product.
107.3	Use various workshop equipments and tools for different workshop jobs
107.4	Recall safety practices while working in industry.

5. CONTENTS:

1.	CARPENTRY SHOP Introduction. Various types of Woods. Different types of Tools, Machines and Accessories	04
2.	PLUMBING Introduction. Various marking, measuring, cutting, holding and striking tools. Different G.I. pipes, PVC pipes, Flexible pipes.	04

	G. I. pipes and PVC pipes fittings and accessories. Adhesive solvents chemical action.	
3.	FITTING SHOP Introduction Various Marking, Measuring, Cutting, Holding and Striking tools Different Fitting operation like Chipping, Filing, Right angle, Drilling Working principle of Drilling machine, Tapping dies and its use. Safety precautions and Safety Equipments	04
4.	WELDING SHOP Introduction to welding, soldering, brazing. Types of welding joints, gas welding & gas cutting. Safety precautions in welding ,safety equipments and its use in welding process	04

6. PRACTICE:

Sr .No. Details of Practical Contents

- 1 **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, Chiselling, Grooving, etc.
 - 3.One Carpentry and one Pattern Making job for group of students.
- 2 **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.
- 3 **PLUMBING SHOP**
 - 1.Demonstration of different plumbing tools
 - 2.Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings.
 - 3.Demonstration of Pipe threading using standard die sets.
- 4 **WELDING SHOP**
 1. Demonstration of soldering and brazing processes.
 2. Assignment on welding including Gas welding processes

NOTE:

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. Raghuvanshi- Workshop Technology- Dhanpat Rai and Sons, New Delhi

3.R K Jain- Production Technology- Khanna Publishers, New Delhi

1. COURSE DETAILS:

Program: CE (C107)	Semester: I
Course: Environmental Studies	Group : B*
Course Code : 160009	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
2	-	-	-	2	-	--	--	--	50@	-	-	50	B*	202	

3. COURSE OBJECTIVES:

- To impart knowledge about renewable and non-renewable natural resources.
- To understand and appreciate the concept of ecosystems, biodiversity and conservation.
- To increase the awareness regarding environmental pollution, climate change, water conservation and environmental legislations.

4. COURSE OUTCOMES: At the end of the course the students will be able to

C102.1	Identify and classify different natural resources and use them prudently.
C102.2	Recognize and categorize the different ecosystems
C102.3	Discuss and estimate the importance of biodiversity and its conservation
C102.4	Judge the type of pollution, identify the pollutants and propose and design methods to reduce the same.
C102.5	Use the information regarding environmental legislation to improve upon their surroundings for the betterment of the community

5. CONTENTS:

SECTION-I		
S. NO.	TOPICS	PERIODS
1	1.0 The Multidisciplinary nature of environmental studies: Definition, scope and importance Need for public awareness	03
2	2.1) Renewable and non-renewable resources: Natural resources and associated problems Forest resources: Use and over-exploitation, deforestation,. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental	10

	<p>effects of extracting and using mineral resources.</p> <p>Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.</p> <p>Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <p>2.2) Energy Crisis:</p> <p>Energy resources :</p> <p>Renewable Energy Resources – Biogas, Solar energy, Wind energy, Energy from falling water, Energy from wastes and tidal energy.</p> <p>Non-Renewable Energy Resources – Coal, Oil, Natural gas Issue of economic viability and ability to meet demands. Inequitable use of energy in urban and rural areas</p>	
3	<p>3.0 Ecosystems :</p> <p>3.1 Concept of ecosystem. Major ecosystems in the world</p>	03
SECTION - II		
4	<p>4.0 Biodiversity and its conservation:</p> <p>4.4 Concepts 4.5 Threats to biodiversity Value and conservation of biodiversity</p>	03
5	<p>5.0 Environmental Pollution:</p> <p>5.7 Definition Cause, effects and control measures of</p> <ul style="list-style-type: none"> •Air pollution •Water pollution •Soil pollution •Noise pollution •Nuclear hazards <p>5.8 Types of wastes – generation, characteristics, treatment and disposal of:</p> <ul style="list-style-type: none"> •Solid waste •e- waste •Biomedical waste 	06
6	<p>6.0 Social Issues and the Environment :</p> <p>6.1 From Unsustainable to Sustainable development 6.2 Water conservation, rain water harvesting, watershed management 6.3 Environmental ethics: Issues and possible solutions like Carbon Credit. 6.4 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. 6.5 Environment legislations-</p> <ul style="list-style-type: none"> •Legal aspects related to environment •Brief description of various acts involving air, water and 	07

	forests. •ISO-14000 Issues involved in enforcement of environmental legislation	
	TOTAL	32

6. PRACTICE:

Term work:

- Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain
- Visit to a local polluted site- Urban/ Rural/ Industrial/ Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems- pond, river, hill slopes, etc.
- Group discussions, film shows, debates, case studies, expert lectures on the different topics of the curriculum.

. IMPLEMENTATION STRATEGY (PLANNING):

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

8. REFERENCE BOOKS:

Sr. No.	Author	Title	Publishers & Address
1.	Erach Bharucha	Text book of Environmental studies	UGC Press
2.	Rajagopalan	Environmental studies	Oxford University Press
3.	Anandita Basak	Environmental studies	Driling Kindersley(India)Pvt. Ltd Pearson
4.	D.D. Mishra	Fundamental concepts in Environmental studies	S. Chand & Co. Ltd.
5.	Jain and Jain	Role of Tech. in Environment and Health	DhanpatRai Publishing Co. New Delhi



Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively

SEMESTER-II

Sr. No.	Course Name & Code	Prerequisite Course. Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
8	Applied Physics (160005)		4	2			6	3	100	30	70	25@	50**		175	B*	426
9	Engineering Mathematics(160008)		3	0		1	4	3	100	30	70	25@			125	B*	314
10	Building Materials and Construction (160104)		3	4			7		100	30	70	50@		50**	200	C*	347
11	Civil Engineering Drawing(160103)		2		5		7	4	100	30	70	50@		50**	200	C*	257
12	Communication Skill (160003)		3	0	0	1	4	3	100	30	70	25@			125	B*	314
13	Stress Management (160016)			2			2									M	022
	Total		15	8	5	2	30		Total Paper = 05	150	350	175	50	100	825		

*: Compulsory,@: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management , # Diploma Award winning courses

Head of Department

Principal

1. COURSE DETAILS:

Program: CE (C108)	Semester: II
Course: Applied Physics	Group : B*
Course Code : 160005	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
4	2	-	-	6	3	100	30	70	25@	50**	-	175	B*	426

3. COURSE OBJECTIVES:

- To understand the physical properties of engineering materials.
- To understand the principles and laws of physics.
- To understand the physical quantities and it's relation with one another.
- To develop laboratory skills of investigations for use in production and technology.

4. COURSE OUTCOMES:

After the successful completion of the course the student will be able to

C108.1	Compute the various physical quantities with accuracy and precision.
C108.2	Recognize the use of physical properties of different materials.
C108.3	Choose and classify materials for different engineering applications.
C108.4	Calculate the errors and minimize it during experiment.
C108.5	Demonstrate the various physical phenomenon.
C108.6	List the materials required to proceed work.

5. DETAILED CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	Introduction: 1.1 Fundamental, Derived , Supplementary and SI units 1.2 Accuracy and Precision in Measurement. 1.3 Significant figures in measured quantities and estimation of the errors..	04	06
2	2 : Properties of matter : Elasticity , Surface Tension , Viscosity 2.1 Elasticity : 2.1.1 Deforming force , restoring force ,elastic and plastic body. 2.1.2 Stress and strain with their types.	12	18

	<p>2.1.3 Elastic limit , Hooke’s law. 2.1.4 Moduli of elasticity. 2.1.5 Stress-strain diagram , behavior of wire under continuously increasing load. 2.1.6 Defination of yield point , ultimate stress, factor of safety. 2.1.7 Numericals on stress , strain and Young’s modulus.</p> <p>2.2 Surface Tension: 2.2.1Molecular force , cohesive and adhesive force, molecular range ,sphere of influence. 2.2.3 Definition of surface tension and its S.I. unit, angle of contact. 2.2.4 Capillary action with examples, shape of meniscus for water and mercury. 2.2.5 Relation between surface tension ,capillary rise and radius of capillary (no derivation). 2.2.6 Effect of impurity and temperature on surface tension, 2.2.7 Numerical on relation between surface tension ,capillary rise and radius.</p> <p>2.3 Viscosity: 2.3.1Fluid friction ,viscous force. 2.3.2 Definition of viscosity, velocity gradient. 2.3.3 Newton’s law of viscosity, Definition coefficient of viscosity and its S.I. unit. 2.3.4 Streamline and turbulent flow with examples, critical velocity, 2.3.5 Experimental determination: Poiseuille’s method for viscosity, Stoke’s method. 2.3.6 Variation of viscosity with temperature. 2.3.7 Reynolds number and its significance. 2.3.8 Stoke’s formula : Free fall of body through viscous medium (no derivation). 2.3.9 Numericals on coefficient of viscosity , Reynold’s number and Stoke’s formula.</p>		
3	<p>3. Heat and Temperature: 3.1 Heat : 3.1.1 Conduction, convection and radiation, good and bad conductor of heat with examples. 3.1.2 Law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit. 3.1.3 Definition of linear, aerial and cubical expansion and relation between them (no derivation). 3.1.4 General Metallurgical processes.</p> <p>3.2 Temperature: 3.2.1Boyle’s law, Charle’s law, Gay Lussac’s law. 3.2.2Absolute zero temperature, Kelvin scale of temperature, general gas equation (statement only).</p>	06	08

	3.2.3 Effect of temperature on physical parameter 3.2.4 Temperature measurement: Optical pyrometer, Thermo-electric thermometer.		
4	<p>4 SOUND, ULTRASONIC AND ACOUSTICS:</p> <p>4.1 Simple Harmonic Motion:</p> <p>4.1.1 Uniform circular motion, periodic motion, Vibration motion (definition with examples),</p> <p>4.1.2 Simple Harmonic Motion (S.H.M.) (Definition)</p> <p>4.1.3 Characteristics of S.H.M.</p> <p>4.1.4 Amplitude, Frequency, Period of S.H.M.</p> <p>4.1.5 General equations of (S.H.M.) (no derivation)</p> <p>4.1.6 Graphical representation of S.H.M. (only diagram).</p> <p>4.1.7 Phase of S.H.M. , Epoch or phase constant of S.H.M. (definition).</p> <p>4.1.8 Numericals on amplitude, frequency and period of S.H.M.</p> <p>4.2 Wave Motion</p> <p>4.2.1 Definition of Wave motion, amplitude, period, frequency and wave length.</p> <p>4.2.2 Relation between velocity, frequency, and wavelength.</p> <p>4.2.3 Equation of progressive wave (no derivation).</p> <p>4.2.3 Longitudinal and transverse wave.</p> <p>4.2.4 Definition and formation of stationary wave.</p> <p>4.2.5 Definition of Node, Antinode, Free vibration, Forced vibration and Resonance.</p> <p>4.2.6 Velocity of sound by resonance tube.</p> <p>4.2.7 Frequency of A.C. Supply by Sonometer. 4.2.7 Numerical on relation $v = n\lambda$ and resonance.</p> <p>4.3 Acoustics and Reverberation:</p> <p>4.3.1 Definition of Echo, Reverberation, Reverberation time.</p> <p>4.3.2 Sabine's formula (no derivation).</p> <p>4.3.3 Definition of Absorption coefficient, Open window unit (OWU), Absorption coefficient in terms of OWU.</p> <p>4.3.4 Essential features for good acoustics or Acoustical planning.</p> <p>4.3.5 Production of ultrasonic , Properties , Applications</p> <p>4.3.6 Numerical problems on Sabine's</p>		

SECTION-II			
5	<p>OPTICS :</p> <p>5.1 Photoelectric effect:</p> <p>5.1.1 Statement of photoelectric effect , Planck's hypotheses, Einstein's equation.</p> <p>5.1.2 Definition : Threshold wavelength , Threshold frequency, Work function.</p> <p>5.1.2 Study of experimental set up for study of photoelectric effect, Study of factors on which photoelectric effect depend on. Defination : Stopping potential.</p> <p>5.1.3 Characteristics of photoelectric effect.</p> <p>5.1.4 Photocells : Photo-emissive, photoconductive, photovoltaic.</p> <p>5.1.5 Engineering applications.</p> <p>5.1.6 Numerical on energy of photon , work function, Einstein's equation.</p> <p>5.2 Interference :</p> <p>5.2.1 Interference of light, Interference pattern. Constructive interference, Destructive interference. Steady interference of light.</p> <p>5.2.2 Conditions for steady interference pattern</p> <p>5.2.3 Formation of thin film, Newton's rings, Newton's rings setup, Explanation of formation of Newton's rings. Wavelength of source of light (No derivation)</p> <p>5.2.4 Optical flatness, Engineering Applications.</p> <p>5.3 Diffraction :</p> <p>5.3.1 Diffraction of light, Diffraction at a slit,</p> <p>5.3.2 Diffraction Grating, Characteristics of grating spectra.</p> <p>5.4 Polarization :</p> <p>5.4.1 Polarization of light, Definition : Plane of polarization, plane of vibration</p> <p>5.4.2 Explanation of polarization of light, Nicol prism.</p> <p>5.4.3 Optical activity and optically active substance, List of optically active substances.</p> <p>5.4.4 Dexto-rotatory or right handed substances, Laevo-rotatory or left handed substances.</p> <p>5.4.5 Definition: Optical rotation, Specific rotation.</p> <p>5.4.6 Lorentz half shade polarimeter</p> <p>5.4.7 Engineering applications of polarization.</p> <p>5.4.8 Numericals on diffraction grating and specific rotation.</p>	10	15
6	<p>6.0 ELECTRICITY AND MAGNETISM:</p> <p>6.1 Coulomb's law , Intensity and Potential :</p> <p>6.1.1 Coulomb's inverse square law for electric charges, Electric fields, Intensity of electric field.</p>	09	15

	<p>6.1.2 Electric line of forces, Properties of electric line of forces.</p> <p>6.1.3 Electric flux, Electric flux density, Relation between flux density and Intensity of electric field.</p> <p>6.1.4 Electric potential, Absolute electric potential.</p> <p>6.1.5 Expression for the potential at a point due to a point charge, Absolute potential at a point, Potential of Earth. Intensity of Electric field at a point, Potential Numerical problems.</p> <p>6.2 Capacitor :</p> <p>6.2.1 Capacity of conductor, Definition: Capacitance, Farad.</p> <p>6.2.2 Capacitance of Spherical conductor, Principle of capacitor (condenser).</p> <p>6.2.3 Capacitors in series and parallel, Expression for the energy stored,</p> <p>6.3.4 Numericals on capacitor.</p> <p>6.4 Current electricity :</p> <p>6.4.1 Ohm's law, Resistance, Specific resistance, Combination of resistances, e.m.f. and p.d., Temperature coefficient of resistance.</p> <p>6.4.2 Wheatstone's network, Wheatstone's network, Wheatstone's Bridge(W.B.), Potentiometer , Applications , Numerical problems on specific resistances and Wheatstone' bridge.</p> <p>6.4 Magnetic materials :</p> <p>6.4.1 Modern concepts of magnetism, Dia, Para, Ferromagnetism,</p> <p>6.4.2 Testing of magnetic materials , Current carrying conductor in magnetic field,</p> <p>6.4.3 Moving coil galvanometer , Shunt.</p>		
7	<p>7.0 MODERN PHYSICS :</p> <p>7.1 Bohr's theory :</p> <p>7.1.1 Bohr's Postulates , Energy level diagram for hydrogen atom.</p> <p>7.2 Crystal Structure</p> <p>7.2.1 Space lattice, Unit cell, Cubic Crystal Structures- Simple cubic,(S.C.), Body centred cubic(B.C.C.), Face centred cubic(F.C.C.).</p> <p>7.2.2 Number of atoms per unit cell, Atomic radius, Co-ordination number, Packing density.</p> <p>7.2.3 Atomic planes and spacing, Miller indices.</p> <p>7.3 Band theory of solids</p> <p>7.3.1 Classification of materials in to conductor semiconductors and insulators , Doping,</p> <p>7.3.2 Formation of p - type and n - type semiconductor.</p> <p>7.5 Lasers :</p> <p>7.5.1 Elementary idea , Spontaneous and Stimulated emissions, Ruby laser, Helium-neon laser.</p>	10	15

	7.6 Fibre optics 7.6.1 Total internal reflection, Wave guide for light, optical fibre-step index and graded index, Applications.		
8	8.0 SUPERCONDUCTIVITY AND NANOTECHNOLOGY: 8.1 Super conductivity : 8.1.1 Principle of superconductivity, zero ohmic resistance, Meissner effect. 8.1.2 Properties and Applications. 8.2 Nanotechnology : 8.2.1 Nano – Technology , Nano – science , Nano – materials , Nano – machines. 8.2.2 Instruments being used in Nano – technology , Five generation of Nano – technology , Carbon allutrops, Applications.	03	05
	TOTAL	64	100

PRACTICAL CONTENTS:

a) Experiments to be perform (Any 10) :

1. Use of Measuring Instruments – Vernier Callipers, Micrometer Screw Gauge , Spherometer.
2. Young’s Modulus by Searle’s Apparatus.
3. Surface tension by Capillary rise method.
4. Viscosity by Poiseuille’s method.
5. Thermal conductivity of a good conductor by Searle’s Apparatus.
6. Velocity of sound by Resonance.
7. Frequency of A.C. Supply by Sonometer and Verification by C.R.O.
8. Study of Spectrometer (Minimum Deviation and Refractive Index and Angle of Prism)
9. Wavelength of Light by Diffraction Grating.
10. Specific rotation by Polarimeter.
11. ‘J ‘by Elecrtical Method.
12. Use of Wheatstone’s Bridge (Resistance , Specific resistance).
13. Use of Potentiometer (Principle , Comparison of e.m.f.s of Cell , Calibration of Voltmeter).
14. Study of Crystal Structure.
15. Wavelength of Laser Beam (He – Ne) by Diffraction Grating.

b) Demonstrations (Any 04) :

- i) Use of Precision Measuring Instruments (Dial Vernier , Dial Micrometer , Travelling Microscope etc.)
- ii) Poisson’s Ratio for Rubber Tube.
- iii) Temperature of Flame (Optical Pyrometer)
- iv) Spectra of Ionised Gases.
- v) Study of Photocell.
- vi) Study of Newton’s Rings.
- vii) Study of Para and Diamagnetism by Electromagnet.

6. TERM WORK:

Compulsory term-work on the list of experiments written in a journal and carrying – 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

7. IMPLEMENTATION STRATEGY (PLANNING):

(i) Theory – Lesson Plan

(ii) Practical – Scheme of making for T/W, Scheme of assessment for Practical Examination.

8. REFERENCE BOOKS:

Sr.No.	Author	Title	Publishers & Address
1.	R.K. Gaur and S.L. Gupta	Engineering Physics	Dhanpat Rai Publishing Co. New Delhi
2.	M.R.Shrinivasan	Physics for Engineers	New Age International , New Delhi
3.	P.G. Kshirsagar and M.N. Avandhunu	A Text Book of Engineering Physics	S.Chand and Co. Ltd , New Delhi
4.	Gambhir, Durgapal and Banerji	Introductory Physics – Volume 1,2 & 3	Wiley Eastern

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8	18			Any 4 out of 5	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C109)	Semester: II
Course: Engineering Mathematics	Group : B*
Course Code : 160008	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	-	-	1	4	3	100	30	70	25@	-	-	125	B*	314

3. COURSE OBJECTIVES:

To impart the knowledge of calculus, vector algebra & complex numbers to solve the engineering problems.

4. COURSE OUTCOMES: At the end of the course the students will be able to

C109.1	Evaluate problems on functions and limits of various types.
C109.2	Analyze suitable methods to solve derivatives and its application in the field of engineering.
C109.3	Perform the various operation on Complex numbers.
C109.4	Apply the concept of vector to solve problems of work done, Moment of force and to find Areas & Volumes

5. CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	FUNCTIONS AND LIMITS 1.1. Definition of variable , constant, value of function , composite function 1.2. Limits of algebraic, trigonometric ,exponential and logarithmic functions	10	22
2	DERIVATIVES 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	14	28

SECTION-II			
6	APPLICATION OF DERIVATIVES 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	08	16
7	COMPLEX NUMBER 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	08	18
8	VECTOR ALGEBRA 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 , tetra hedron	08	16
TOTAL		48	100

6. TERM WORK:

One assignment on each topic consisting of problems covering all varieties, continuously assessed by teacher & submitted by student at the end of term.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Tutorials
3. Assignments

8. REFERENCE BOOKS:

S. N.	Author	Title	Edition	Publisher & Address
1	Shri. S.P.Deshpande	Calculus for Polytechnics	Latest	Pune Vidyarthi Graha Prakashan Pune-30
2	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics	Latest	Nirali Prakashan Mumbai
3	Dr. B.S. Grewal	Higher Engineering Mathematics	Latest	Khanna Publishers 2/B, Delhi-6
4	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics	Latest	Pune Vidyarthigraha Prakashan, Pune-30

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :CE (CE 110)	Semester: II
Course: Building Materials and Construction	Group: C*
Course Code:160104	Duration:16 Weeks

2.TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
3	4			7	3	100	30	70	50 @		50**	200	C*	347

3.COURSE OBJECTIVE

Building Materials and Construction is a core subject in Civil Engineering, which deals with the construction materials and construction processes. Topic on materials will be useful to learn variety of construction materials, their identification, selection, handling, storing, field / laboratory testing, quality checking and their uses in construction. Topics on construction deal with construction of sub structure, super structure and building finishes. The topic on substructure will be useful in executing the foundation work in different situations. The contents on stone and brick masonry, doors and windows and vertical communication will be useful to understand the process of construction of these.

4.COURSE OUTCOMES:

After the successful completion of the course, the student will be able to

C110.1	Learn variety of construction materials, their identification, selection, handling, storing and field and testing, quality checking
C110.2	Learn the uses of construction materials in Civil Engineering project.
C110.3	Know the various technical term related to different components of building structure.
C110.4	Understand various construction processes of different building components.
C110.5	Understand the process of setting out of building.

5.DETAILED CONTENT:

Sr. No.	Topics	Period	Marks
SECTION - I			
1	1.0 Timber and Timber Products:	4	8
	1.1 Timber as a material of construction, Relative advantages of its use as compared to other materials.		
	1.2 Strength of Timber: Strength of timber parallel to and across the grains. Proper direction for fixing screws bolts and nails.		
	1.3 Types of Boards: Ply, Veneer, Ply wood, Batten Board, Block Board, Laminates, their properties and uses.		
	1.4 Bamboo and Ballis, properties, uses of bamboos and ballis.		
2	2.0 Lime, Gypsum and Plaster of Paris	2	4
	2.1 Classification of limes, Uses of limes, Tests on lime.		
	2.2 Gypsum, Gypsum Plaster and uses.		
3	3.0 Sand and coarse aggregate:	2	4
	3.1 Sources, properties and uses.		
4	4.0 Cement:	4	8
	4.1 Chemical composition of Cement		
	4.2 Varieties :(1) Portland Cement, (2). Portland Pozzolana Cement, (3) Portland Slag Cement (4). Sulphate resistant cement, (6) White cement, and their uses.		
	4.3 Testing of Cement: Setting and hardening of cement and relative strength. Grades of cement, List of tests and necessity of these tests.		
5	5.0 Mortar:	2	4
	5.1 Varieties of mortar: lime mortar and cement mortar.		
	5.2 Ingredients mixing of mortar, properties, uses in construction.		
6	6.0 Concrete:	4	8
	6.1 Ingredients of concrete, Grading of Concrete, Mix proportioning, Volumetric and Weigh Batching		
	6.2 Reinforced Cement Concrete, Reinforcement		
7	7.0 Stones:	2	4
	7.1 Varieties of stones commonly used in construction.		
	7.2 Suitability of stone for different uses, such as masonry, flooring, pitching etc.		
8	8.0 Masonry Materials:	5	12
	8.1 Quality of good bricks, Strength of bricks, Tests on bricks, Classification of bricks, Uses of bricks		
	8.2 Stones, suitability of stones for masonry work, quality of stones, dressing of stones, Uses of stones		
	8.3 Concrete blocks.		
	8.4 Light weight Autoclaved aerated concrete (AAC) block		
9	9.0 Tiles:	2	4
	9.1 Types of tiles : Floor tiles, Roof tiles, Terra cotta, Glazed Tiles		

Sr. No.	Topics	Period	Marks
	9.2 Characteristics of good tiles		
10	10.0 Paint and Varnish:	3	6
	10.1 Characteristics of good paint		
	10.2 White wash distempering oil painting, etc.		
	10.3 Varieties like (1) Aluminium paint (2) Cement paint, (3) Enamel Paint, (4) Cellulose Paint, (5) Bituminous paint, (6) Anti-corrosive paint (7) Oil paint, (8) Emulsion Paint (9). Plastic Paint		
	10.4 Varieties like water varnish, oil varnish, spirit varnish and turpentine varnish.		
	Sub-Total	24	50
	SECTION - II		
11	11.0 Types of Building Structures and components	2	4
	11.1 Classify various types of structure: Load bearing , Framed and composite structure		
	11.2 Various components of building and their functions: foundation, Plinth and DPC its function, Wall, sill, lintel, doors and windows, floor, roof, parapet, slab, columns, beams, and their functions.		
12	12.0 Construction of Sub-Structure	5	10
	12.1 Job layout preparation, layout by centre line and face line method and precautions during layout.		
	12.2 Excavation for foundation, shoring and strutting of trench, dewatering, excavation tools and plants.		
	12.3 Foundations: Definition, Function, requirements of good foundation.		
	12.4 Types of foundation (a) Shallow foundation: wall footing, isolated and combined column footing, stepped foundation, raft foundation. (b) Deep Foundation: Pile foundation, well foundation and caisson.		
13	13.0 Construction of Superstructure	4	10
	13.1 Stone masonry: Terms used in stone masonry- facing, backing, hearting, through stone, corner stone, cornice etc. Type of stone masonry: Rubble masonry, Ashlar Masonry and their types. Requirements of good stone masonry, expansion joints in stone masonry their purpose and procedure.		
	13.2 Brick masonry: Terms used in brick masonry- bond, joints, lap, frog, line, level and plumb. Bonds in brick masonry- header bond, stretcher bond, English bond and Flemish bond. Requirements of good brick masonry, expansion joints in brick masonry their purpose and procedure.		
	13.3 Comparison between stone masonry and Brick Masonry.		
	13.4 Tools and plants required for construction of stone masonry and brick masonry.		
	13.5 Hollow concrete block masonry and composite masonry.		

Sr. No.	Topics	Period	Marks
	13.6 Scaffolding: Necessity, component parts and types of Scaffolding, Scaffolding and platforms used for multi storied building.		
14	14.0 Doors and windows	3	6
	14.1 Door & window frames, location of Doors and Windows, various sizes of doors and windows for residential and public buildings.		
	14.2 Types of doors: Batten Ledged braced framed door, panelled, glazed, flush, collapsible, revolving doors, rolling shutters.		
	14.3 Types of windows: Casement, Panelled, Steel, Aluminium, Sliding, louvered window, Grills and Ventilators. Fixture and Fastening for doors, windows Sill, lintel - types and function, Arch - types and function.		
15	15.0 Vertical Communications	3	6
	15.1 Means of vertical communications: Stairs, lift/ Elevators, Escalators, Ramp.		
	15.2 Terms used in stair- Step, riser, tread, flight, Winder, Kite step, landing, soffit, pitch, Newel posts, hand rail, balustrade, head room. Types of stairs: straight, quarter turn, half turn, open well, doglegged, spiral, bifurcated, circular, sketch and suitability, requirements of good staircase, thumb rule for stair design.		
16	16.0 Floors and Roofs	3	6
	16.1 Types of floors – Mud floor, wood floor, stone floor, concrete floor (construction and suitability).		
	16.2 Types of floor finishes- Shahabad, Kota, marble, granite, kaddappa, ceramic, vitrified, marbonite, chequered tiles (construction procedure).		
	16.3 Pavement blocks, tremix floors, skirting and dado		
	16.4 Types of roofs -Pitched roofs and Flat roof : Terms used, lean to roof, king post truss, queen post truss, steel trusses		
17	17.0 Finishing works	4	8
	17.1 Plastering: Necessity, pre-construction preparation, single coat, double coat, rough finish, sponge finish, neeru finish, Special plasters, pebble finish and stucco plaster. Precautions to be taken while plastering. Defects in plastering, methods for curing.		
	17.2 Pointing : Necessity, types and procedure of pointing		
	17.3 Painting: Surface preparation for painting to wall, timber, steel. Number of coats in painting. Procedure for repainting after repairs.		
	Sub-Total	24	50
	Total	48	100

6. Practical (minimum 10 from list):

- (i) Silt content in sand.
- (ii) Water required for cement of standard consistency.

- (iii) Initial and Final Setting Time of cement.
- (iv) Soundness test on cement.
- (v) Compressive Strength Test on cement.
- (vi) Water absorption on bricks.
- (vii) Compressive Strength test on bricks.
- (viii) Efflorescence Test on bricks.
- (ix) Setting out Foundation Plan on ground for load bearing and framed structure.
- (x) To construct dry brick masonry using actual bricks in stretcher. Header, English bond and Flemish bond with closer and bats for half, one and half brick thick wall.
- (xi) To check the verticality and horizontal level of construction work.
- (xii) Demonstration of plastering wall surface including preparation of cement mortar 1:4 with all precautions.
- (xiii) Assignment on building components and construction work like scaffolding, formwork, centering (Sketches).
- (xiv) Model making (Any one)
- (xv) Assignment on rate enquiry, brand names and specifications of material available in market.

7.IMPLEMENTATION STRATEGY:

1. Teaching Plan
2. Preparation of Drawings and sketches
3. Practical as per list
4. Models making
5. Market enquiry of materials
6. Use of Visual Aids

8.TEXT BOOKS :

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
1.	S.C. Rangawala	Engineering Materials.	Latest	2012	Charotar Publishing House
2.	Sushil Kumar	Building Construction	Latest	2012	Standard, New Delhi
3.	S. P.Arora	Building Construction	Latest	2012	Dhanpat Rai & sons

9.REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
1	S.K.Duggal	Building Materials	Latest	2009	New Age International
2	D.N.Ghosh	Materials of Constructions	Latest	1989	Tata McGraw Hill Publish.
3	P.C.Verghese	Building Materials	Latest	2005	PHI Learning Pvt. Ltd.
	Francis D.K. Ching	Building construction illustrated	Latest	2005	Wiley India
4	I.S. Codes				Bureau of Indian Standard

10.QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
*4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C111)	Semester: II
Course: Civil Engineering Drawing	Group : C*
Course Code : 160103	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
2	-	5	-	7	4	100	30	70	50@	-	50**	200	C*	257

3. COURSE OBJECTIVES:

Course will enable the student to appropriately read and interpret civil engineering drawings while supervising the Building under construction. Will be able to prepare Drawings of existing buildings by taking measurements. Will also be able to prepare working drawings and sectional drawings as a draftsman and also interpret drawings for estimating while working as an estimator.

4. COURSE OUTCOMES:

C111.1	Identify & illustrate technical terms, specifications
C111.2	Draw line plan and actual plan, elevation, section of public & private buildings.
C111.3	Understand the process for approval of building drawings with authorities.
C111.4	Draw the interiors and perspective of building.

5. CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	Introduction: 1.1 Selection and Designation of Paper sizes 1.2 Scales & Dimensioning. 1.3 Conventional representation of materials in section. 1.4 Symbols for General Fitments, Sanitary Applications & Electrical Installations.	04	10
2	Principles of layout 2.1 General principles, proportioning, composition, functional treatment and massing as applied to the buildings of various types. 2.2 Sun path Diagram & orientation of building. 2.3 Building Bye Laws.	06	10

3	Development of Line Plan: Proportioning & planning of 3.1 Residential buildings 3.2 Public Buildings like Hospitals, Hostels, Shops, Public Health Centers, Market, Hotels, Primary Schools, Small factories, Office buildings, Scheduled banks. etc.,	06	30
SECTION-II			
4	Detailed Drawing & Interior details : 4.1 Important terms used in Building Drawing 4.2 Drawing of Plan Elevation & Sectional Elevation of a Building. 4.3 Detailing and Proportioning of Interior of Building components. 4.4 Measure Drawing	06	20
5	Perspective Drawing: 5.1 Definitions of different planes 5.2 Introduction to Types of Perspectives 5.3 One point perspective of objects 5.4 Two point perspective of exterior of Building (Single floor only)	06	20
6	Municipal Drawings: 6.1 Preparation of different municipal drawings	04	10
TOTAL		32	100

6. TERM WORK:

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

1. Line plan of a Single storeyed Building.
2. One drawing of a single storeyed residential building prepared by taking actual measurements.
3. Two drawings showing the details of a Single storeyed Building prepared from a given line plan.
4. Perspective drawing of object (1 point perspective), Exterior of Building (2 point perspective)

7. IMPLEMENTATION STRATEGY (PLANNING):

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

8. 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	-
4	Sudhindra Yeri	Building Planning & Drawing	1 st	2014	Eastern Book Promoters. Belgaum

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 1 out of 2	22			Any 1 out of 2	16
2.	Any 3 out of 4 (4 marks each)	12			Any 1 out of 2	06
3.	Any 2 out of 3 (8 marks each)	16			Any 2 out of 3 (8 marks each)	08
4.			Any 1 out of 2	20		
5.			Any 1 out of 2 (4 marks each)	20		
6.			Any 2 out of 3 (5 marks each)	10		
Total		50		50		30

1 PROGRAM DETAILS:

Program: CE (C112)	Semester: II
Course: Communication Skill	Group : B*
Course Code : 160003	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	-	-	1	4	3	100	30	70	25 @	-	----	125	B*	314

3. COURSE OBJECTIVES:

Language remains a potential communicative medium of expressing ideas and concepts moods, feelings and attitudes. English is a means not only of international commerce; but also it is our window to the world. Properly used, new technology will help students to acquire the communication skills they need to survive in a complex, highly technological knowledge-based economy world. . Proficiency in English is a mandatory requirement of any professional workplace in the global job market. However, the ability to communicate effectively in English does not come easily to many people. Here arises the need to learn communication skills which will enable the students to enhance their comprehension, writing and oral skills in English.

4. COURSE OUTCOMES: Students will be able to

C112.1	Use the various grammatical structures which will enhance their oral and written communication.
C112.2	Apply all four language skills (LSRW) Listening, speaking, reading writing in real life situations to become effective communicator
C112.3	Demonstrate the proficiency in spoken English by using language lab software
C112.4	Prepare various types of reports, letters at organizational and personal level.

5. CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	Language 1.1 Language : Meaning & Nature Characteristics of Language	03	08
2	Development of Language skills - LSRW 2.1 Productive Skills: Speaking and Writing Types of Speaking and Writing , Techniques to improve Speaking and Writing	05	12
	2.2 Receptive Skills : Listening and Reading Types of Listening and Reading , Techniques of Listening and Reading		
3	Communication 3.1 Nature and Definition of communication 3.2 Process/ cycle of communication 3.3 Characteristics of communication	04	07
4	Organizational Networks of Communication 4.1 Importance communication in Organization 4.2 Horizontal communication 4.3 Vertical – downward & upward 4.4 Grapevine communication 4.5 Diagonal Communication	04	08
5	Grammar 5.1 Tense & its Types 5.2 Parts of speech 5.3 Degree and Its types	04	07
6	Vocabulary Building 6.1 Word Formation Processes Affixation : Prefix ,Suffix, clipping, blending compounding , Backformation, shortfoms, Acronyms 6.2 Antonyms and synonyms 6.3 Homonyms, homophones , homographs, Heteronyms and capitonyms	04	08
SECTION-II			
1	Language Lab & Spoken English 1.1 Listening & Speaking activities 1.2 English sound system (RP) Vowels & Diphthongs(RP) , Consonants(RP) 1.3 Word Accent , stress a Rhythm and Intonation	06	08
2	Letter writing 2.1 Importance of business communication 2.2 7 Cs of letter writing , 2.3 Layouts: semi –block ,Full block,	04	12

	2.4 letter of Enquiry, Order , 2.5 Job application with Resume		
3	Reading comprehension Reading Unseen passages for comprehension	04	08
4	Report Writing 4.1 Definition and Features of Report 4.2 Formats of reports 4.3 Types of Report : Accident, Investigation etc.	05	12
5	Essay writing 5.1 Definition of essay 5.2 Types of essay :Descriptive , Narrative , Imaginary , Critical, etc	05	10
TOTAL		48	100

6. TERM WORK:

List of Assignments

1. Explain the meaning and nature of Language.
2. **Speaking Activity** : Each student has to speak on given topic (#)
3. Find out any twenty difficult words from the English newspaper and understand their meaning by using dictionary and use it in your own sentences.
4. Write five examples of each sub type of Tense (Present , Past and Future)
5. Write the phonetic transcription of given words by using dictionary. (#)
6. Listen the recorded CD's on particular topic, and try to imitate the pronunciation by following intonation and rhythm. (#)
7. Listen and mark the primary, secondary accent for following words. (#)
8. Write a report on given topic in proper format.
9. Write a job application with your own resume.
10. Explain the Various formats of letter writing and give examples of each.
11. Write an essay on the given topic.

Note:

1. Each student has to attempt given ten assignments.
2. # marked are compulsory assignments/Practical to be completed in Classroom
/ Language Lab.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan

2. Lesson Plan

9. REFERENCE BOOKS:

S.N.	Author	Title	Edition	Year of Publication	Publisher & Address
1	Rekha Aslam	Aspects of language Teaching	Latest	-	Northern Book Centre ,New Delhi 1992
2	Lesikar and Petic	Business Communication	Latest	-	Tata Mcgraw Hill Publication New Delhi . 1995
3	-----	Communication Skills for Technical students	Latest	-	Orient Longman New Delhi .
4	Dr. Urmila Rai	Business Communication	Latest	-	Himalaya Publication, Mumbai .

10. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C113)	Semester: II
Course: Stress Management	Group : M
Course Code : 160016	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
-	2	-	-	2	--	---	--	---	--	--	-	--	M	022

3. COURSE OBJECTIVES:

1. Understand the basic methods to manage the stress.
2. Understand the social ethics
3. Develop the positive attitude towards society
4. Reduce psychological, mental and emotional stress

4. COURSE OUTCOMES: At the end of the course the students will be able to

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

5. DETAILED CONTENT

SR. NO.	TOPIC	PERIOD	MARKS
1.	1. HISTORICAL BACKGROUND AND YOGA i) Yoga in Vedas ii) Yoga and its Principles iii) Consciousness iv) v) Yoga approach and Scientific view vi) vii) Pranayama: Breath Control, Breath and Postures,	10	--

	<p>Rhythmic Breathing</p> <p>viii) Controlling the Body, Mechanism of Body: Kriyas and its high Therapeutic value.</p> <p>ix) vii) Body as understood in its frame work systems and structure: Asanas – Cultural and Relaxation Asanas -</p> <p>viii) Muscles strength, Muscular coordination strength of Immune system</p> <p>ix) Relation and Reflection techniques Shavasana – Shakshi Bhavanam.</p> <p>x) Bandhas and Mudras.</p> <p>xi) Depth of perception and expansion of awareness</p> <p>xii) Gross level – Muscular stretches</p> <p>xiii) Subtle level – Respiration changes and normalizing breath.</p>		
2.	<p>2. MEDITATION AND ITS TECHNIQUES: Meditative postures and kinds of Meditation</p>	10	10 --
	<p>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.</p> <p>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.</p> <p>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.</p> <p>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 at an individual level, help develop a value based social system.</p> <p>Spiritual Growth – Consciousness evolves, meditation brings harmony in creation, personal transformation, realization of self.</p> <p>Trusting, Happy and Content Society – These are the objectives of any society. Meditation empowers a society to achieve these qualities.</p>		
3.	<p>3. STRESS MANAGEMENT FOR STUDENTS Stress management techniques:</p> <ol style="list-style-type: none"> 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. 	04	04 --

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



Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively
SEMESTER-III

Sr. No.	Course Name & Code	Prerequisite Course. Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
14	Surveying (160105)		2	5			7	3	100	30	70	50@	50**		200	C*	257
15	Transportation Engineering -I (160107)		3	4			7	3	100	30	70	25@			125	C*	347
16	Concrete Technology (160108)		2	4			6	3	100	30	70	50@		50**	200	A*	246
17	Materials and Structures (160109)		4	2			6	3	100	30	70	25@			125	C*	426
18	Fluid Mechanics'(160113)		3	2			5	3	100	30	70	25@		50**	175	C*	325
19	Applied Mathematics (160013)		3			1	4	3	100	30	70	25@			125	C	314
20	Transportation Engineering-II (160110)		3				3	3	100	30	70				100	C	303
	Total		14	17	0	0	31	Total Paper = 05		150	350	175	100	100	825		

*: Compulsory,@: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management , # Diploma Award winning courses

Head of Department

Principal

1.COURSE DETAILS

Program :CE(C 201)	Semester: III
Course: Surveying	Group: C*
Course Code:160105	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	O	Total		
2	5	-	7		03	100	30	70	50@	50*	*	200	C*	257

3. COURSE OBJECTIVE:

This is core technology subject intended to teach the students core facts, concepts, principles and 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.COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C201.1	Understand the working principles of survey instruments i.e cross staff, prismatic compass, Planimeter, dumpy level, Theodolite, Plane Table and Tacheometer.
C201.2	Calculate the required the level at given points from the given Temporary Bench Mark and apply suitable checks.
C201.3	Calculate the angles from the bearings, find out the errors in bearings, correct the distance measured by erroneous chain, Calculate the distance and levels from the Tacheometer, calculate the consecutive and independent coordinates from the traverse data.
C201.4	Apply different methods of surveying and leveling used for traversing with chain, cross staff, Dumpy Level, Prismatic Compass, Theodolite, Plane Table and Tacheometer by working in teams.

5.DETAILED CONTENT:

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.	(01)	(04)
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 Cross staff: Use and adjustments, calculation of area of a regular plot 2.4 Tie lines and check lines. 2.5 Errors in chaining, locating details, recording in field book, plotting the survey, conventional signs	(02)	(10)
3	3.0 Chain and Compass Surveying: 3.1 Magnetic and true meridians, magnetic declination variation, prismatic compass parts, bearings, types of bearings, their conversions, checks, 3.2 Use and adjustments of prismatic compass, finding our 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, adjustments of errors etc.	(03)	(10)
4	4.0 Methods of levelling: 4.1 Parts of Dumpy level and its telescope, line of collimation , plane of collimation , bubble tube, focusing, parallax, bench marks, types of 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, types of leveling, precautions in levelling , sources of errors in leveling, permissible errors, plotting the level survey etc. 4.4 Leveling with any other instruments,	(04)	(16)
5	5.0 Contouring survey: 5.1 definition, characteristics of contour, Methods of contouring, interpolation of contours, use of contours, Topo sheets and their reading. .	(03)	(04)
6	6.0 Planimeter: 6.1 Parts, their functions, and use in measurements of areas by digital Digital planimeter	(03)	(06)

SECTION-II		(04)	(10)
7	<p>1.0 Theodolite Surveying</p> <p>1.1 Introduction, Classification of Theodolite, Transit and non- transit type, Vernier Theodolite, One Seconds Theodolite, etc.</p> <p>1.2 Technical Terms used in Theodolite, Swinging, Transiting, Telescope Normal, Telescope Inverted, Face Left, Face Right, Changing Face, etc.</p> <p>1.3 Fundamental axes of Theodolite, Relationship between fundamentals axes, Line of collimation, Axis of Telescope, Axis of level tube, Horizontal Axis, Vertical Axis,</p> <p>1.4 Temporary & Adjustment of Theodolite, Centering, Levelling, Elimination of Parallax, Permanent Adjustment of Theodolite,</p> <p>1.5 Use and application in measurement of horizontal angles and vertical angles in horizontal and vertical planes like, included angle, excluded angle, deflection angle, angle of elevation, angle of depression, vertical angle, levelling etc.</p> <p>1.6 Measurement of Horizontal Angles by different method , Ordinary method, Repetition method, Re-iteration method.</p> <p>1.7 Measurement of vertical angles, angle of elevation, depression and vertical angle.</p> <p>1.8 Precautions required in angular measurement with Theodolite, accuracy of work, Errors in theodolite survey</p>		
8	<p>2.0 Traversing :</p> <p>Various methods of traversing like included angles, excluded angles, deflection angle etc, Relation of included angles and bearings, latitudes and departure, consecutive and independent coordinates.</p>	(02)	(10)
	<p>2.1 Traverse Computation:</p> <p>7.1 Reduction and tabulation of co-ordinates, checks, plotting of co-ordinates, balancing the traverse, closing error and its adjustments, Gales Traverse Table, Bowditch's Rule, Transit Rule etc.</p>		
9	<p>3.0 Tacheometric Survey</p> <p>3.1 Principles of tacheometric surveying.</p> <p>3.2 Types of tachometers, use of anallatic lens,</p> <p>3.3 Difference between theodolite and tacheometer, Requirements of a tacheometer, Stadia Rod,</p> <p>3.4 Methods of tacheometric Survey, introduction of Fixed and Movable hair method</p> <p>3.5 Fixed Hair Method, 2 cases to be studied in detail i.e Line of Collimation Horizontal and Inclined and Staff Held Vertical in both the cases.</p> <p>3.6 Use for traversing and contouring, degree of accuracy, Problems on Line of sight Horizontal and staff held vertical and line of sight inclined and staff held vertical</p> <p>3.7 Tacheometric tables, computations, movable hairs and tangential method.(no questions to be asked)</p>	(04)	(12)
10	<p>4.0 Plane Table Surveying:</p> <p>4.1 Plane table, its use, Equipments used in plane table surveying, alidade, U fork or Plumbing Fork, Trough Compass etc, orientation, Magnetic needle method, back sight method of orientation</p>	(02)	(08)

	4.2 Methods of Plane Table Survey, Radiation Method, Intersection Method, Resection Method, Traversing Method.		
11	5.0 Curves : 5.1 Necessity of curves, (as on roads, railways, etc.). 5.2 Types of curves like simple, compound, reverse, transition and vertical curves, radius and degree of curve. 5.3 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. 5.4 Simple methods of setting out curves. (No Numericals on setting of curves)	(04)	(10)
Total		32	100

6.PRACTICAL:

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

6.1TERM WORKS:

The term work will consists 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 levelingOne sheet
5. ContouringOne sheet
6. Theodolite traverse survey One sheet
7. Plane table survey .. (Field work only and plotting of sheet by transferring points)
8. Journal: all experiments Minimum 10 covering all instruments

6.2PROJECT:

The project will consist of following on rough natural terrain

1. Profile Levelling for 750m, with offsets at every 15m interval and 3m on either side (2 days)
2. Contour Survey for plot of 25x25 meters (1 day)
3. Theodolite Traversing by Method of Included Angles (1 day)
4. Plane table Survey by Traversing and other methods (1 day)

7.IMPLEMENTATION STRATEGY:

1. Teaching Plan
2. Preparation of Drawings from the field data
3. Use of Instruments
4. Use of Visual Aids
5. Presentations

8.REFERENCE BOOKS

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	Purnima BC	Surveying-I Vol –I & II	15th	2010	Laxmi Pub New Delhi
2	Kanetkar & Kulkarni	Surveying and leveling Part-I & Part-II	26th	2011	Vidyarthi Griha, Pune
3	Hussain Nagaraj & Gajare V.S.	Surveying	9 th	2009	S.Chand Co.

9.QUESTION PAPERPATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C202)	Semester: III
Course: Transportation Engineering - I	Group : C*
Course Code : 160107	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	4	-	-	7	03	100	30	70	25@	-	-	125	C*	347

3. COURSE OBJECTIVE:

This course will help the student developing knowledge and skills in different areas such as planning, execution, supervision and maintenance of highways, roads and bridges and railways

4. COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C202.1	To classify the types of roads and bridges
C202.2	Understand the geometric design, construction and maintenance of roads, highways and railways.
C202.3	Understand the conditions prevailing at a bridge site and select a suitable bridge accordingly
C202.4	Understand various track alignment terms and yards.

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
	SECTION-I		
1	1.0 Overview of Transportation Engineering 1.1 Role of transportation in the development of nation 1.2 Modes of Transportation Systems –Roads, Railways, Waterways 1.3 Importance of each mode, Comparison and their relative merits	03	06

2	<p>2.0 Railways 2.0 Permanent way section for single line in cutting: Requirements, components and their functions 2.2 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. 2.3 Permanent way: Requirements , components and their functions: 2.4 Rails: Standard section used on Indian Railways, their relative merits and demerits.</p>	04	10
3	<p>3.0 Section of Rails, Fish plates and fish bolts: 3.1 Various rail sections along with their merits and dermerits.</p>	03	06
	<p>3.2 Rail joints. Fish plates _ common types. Expansion of rails, welding of rails. 3.3 Rail chair with fasteners 3.4 Bearing plates with fasteners 3.5 Spikes and Rail anchors</p>		
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	08
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. 5.1 Points and crossings: Description of split switch turns out. Number of crossings. Curve load, switch lead, lead of crossing, cross over. Diamond crossing, triangles, ladder tracks, gauntlet tracks. Traps. (No calculations.) 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>	06	10
6	<p>6.0 Mono rails, 6.1 Metro rails 6.2 Elevated rails</p>	05	10
	Total	24	50
Sr. No.	Topics SECTION-II	Periods	Marks

1	1.0 Highway and components 1.1 Classification of highway 1.2 Typical cross-section and components of a road 1.3 Requirements of an ideal highway 1.4 Highway Alignment and factors affecting it	02	06
2	2.0 Surveys, Alignment and Geometrics 2.1 Types of Surveys-Reconnaissance, Preliminary, Location 2.2 Sight Distance and its types 2.3 Gradient, super elevation, camber, grade compensation, widening of roads 2.4 Types of Curves	04	06
3	3.0 Bituminous Roads 3.1 Bituminous Materials and its applications 3.2 Tests for Bituminous Aggregates 3.3 Construction of bituminous roads 3.4 Failures in Bituminous Roads	03	06
5	5.0 Cement Concrete Roads 5.1 Construction of Cement Concrete roads 5.3 Failures in Cement Concrete Roads 5.4 Joints in Cement Concrete Roads	03	08
6	6.0 Highway Drainage 6.1 Sources of Drainage entering the road structure 6.2 Defects due to improper highway drainage 6.3 Requirements of a good drainage system 6.4 Surface and Subsurface Drainage	03	06
7	7.0 Bridge and component parts 7.1 Components of a bridge-Abutments, Wing walls, Piers, Bearings 7.2 Afflux, Economic Span, Freeboard, Waterway, Linearway 7.3 Alignment of a bridge 7.4 Selection of site for a bridge	03	06
8	8.0 Types of Bridges and Culverts 8.1 Fixed Span Bridge 8.2 Movable Span Bridges 8.3 Temporary Bridges 8.4 Types of Culverts	04	08
9	9.0 Maintenance of Bridges	02	04
		24	50
	Total	48	100

6. TERMWORK:

The term work shall comprise of a sketchbook consisting of following sketches

- A) Highway – 15 sketches
- B) Bridge- 15 sketches

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Site Visits
3. Assignments

8. REFERENCEBOOKS:

Sr. N	Author	Title	Edition	YearofPubl ication	Publisher&Address.
1	Birdi & Ahuja	Roads Railways & Bridges	7 th	1998	-
2	Khanna & Justo	Highway Engineering	8 th	2001	StandardBookHouse, NewDelhi
3	Bindra S.I.	Bridge Engineering	4 th	1999	Dhanpatrai&SonsN ewDelhi
4	N. L. Arora	Transportation Engineering	10 th	2005	-

9. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :CE(C 203)	Semester: III
Course: Concrete Technology	Group: A*
Course Code:160108	Duration:16 Weeks

2.TEACHINGANDEXAMINATIONSCHEME:

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	03	100	30	70	50@		50**	200	A*	246

3. COURSE OBJECTIVE:

To understand the core material of construction as Concrete, its ingredients, properties, making, handling, and quality control of the concrete.

4.COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C203.1	Understand the role of various ingredients of concrete, properties of concrete
C203.2	Implement quality control at site.
C203.3	Analyze the effects of different parameters on properties of concrete.
C203.4	Design the concrete mix.

5.CONTENT:

Sr. No.	Topics	Period	Marks
	SECTION - I		
1.	1.0 Materials for cement concrete: 1.1 Cement: Types of cement, Test (Ordinary Portland Cement, Portland Pozzolana Cement, Portland Slag Cement and their uses), Field testing, Laboratory testing (Standard Consistency, Initial and Final setting time test, soundness test, compressive strength test. 1.2 Aggregates: Classification, sources of aggregates, Size, Shape, Texture, Strength of aggregates, Bulk Density, Specific Gravity, Bulking of aggregates, Alkali Aggregate reaction, Grading of aggregates: Sieve analysis and	4	13

Sr. No.	Topics	Period	Marks
	combining aggregates, Standard grading curve. 1.3 Water: Quality of water for use in concrete. 1.4 Admixtures: Classification, Plasticizer and super plasticizer, action of plasticizer and super plasticizer, Retarder, Accelerator, Air-entraining agents, Mineral Additives: Natural and artificial pozzolanic materials.		
2.	2.0 Fresh concrete: 2.1 Workability, Factors affecting workability, Measurement of workability: Slump test and types of slump, Compaction factor test, Flow test, Flow table test, Vee-Bee consistometer Test, Segregation, Bleeding, Temperature of concrete.	3	13
3.	3.0 Manufacturing of concrete: 3.1 Manufacturing process of concrete: Batching: Weigh batching and volumetric batching, Quantity estimate of materials, Mixing: Hand mixing and machine mixing, transporting, Pumping, Selection of pump, Placing, Compacting, Types and use of vibrators, Over-vibration, Re-vibration. 3.2 Curing, Curing methods, Finishing of concrete 3.3 Ready mix concrete (RMC)	3	8
4.	4.0 Testing of hardened concrete: 4.1 Compression Test: Moulds, Compaction: by hand and by vibration, Failure of specimen, Cylinder strength, Effect of height to diameter ration, comparison of cube and cylinder strength, Tensile strngth (Flexural test), Accelerated curing test, Core test. 4.2 Non Destructive Tests: Smidth Rebound Hammer Test, Ultra Sonic Pulse Velocity Test.	3	8
5.	5.0 Strength of concrete: 5.1 Water / Cement ratio, Effect of water / cement ratio, Strength gain with age, Relation between free water cement ratio and compressive strength, Effect of compaction on strength, Effect of curing on strength. 5.2 High strength concrete, Ultra high strength concrete, High performance concrete.	3	8
	Sub-total (I)	16	50
	Section -II		
6.	6.0 Durability of concrete: 6.1 Creep, effect of creep, Shrinkage : plastic shrinkage, drying shrinkage	2	8

Sr. No.	Topics	Period	Marks
	6.2 Strength and durability relationship, Cracking in concrete: Plastic shrinkage cracks, Settlement crack, Drying shrinkage cracks, 6.3 Joints in concrete: Construction joint, Expansion joint.		
7.	7.0 Concrete mix design: 7.1 Nominal Mix and Design Mix, Introduction to mix design, Terminology in mix design, General principles and considerations of mix design. 7.2 Variability in concrete, factors contributing to variability in concrete strength, Measure for good quality concrete, Characteristic strength, Sampling and number of samples, Standard deviation and tolerance factor, Target mean strength, Acceptance criteria as per I.S. 456:2000. 7.3 Methods of mix designs: Introduction to different method: Road Note No. 4 Method, A.C.I. Method, B.R.E. Method, I.S. Guidelines Method, Comparison of different methods. 7.4 Detailed concrete mix design by I.S. Guidelines Method	5	18
8.	8.0 Special Concrete: 8.1 Light weight concrete 8.2 Aerate concrete 8.3 High density concrete 8.4 Fibre reinforced concrete 8.5 Self compacting concrete (SCC), material for SCC, Workability requirement, Use of new generation plasticizers (viscosity modifier)	3	8
9.	9.0 Precast concrete products: 9.1 Types, method of casting, uses.	2	4
10.	10.0 Form work for concrete construction: 10.1 Materials for formwork, Quality of good formwork, Permissible tolerance from specified dimension, (No problem on design of form work), formwork removing non-staining oil (releasing agent), 10.2 Form work for columns, column footings, beams, slab, walls, retaining walls, staircase and circular tanks 10.3 Removal of form work, Stripping time of formwork, Sequence of formwork removal, Repropping.	2	8
11.	11.0 Machinery for execution of concrete works: 11.1 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., 11.2 Machinery for compaction of concrete, internal vibrators,	2	4

Sr. No.	Topics	Period	Marks
	external vibrators, vibrating tables, surface vibrators. 11.3 Maintenance of construction equipment.		
	Sub-total (II)	16	50
	Total	32	100

6. PRACTICAL AND TERM WORK:

The term work shall comprise practical (minimum 10 from list) from amongst the following:

- 1.Slump Cone Test
- 2.Compaction Factor Test
- 3.Concrete Cube Test
- 4.To study the effect of water- cement ratio on strength of concrete.
- 5.To study the effect of compaction.
- 6.To study the effect of Curing on concrete.
- 7.To study effect of Various Admixtures on concrete.
- 8.Effect of specimen size on compressive strength.
- 9.Fineness modulus of coarse and fine aggregates.
- 10.Dry Loose Bulk Density
- 11.Specific Gravity of Fine and Coarse Aggregate
- 12.Concrete mix design by I.S. guideline method
- 13.Rebound hammer test
- 14.Ultra-sonic Pulse Velocity Test
- 15.Core Test (demonstration)
- 16.Sketch book (minimum 6 plates) on formwork

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Presentation and videos
3. Site Visits

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
2	M.S.Shetty	Concrete Technology	17 th	2015	S.Chand & Co,New Delh
3	M.Y.Sabnis	Mix Design Made Easy	3 rd	2009	ACC Ltd
4	A.M.Neville	Properties of Concrete	4 th	2009	ELBS England
5	ACC- RCD	Concrete Mix Design	1 st	1993	ACC RDD Thane
7	ISI	Handbook of Concrete Mixture	1 st	1982	ISI
8	IS 456: 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 Ozyildirim	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 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1 COURSE DETAILS:

Program: CE (C204)	Semester: III
Course: Material and Structure	Group : C*
Course Code : 160109	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
4	2	-	-	6	03	100	30	70	25@	--		125	C*	426

3. COURSE OBJECTIVES:

To impart the knowledge of elastic behavior of materials and judge the strength characters against the different modes of stresses acting on it by using the principles of mechanics as a tool.

4. COURSE OUTCOMES: At the end of the course the students will be able to

C204.1	Classify elastic & plastic materials and determine the second moment of area of prismatic structural members.
C204.2	Determine simple stresses and strains in structural members subjected to axial, bending and torsional loads and strain energy due to axial load
C204.3	Determine the compound stresses & strains and identify principal stresses and planes
C204.4	Determine shear force & bending moment in structural members and draw SF & BM Diagram.
C204.5	Classify concentric (axial) load and eccentric load on structural member and determine stresses due to eccentric load.

5. CONTENTS:

S. NO.	SECTION-I	PERIODS	MARKS
	TOPICS		
1	STRESS & STRAIN 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. Practical 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	15
2	2.0 ELASTIC CONSTANTS	06	10

	<p>2.1 Definition of lateral strain, Poisson's ratio.</p> <p>2.2 Change in lateral dimensions</p> <p>2.3 Volumetric strain due to axial force and change in volume</p> <p>2.4 Bi axial and Tri axial stresses and volumetric strain</p> <p>2.5 Definition of Bulk Modulus, change in volume</p> <p>2.6 Relation between Modulus of Elasticity Modulus of Rigidity and Bulk Modulus.</p>		
3	<p>STRAIN ENERGY</p> <p>3.1 Types of loading - gradual, sudden & Impact load</p> <p>3.2 Definition of strain energy, modulus of resilience and proof resilience.</p> <p>3.3 Comparison of stresses due to gradual load, sudden load and impact load. Instantaneous stress induced in the body</p> <p>3.4 Strain energy stored due to gradual, sudden & impact load in the body.</p> <p>Practical</p> <p>Impact test on mild steel, brass, copper and cast iron</p>	04	05
4	<p>PRINCIPAL PLANES AND STRESSES</p> <p>4.1 Stresses on oblique plane i.e. normal stress and tangential stress</p> <p>4.2 Definition of principal planes and principal stresses</p> <p>4.3 Principal planes and principal stresses due to Biaxial stress system (Analytical and graphical method)</p> <p>4.4 Principal plane and principal stresses due to complex stress system (Analytical and graphical method)</p>	06	10
5	<p>MOMENT OF INERTIA</p> <p>5.1 Concept of moment of inertia M.I. of plane areas such as rectangle, triangle, circle, semicircle and quarter circle</p> <p>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.</p>	06	10
	SECTION - II		
6	<p>SHEAR FORCE & BENDING MOMENT DIAGRAMS</p> <p>6.1 Definition of Shear Force and Bending Moment, relation between SF & BM and Load.</p> <p>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).</p> <p>6.3 Maximum SF and BM and their positions, Point of contra flexure.</p>	10	15
7	BENDING STRESSES IN BEAMS	06	10

	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 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.	04	05
9	TORSION 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	06	10
10	DIRECT AND BENDING STRESSES. 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.	06	10
	TOTAL	64	100

6. TERM WORK:

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

Part I: (Minimum one from each)

a. Cement

1. Fineness,
2. Adulteration,
3. Consistency
4. Initial & final setting time

b. Sand (fine aggregates)

1. Voids,
2. Silt content
3. Bulking
4. Fineness modulus
5. Metal (coarse aggregates)
6. 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.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Charts & Models
3. Power Point Presentations

8. 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
6	S B Junnarkar	Mechanics of Structures Vol-I & II	LATEST	Charotar Publishing House

9. QUESTION PAPER PATTERN

Que. No	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
	Total	50		50		30

1. COURSE DETAILS:

Program: CE (C205)	Semester: III
Course: Fluid Mechanics	Group : C*
Course Code : 160113	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	2	-	-	5	03	100	30	70	25@	-	50**	175	C*	325

3. COURSE OBJECTIVES:

The course will introduce the fundamental principles of fluid mechanics and establish its relevance in civil engineering and demonstrate how these are used for the design of simple hydraulic components

4. COURSE OUTCOMES:

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

C205.1	Determine different types of fluids and fluid properties
C205.2	Understand types of pressure gauges and Calculate pressure in a pipe using Piezometer, Differential manometer and U-tube manometer
C205.3	Identify and Calculate major and minor losses in pipes
C205.4	Classify and Determine coefficient of discharge for orifices, venturimeter, notches, weirs, mouthpieces and nozzles
C205.5	Calculate Hydrostatic forces for submerged bodies and metacentric height for floating bodies
C205.6	Understand working of different types of pumps

5. DETAILED CONTENTS:

Sr. No	Topics Section I	Period	Marks
1.	1.0 Introduction 1.1 Definition of fluid, fluid mechanics, types of fluids 1.2 Properties of fluids 1.3 Newton's law of viscosity, Types of viscosity	04	08
2	2.0 Pressure and its measurement 2.1 Fluid pressure, Pascal's law and its application 2.2 Absolute, Gauge, Atmospheric and Vacuum pressure. 2.3 Measurement of Pressure-Manometers and Mechanical Gauges	06	12
3	3.0 Hydrostatic Forces on Surfaces 3.1 Total pressure and centre of pressure 3.2 Total pressure and center of pressure for Vertical and inclined plane surfaces,	04	10

4	4.0 Equilibrium of floating bodies 4.1 Archimedes Principle, Buoyancy 4.2 Buoyancy, Centre of Buoyancy 4.3 Metacentre, Metacentric Height 4.4 Stable, Unstable , Neutral Equilibrium	06	12
4	4.0 Kinematics and Dynamics of flow 4.1 Types of fluid flows 4.2 Rate of flow, Continuity Equation. 4.3 Bernoulli's theorem. 4.4 Applications of Bernoulli's theorem	04	08
Section II			
5	5.0 Orifices and Mouthpieces 5.1 Classification of orifices 5.2 Experimental determination of hydraulic coefficients 5.3 Flow through large, fully and partially submerged orifices 5.4 Classification of Mouthpieces 5.5 Flow through External and Internal Mouthpieces	04	10
6	6.0 Notches & weirs: 6.1 Classification of notches and weirs. 6.2 Discharge over a rectangular, triangular and trapezoidal notch/weir 6.3 Velocity of Approach and End Contractions 6.4 Cipolletti, Ogee and Submerged weirs	04	10
7	7.0 Flow through pipes: 7.1 Loss of Energy in Pipes: Major and Minor losses 7.2 Hydraulic gradient and total energy line 7.3 Waterhammer: Causes and Effects 7.4 Flow through pipes in series and parallel	10	18
8	8.0 Pumps: 9.1 Definition and Use of a pump 9.2 Centrifugal Pump: Heads and Efficiencies, Main Parts, Working, Priming 9.3 Reciprocating: Main parts, working 9.4 Simple numericals on capacity and efficiency of pumps	06	12
Total		48	100

6. 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) Verification of Bernoulli's theorem.
- (ii) Determination of Coefficient of discharge of Venturi meter and Orifice meter
- (iii) Determination of friction factor in a pipe

- (iv) Determination of minor losses in a pipe
- (v) Determination of coefficient of discharge for various types of notches and weirs
- (vi) Determination of co-efficient of discharge of an external or internal cylindrical mouthpiece running full.
- (vii) Study of flow in open channels
- (viii) Measurement of velocity by any one of the following: Current meter, Pitot tube or Orifice meter

7. IMPLEMENTATION STRATEGY (PLANNING):

- a. Teaching Plan
- b. Assignments

8. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1.	R. K. Bansal	A Textbook of Fluid Mechanics and Hydraulic Machines	9th	2012	Laxmi publications Pvt Ltd.
2	Modi & Seth	Fluid Mechanics & Hydraulic Machines	5th	1992	Standard Book House
3	Jagdish Lal	Fluid Mechanics & Hydraulic Machinery	9th	1987	Metropolitan Book, New Delhi
4	A. K. Mohany	Fluid Mechanics	2nd	2002	Prentice Hall of India Pvt. Ltd. New Delhi

9. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
	Total	50		50		30

1. COURSE DETAILS:

Program: CE (C206)	Semester: III
Course: Applied Mathematics	Group : C
Course Code : 160013	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	-	-	1	4	3	100	30	70	25@	-	-	125	C	314

3. COURSE OBJECTIVES:

Applied Mathematics intends to teach students the concepts and principles of Mathematics which can be applied to solve problems in Civil & Structural Engineering Analysis.

4. COURSE OUTCOMES:

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

C206.1	Understand & solve problems of different Integration methods & apply the same in engineering problems.
C206.2	Effectively apply the probability concepts in engineering problem solving.
C206.3	Understand & form differential equations of civil engineering analysis problems and solve it.
C206.4	Solve numerical method based problems of engineering applications.

5. DETAILED CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	INTEGRATION 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 <ul style="list-style-type: none"> •Substitution •Partial fraction •Trigonometric transformation •Part's Method 1.5 Definite Integration <ul style="list-style-type: none"> •Using properties •Mean Value •Root mean square value •Reduction Formula 1.6. Application of Integration <ul style="list-style-type: none"> •Area •Volume •Centre of Gravity •Moment of inertia 	15	32

	•Rectification		
2	PROBABILITY 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	09	18
	SECTION-II		
3	DIFFERENTIAL EQUATIONS 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	15	32
4	NUMERICAL METHODS 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	09	18
	TOTAL	48	100

6. TERM WORK:

One assignment on each topic consisting of problems covering all varieties, continuously assessed by teacher & submitted by student at the end of term.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Tutorials
3. Assignments

8. REFERENCE BOOKS:

S. N.	Author	Title	Edition	Publisher & Address
1	Shri. S.P.Deshpande	Calculus for Polytechnics	Latest	Pune Vidyarthi Graha Prakashan Pune-30
2	Shri. B.M. Patel Shri J.M. Rawal	Applied Mathematics	Latest	Nirali Prakashan Mumbai
3	Dr. B.S. Grewal	Higher Engineering Mathematics	Latest	Khanna Publishers 2/B, Delhi-6
4	J.N. Wartikar, P.N. Wartikar	A text book of Applied Mathematics	Latest	Pune Vidyarthigraha Prakashan, Pune-30
	S.S.Sastry	Introductory methods of Numerical analysis	Latest	Prentice Hall of India – New Delhi
	M.K.Jain	Numerical method for Scientific and engineering	Latest	Wiley estern

		computation		
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8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS

Program :CE(C 207)	Semester: III
Course: Transportation Engineering - II	Group: C
Course Code:160110	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	-	-		3	03	100	30	70	--	--		100	C	303

3. COURSE OBJECTIVE:

The course will introduce various terms of Railway engineering and establish its relevance in civil engineering. Also the student will be able to assist in planning of airport, run ways, surface drainages, layout, etc. and maintenance the airport civil structures.

4. COURSE OUTCOME:

After the completion of the course the student will be able to:

C208.1	Understand the basic terminologies of Airport and Design airport pavement.
C208.2	Apprehend airport drainage system with respect to all terminologies.
C208.3	Understand various terms and new systems related to MRTS (Mass Rapid Transport Systems).

5. DETAILED CONTENTS:

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.	02	06
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.	04	07
5	5.0 Airport terminal area & layout: 5.1 Planning Terminal requirements and Facilities. 5.2 Typical Airport Layout	04	05
6	6.0 Design & types of pavement: 6.1 Types of pavement. 6.2 Design of flexible pavement. 6.3 Design of Rigid pavements.	04	05

7	7.0 Airport drainages. 7.1 Surface drainages. Underground drainage. 7.2 Special features of Airport Drainage.	02	06
8	8.0 Traffic aids and Airport marking: 8.1 Traffic aids & airport marking. 8.2 Terminal area control. 8.3 Identification of runways. Lighting of runways. 8.4 Terminal Area control 8.5 Identification of Runway 8.6 Lighting of Runway	04	09
9	9.0 Accident in Air – Introduction: 9.1 Probable causes of accidents. 9.2 Navigational Aids	02	06
	Total	24	50
	SECTION - II		
12	Present scenario of transportation systems	01	03
13	Need of Mass Rapid Transport System (MRTS) in metro and mega cities	01	04
14	Metro rails and mono-rails. Concept of Bus rapid transport systems (BRTS)	04	08
15	BRTS. Bus rapid transport systems, concept	02	04
16	Infrastructure related to MRTS	04	08
17	Project management of MRTS projects, feasibility, safety	06	12
18	New modes like skywalks, station traffic control systems	02	04
19	Linkages, Trans harbour links, links road, FOBs, common ticketing, point to point services	02	04
20	Govt. initiatives for private sector to participate in MRTS and projects	01	03
	Total	24	50

6. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visits

7. REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of	Publisher & Address.
1	Birdi & Ahuja	Roads, Railways & Bridges.	7th	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 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30



Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively
SEMESTER-IV

Sr. No.	Course Name & Code	Prerequisite Course. Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
21	#Environmental Engineering (160112)		4	3			7	3	100	30	70	50@		50**	200	A*	437
22	#Quantity Survey, Estimation & Valuation (160114)		2	4			6	3	100	30	70	50@		50**	200	A*	246
23	Mechanics of Structures (160115)		4				4	3	100	30	70				100	C*	404
24	#Geotechnical Engineering (160125)		3	3			6	3	100	30	70	50@		50**	200	A*	336
25	Elective (Any one)																
	Design Practice of Steel Structures (160116)		3		4		7	3	100	30	70	50@		50**	200	A*	347
	Urban Renewal & Redevelopment (160119)		4		2	1	7	3	100	30	70	50@		50**	200	A*	437
26	Solid Waste Management (160118)		3				3	3	100	30	70				100	A	303
27	Computer Software Skill (160111)			4			4					50@	50**		100	A	044
	Total		16	10	4	0	30	Total Paper = 05		150	350	200	0	200	900		

*: Compulsory, @: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management, # Diploma Award winning courses

Head of Department

Principal

1.COURSE DETAILS

Program :CE(C 208)	Semester: .IV
Course: #Environmental Engineering	Group: A*
Course Code:160112	Duration:16 Weeks

2.TEACHINGANDEXAMINATIONSCHEME:

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	3	-	-	7	03	100	30	70	50@		50**	200	A*	437

3. COURSE OBJECTIVE:

This subject is intended to teach the students concepts, principles and procedures in different treatment required for water and wastewater and their suitability.

4. COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C208.1	Analyze characteristics of water and waste water.
C208.2	Work out the different demands of water required to be supplied while planning a water treatment plant and the quantity of waste water while planning a sewage treatment plant.
C208.3	Understand the working, operational problems and maintenance of different component of water and waste water treatment plants.
C208.4	Decide the suitable treatment to be given to the raw water and waste water based on the characteristics.

5.CONTENT:

Sr. No	Topics Section I	Period	Marks
1.	Introduction 1.4Importance and necessity for Planned Water Supply scheme. 1.5Planning, execution and pricing of Municipal Water Supplies	01	04
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	06

3	Sources of water 3.1 Surface, subsurface sources 3.2 Intakes, Definition, factors governing location of an intake 3.3 wet intake tower, dry intake tower, River intake, Canal Intake, etc	03	06
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 Quality standards for Municipal Water Supplies.	06	08
5	Treatment of water 5.1 Screenings, Coarse and fine screens 5.2 Plain Sedimentation, Theory of Sedimentation, Sedimentation tanks, Horizontal Flow, Vertical Flow 5.3 Sedimentation Aided with Co-agulation, Chemicals used for coagulation and their comparison, Coagulation sedimentation plant 5.4 Filtration, theory of filtration, Filter materials Slow sand filters, Construction, Operation and Cleaning, Rate of filtration, Efficiency and performance, 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 5.5 Disinfection: Chlorination, Doses of chlorine, Types of Chlorination, Pre, post, Double, Break point, Super, and De-chlorination.	10	14
6	Miscellaneous Treatment 6.1 Water Softening : Necessity, Methods of removal of Temporary and permanent hardness 6.2 Removal of Color, Odour and Taste: Aeration, Methods of Aeration 6.3 Removal of Salt and Dissolved Solids: Desalination Process	04	06
7	Distribution System 7.1 Necessity, Requirements of good distribution system 7.2 Layouts of Distribution System, Dead End system, Grid Iron system, Ring system, Radial system. 7.3 Methods of Distribution of Water, Gravitational System, Pumping System, pressure in the distribution system 7.4 Distribution Reservoirs, Surface, Elevated, Stand Pipes	04	06
SECTION-II			

1. Introduction 1.1 Sanitation, importance of sanitation, principles of sanitation 1.2 Systems of Sanitation 1.3 Types of Sewerage Systems 1.4 Components of a sewerage system 1.5 Estimation of Design sewage discharge	02	04
2 Sewers: Construction, Maintenance and required Appurtenances 2.1 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) 2.2 Appurtenances: Catch basins and clean outs ,Drop manholes ,flushing tanks, grease and oil traps ,Types of traps, Flushing cisterns, Inlets, inverted siphon, lampholes, manholes,	06	08
3 Sewage Collection from houses and buildings 3.1 Traps, classification of traps, Requirements of good traps, 3.2 System of Plumbing, single stack, one pipe, two pipe, one pipe partially ventilated. 3.3 Wastewater Recycling in Buildings	04	06
4 Characteristics of Sewage: 4.1 Physical tests like colour, taste and odour, temperature, turbidity 4.2 Chemical tests like chlorine, fats grease and oil, nitrogen, oxygen, pH value, total solids, 4.3 Bacteriological tests	04	06
5 Disposal of the Sewage effluents 5.1 Disposal by dilution-Conditions favoring disposal by dilution ,Self purification of streams, Standards of dilution for discharge of wastewater into rivers 5.2 Disposal in land: Disposal of sewage effluent on land for irrigation, Quality standards for wastewater effluents to be discharged on land for irrigation, Effluent irrigation and sewage farming, sewage sickness	04	06
6 Treatment of sewage 6.1 Primary treatment, screening, disposal of screenings, grit chambers, detritus tank, plain sedimentation tanks, classification of sedimentation tanks 6.2 Secondary treatment: Trickling Filters, Activated Sludge process, Rotating Biological Contractors, oxidation ponds, Aerated Lagoons 6.3 Anaerobic stabilization Units: Septic tanks, Imhoff tanks, Claridigesters 6.4 Chlorination of sewage	08	14
7 Sludge Digestion and Disposal 7.1 Sludge and its moisture content 7.2 Stages in Sludge digestion Process 7.3 Sludge Digested tanks or digestors 7.4 Disposal of digested sludge	04	06

	Total	64	100
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6. TERM WORK:

The term work shall comprise exercises from amongst the following:

- Various tests on water and waste water.
- The students should prepare a sketch book containing 25 sketches on the topics mentioned in the syllabus.
- This will consist of a report on the visit to the water and sewage treatment plant.
- There will be practical examination consisting of sketching and oral based on the term work.

7. IMPLEMENTATION STRATEGY (PLANNING) :

4. Teaching Plan
5. Site Visit to Water Treatment Plant and Waste Water Treatment Plant
6. Presentations

8. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	S.K. Garg	Water Supply & Sanitary Engineering	8 th	2013	Khanna Publisher New Delhi
2	Gharpure V.N	Water Supply & Sanitary Engineering	8 th	1999	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	8 th	2012	S.Chand & Co. New Delhi

9. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		

5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C209)	Semester: IV
Course: #Quantity Survey Estimation & Valuation	Group : A*
Course Code : 160114	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
2	4	-	-	6	03	100	30	70	50@	-	50**	200	A*	246

3. COURSE OBJECTIVES:

This subject will help the students to understand the different methods of estimating, mode of measurement and enable the student to prepare outline specification and learns to draft specification for building items.

4. COURSE OUTCOMES:

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

C209.1	Understand Necessity, Types and Use of Estimate
C209.2	Identify modes of measurements as per IS 1200
C209.3	Prepare quantity Estimates for roads, buildings and Bridges
C209.4	Write specifications for various items of Civil Engineering works
C209.5	Prepare Rate Analysis for various items of Civil Engineering works
C209.6	Understand Valuation and Depreciation

5. DETAILED CONTENTS:

Sr. No	Topics Section I	Period	Marks
1.	1.0 Introduction 1.1 Meaning of the terms - Quantity Surveying, Estimation 1.2 Purpose of Estimating and Costing 1.3 Type of Estimates: Approximate & Detailed	04	08
2	2.0 Types of Approximate Estimates 2.1 Uses of Approximate Estimates 2.2 Methods of Approximate Estimates for buildings only. 2.2.1 Plinth area / built up area 2.2.2 Cubical contents 2.2.3 Service unit/ Unit rate 2.2.4 Bay Method	04	12
3	3.0 Modes of measurements 3.1 Fixing unit of measurement for items of work (Principle of Unit) 3.2 Desired accuracy in taking measurement 3.3 Standard modes of measurement of important items of Civil & Architectural works as per P.W.D. and I.S. – 1200	04	10

4	4.0 Detailed Estimates 4.1 Uses of detailed Estimates 4.2 Types of Detailed Estimates – 4.2.1 Fresh/New estimate 4.2.2 Supplementary estimate, 4.2.3 Revised estimate, 4.2.4 Annual repair & maintenance estimate & special repairs estimate 4.3 Data required for preparing detailed Estimate - drawings, specification, rates & mode of measurements. 4.4 Estimating quantities for different items of work for buildings (P.W.D.method).	06	20
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.	02	06
6	6.0 Specifications 6.1 Definition and purpose. 6.2 Principles of writing specifications. 6.3 Types of Specification 6.5 Drafting of detailed specifications	04	16
7	7.0 Rate analysis: 1 Definition. 2 Factors affecting Rate Analysis 3 District Schedule of rates. 7.4 Lump sum provisions, Contingencies, Overhead costs. 7.5 Rate analysis for important items of work of Civil Engineering.	06	18
7	8.0 Valuation and Depreciation: 8.1 Meaning of Valuation 8.2 Types of Values. 8.3 Methods of Valuation	04	10
Total		32	100

6. TERM WORK:

The term work shall comprise of the following list of Practicals:

- 1) Simple problems on methods of approximate estimates for buildings only
- 2) Simple problems on calculation of quantities for different components of a building
- 3) Writing/ drafting detailed specifications for some important items of Civil and Architectural Works. (Minimum 5 items)
- 4) Preparing Rate Analysis for some important items of Civil and Architectural Works. (Minimum 5 items)
- 5) Numerical on Valuation

7. IMPLEMENTATION STRATEGY (PLANNING):

4. Teaching Plan
5. Site Visits
6. Assignments

8. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	B.N. Dutta	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

9. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
	Total	50		50		30

1.COURSE DETAILS

Program : CE(C 210)	Semester: IV
Course: Mechanics of Structures	Group: C*
Course Code: 160115	Duration:16 Weeks

2.TEACHINGANDEXAMINATIONScheme:

Scheme of Instruction 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	100	30	70				C*	404

3. COURSE OBJECTIVE:

To understand the analysis of various structural elements like frames, beams, columns, retaining structures, etc., under the loaded condition.

4.COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C210.1	Analyse the structure for Flexure, shear, deflection, etc.
C210.2	Analysis the stability conditions of water and earth retaining structures.
C210.3	Compare and distinguish between elastic and plastic (inelastic) methods of analysis in structures.

5.CONTENT:

Sr. No.	Topics	Period	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, assumptions, BUCKLING LOAD, Rankine's Formula, factor of safety, safe load on columns, built up columns, application of Eulers's and Rankine formulae, designing solid circular or hollow circular sections	8	12

Sr. No.	Topics	Period	Marks
2	<p>2.0 Stresses in plane (pin jointed) frames</p> <p>2.1 Introduction, Types of frames, perfect and imperfect frames, relation between joint and member, condition for perfect frame.</p> <p>2.2 Analysis for Forces in perfect frames</p> <p>2.3 Method of joints, Methods of sections. Graphical method</p>	8	12
3	<p>3.0 Dams and Retaining Walls:</p> <p>Water retaining structures:</p> <p>3.1 Rectangular dams. Trapezoidal dams having water face vertical as well as battered.</p> <p>3.2 Stability conditions of a dam section</p> <p>3.3 Minimum base width of a dam. Maximum height of a dam.</p> <p>Earth retaining masonry structures.</p> <p>3.4 Application only of Rankine's theory of earth pressure. Active and passive earth pressure.</p> <p>3.5 With earth retaining face vertical or battered. (No surcharge to be considered in all these cases).</p> <p>3.6 Stability conditions of retaining walls.</p> <p>3.7 Minimum depth of foundation by Rankine's theory.</p>	8	14
4	<p>4.0 Plastic Theory :</p> <p>4.1 Introduction to advanced developments in 'Structural Engineering analyses such as plastic theory, Limit design.</p> <p>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,</p> <p>4.3 Equal area axis, plastic section modulus, shape factor of sections used in structures.</p> <p>4.4 Application of plastic theory to simply supported beams, propped cantilevers, fixed beams, simple problems.</p>	8	12
	Sub-total (1)	32	50
	SECTION – II		
5	<p>5.0 Slope and deflection :</p> <p>5.1 Introduction, Relation between slope, deflection and radius of curvature. Slope and deflection at a point in a simply supported and cantilever beams.</p> <p>5.2 Macaulay's method for combination of loads in beams.</p> <p>5.3 Moment area method for slope and deflection.</p>	6	10

Sr. No.	Topics	Period	Marks
6	6.0 Fixed beams : 6.1 Introduction, Advantages of fixed beams. 6.2 Fixed 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	12
7	7.0 Continuous beams : 7.1 Introduction, Clapeyron's theorem of three moments (derivation is excluded). 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	14
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, Bending moment and Shear force diagrams. 8.3 Application to the symmetrical non-sway single storey single bay portal frames, Bending moment diagram.	10	14
Sub-total (2)		32	50
Total		64	100

6. IMPLEMENTATION STRATEGY (PLANNING):

- Teaching plan and assignments.

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	Vazirani & Ratwani	Analysis of Structures Vol. II	-do -	- do -	Khanna Publishers New Delhi
3	S. B. Junnerkar & Advani	Mechanics of Structures	-do -	- do -	Charotar Pub. House
4	S. Ramamrutam	Theory of Structures	-do -	- do -	Dhanpat Rai Publishing New Delhi

8.0 QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4			Any 6 out of 8 (3 marks each)	18		
5			Any 4 out of 6 (4 marks each)	16		
6			Any 2 out of 3 (8 marks each)	16		
	Total	50		50		30

1. COURSE DETAILS:

Program: CE (C 211)	Semester: IV
Course: # Geotechnical Engineering	Group : A*
Course Code : 160125	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	3	-	-	6	3	100	30	70	50@	-	50**	200	A*	336

3. COURSE OBJECTIVES:

To impart the knowledge of soil classification and determine the basic properties and behaviour of soil under different conditions, to judge the strength parameters and find the bearing capacity of soil, to determine the earth pressure on the retaining walls.

4. COURSE OUTCOMES:

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

C211.1	Determine and Interpret characteristics and classify the soils
C211.2	Understand the compaction methods and its control
C211.3	Identify and calculate the shear strength parameters of soil in fields
C211.4	Classify and understand bearing capacity of soils & suggest the improvements.

5. DETAILED CONTENTS:

S. NO.	SECTION-I TOPICS	PERIODS	MARKS
1	INTRODUCTION 1.1 Definition of soil, Geological & Engineering 1.2 Importance of soil in Civil Engineering Structures as foundation bed for structures 1.3 Field application of geotechnical engineering foundation design, pavement design, design of earth retaining structures, design of earthen dams (brief ideas only)	02	04
2	PHYSICAL PROPERTIES OF SOIL 2.1 Soil as a two phase & three phase system 2.2 Water content, Determination of water content by oven drying method as per IS code 2.3 Void ratio, porosity and degree of saturation, density index 2.4 Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated and submerged unit weight 2.5 Weight & volume and other fundamental relationships.	06	12

	2.6 Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code 2.7 Specific gravity, determination of specific gravity by pycnometer.		
3	CONSISTENCY OF SOIL 3.1 Consistency of soil, stages of consistency, Atterberg's limits of consistency viz. Liquid limit, plastic limit and shrinkage limit, plasticity index. 3.2 Determination of liquid limit, plastic limit and shrinkage limit as per IS code.	04	10
4	MECHANICAL ANALYSIS & CLASSIFICATION 4.1 Particle size distribution, mechanical sieve analysis as per IS code particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils. 4.2 Interpretation of result. 4.3 Particle size classification of soils & IS classification of soil	06	12
5	PERMEABILITY OF SOIL 5.1 Definition of permeability 5.2 Darcy's law of permeability, difference between discharge velocity & seepage velocity 5.3 coefficient of permeability, typical values of coefficient of permeability for different soil, 5.4 Factors affecting permeability 5.5 Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability.	06	12
	SECTION-II		
6	SHEAR STRENGTH OF SOIL 6.1 Shear failure of soil, field situation of shear failure 6.2 Concept of shear strength of soil 6.3 Components of shearing resistance of soil – cohesion, internal friction 6.4 Mohr-coulomb failure theory, Strength envelope, strength equation 6.5 Types of soil based on Cohesion & Friction 6.6 Laboratory determination of shear strength of soil – Direct shear test, Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil, demonstration of Tri-axial Shear Test	06	12
7	COMPACTION OF SOIL	06	12

	7.1 Concept of compaction, purpose of compaction field situations where compaction is required. 7.2 Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, Zero airvoids line. 7.3 Modified proctor test 7.4 Factors affecting compaction 7.5 Field methods of compaction – rolling, ramming & vibration and Suitability of various compaction equipments. 7.6 California bearing ratio, CBR test, significance of CBR value 7.7 Difference between compaction and consolidation		
8	SOIL STABILISATION 8.1 Concept of soil stabilization, necessity of soil stabilization 8.2 Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization	03	07
9	BEARING CAPACITY OF SOILS 9.1 Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure 9.2 Terzaghi's analysis and assumptions made. 9.3 Effect of water table on bearing capacity 9.4 Field methods for determination of bearing capacity – Plate load test and standard penetration test. IS Test procedures. 9.5 Typical values of bearing capacity from building code IS:1904 9.6 Improving the Bearing capacity of soil	06	12
10	EARTH PRESSURE 10.1 Introduction to theories of earth pressure. 10.2 Effects of back- fill on retaining walls (without surcharge)	03	07
	TOTAL	48	100

6. TERM WORK:

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

1. Determination of Water Content
2. Determination of specific gravity.
3. Sieve Analysis.
4. Atterberg's limits.
5. Standard Proctor compaction test.
6. Modified Proctor compaction test.
7. Determination of Permeability.
8. Direct Shear test.

9. Unconfined Compression test.
10. California bearing test.
11. Determination of field density.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Charts & Models
3. Power Point Presentations

8. REFERENCE BOOKS:

S. N.	Author	Title	Edition	Publisher & Address
1	B. C. Punmia	Soil Mechanics & Foundation Engineering.	Latest	Laxmi Publishers
2	K R Arora	Soil Mechanics & Foundation Engineering	Latest	Standard Publishers
3	Gopal Ranjan, A S R Rao	Basic & Applied Soil Mechanics	Latest	New Age International Publishers
4	S. D. Pathak	Geotechnical Engineering	Latest	-
5	Murty	Soil Mechanics & Foundation Engineering.	Latest	Tata McGraw Hill , New Delhi
6	B. J. Kasmalkar	Soil Mechanics	Latest	Pune Vidhyarti Griha, Pune

8. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C212)	Semester: IV
Course: Design Practice of Steel Structures	Group : A*
Course Code : 160116	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total	L/P/CR	
3	-	4	-	7	3	100	30	70	50@	-	50**	200	A*	347

3. COURSE OBJECTIVES:

To impart basic design concepts in steel structures with and the use of standard structural steel sections and with latest design philosophy conforming to Bureau of Indian Standard Specifications. To make them practice the design of structural components & to read and understand design and drawings of the structures.

4. COURSE OUTCOMES:

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

C212.1	Design bolted & welded connections.
C212.2	Design tension & compression members.
C212.3	Design beams and beam-end connections.
C212.4	Design compound members & column bases.
C212.5	Analyse the loads and Design roof truss.

5. DETAILED CONTENTS:

SECTION-I			
S. NO.	TOPICS	PERIODS	MARKS
1	Introduction to IS: 800 – 2007 1.1 Structural steel and properties of structural steel 1.2 Design philosophy, comparison of working stress & Limit state method. 1.3 Limit state of strength 1.4 Limit state of serviceability. 1.5 Action (loads) 1.6 Design strength 1.7 Partial safety factor for materials 1.8 Loads, Load combination and partial safety factors for loads.	04	08
2	Bolted Connections 2.1 Classification of bolts 2.2 Explain terms: Pitch of bolts, gauge distance, edge distance, end distance & tacking fasteners. 2.3 IS: 800 – 2007 Provisions for clearance for holes, spacing, edge and end distance & tacking fasteners. 2.4 Type of bolted joints and failures of bolted joint.	08	16

	2.5 Design strength of bolt and efficiency of joints. 2.6 Design of bolted joint for truss members		
3	Welded Joints. 3.1 Types of Welds & Joints 3.2 Advantages and disadvantages of welded joints. 3.3 Strength of welds & joint, failure types of Welded Joints. 3.4 Design strength & Design of Welded joints for axially loaded members	04	10
4	Tension member 4.1 Standard Sections used as a tension member 4.2 Design Strength of a tension member -Design Strength due to yielding of gross section -Design Strength due to rupture of critical section -Design Strength due to block shear 4.3 Design strength of members 4.4 Design of tension members for angle sections	08	16
SECTION-II			
5	Compression member 5.1 Slender sections used as compression member 5.2 Buckling class of cross section 5.3 Effective length and slenderness ratio 5.4 Design compressive stress and strength 5.5 Design strength & Design of strut 5.6 Design of simple column and built up column 5.7 Lacing & Battening, necessity and use (No design)	08	16
6	Column Bases 6.1 Types of column bases 6.2 Design of slab base 6.3 Gusseted base sketch, meaning & purpose (no design)	04	08
7	Beam : 7.1 Classification of cross section 7.2 Laterally supported beam -Strength of beam in flexure -Strength of beam in shear -Deflection limits 7.3 Design of laterally supported beam 7.4 Beam end connections (framed & unstiffened seated connections only)	08	16
8	Roof Truss: 8.1 Types of roof truss & Elements of roof truss 8.2 Load on roof truss <ul style="list-style-type: none"> • Dead load • Imposed load • Wind load • Load combinations 8.3 Find load per panel point for DL, LL, WL 8.4 Find Member forces of truss graphically 8.5 Design each member of truss and check for reversal of stress	04	10

	8.6 Design of joints & Purlins(Angle Purlin)		
	TOTAL	48	100

Use of I.S. Codes (IS:800-2007 and IS:875-1987), 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.

6. TERM WORK:

Design & Drawing covering

1. Structural steel sections & Fasteners.
2. Design of Roof Truss.
3. Design of single floor.

7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Charts & Models
3. Power Point Presentations

8. REFERENCE BOOKS:

S. N.	Author	Title	Edition	Publisher & Address
1	S K Duggal	Limit state Design of Steel Structures	2012	Tata McGraw Hill Publishers.
2	S SBhavikatti	Design of Steel Structures	2014	I K Int. Publishing House
3	Dr. V L Shah & Veena Gaur	Limit State Design of Steel Structures	2010	Structures Publishers Pune
4	N Subramaniam	Design of Steel Structures	2010	Oxford Publishers
5	K S Sai Ram	Design of Steel Structures	2010	Pearson Publishers
6	R RGadpal	Design of Steel Structures	2014	NiraliPrakashan

9. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C213)	Semester: IV
Course: Urban Renewal & Redevelopment	Group : A*
Course Code : 160119	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
4	-	2	1	7	03	100	30	70	50@	-	50**	200	A*	437

3. COURSE OBJECTIVES:

- To study the urbanization and policies for urban development.
- To understand needs of urban infrastructure.
- To study urban renewal and need of smart cities

4. COURSE OUTCOMES:

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

C213.1	Understand different elements of urban planning and its renewal
C213.2	Analyze the importance of urban planning and evaluate its impact on real estate development

5. DETAILED CONTENT

Sr. No	Topics Section I	Period	Marks
1.	Introduction: Urbanization with reference to growth of cities, pattern, growth its trends, causes and prospects of urbanization, cost of urbanization, growth of urban population, resources of urban development, spatial pattern of urbanization, problems of metropolitan cities in India policy issues and their need, trends and projections for urbanization.	06	
2	Fundamental of Urban Science & Engineering: Organization of Urban areas (Definitions, occupation, pattern, types of cities, such as industrial, administrative, religious etc.) ₂ Urban services like hospital, waste management centres etc.	08	
3	Urbanization of Cities, Suburbs, Region and Hinterland: Plans for cities and suburban areas, metropolitan regions, role of peripheral region in urban development, concept of hinterland, small towns, tributaries/ twin cities of metropolitan cities.	08	
4	Management Techniques for Urban Systems: Overview of urban systems & issues, urban systems and global environment climate and urban system mitigation and adoption of strategies and techniques. Economic instruments in urban systems and Ecosystem Services.	10	

SECTION - II			
5	Notifications: CRZ coastal and marine areas, Coastal management zones, set back line. Norms pertaining to civil aviation .	06	
6	Connectivity and Conversion: Satellite cities, cities of cultural / business / tourism attraction, between cities and towns, Cities getting converted into regions and towns getting converted into cities. Express ways and freight corridors, Special projects like Golden Quadrilateral, Hub airport, Impact urban development	06	
7	Smart Buildings and Cities: Need of smart cities and townships concept, few smart technologies of deployable for efficient civic services. Urban renewal through smart city concept. Advanced communications systems, metro rail systems, traffic management systems, smart meters, solid waste management, GIS to manage property tax, online quality monitoring, IT initiatives. Case studies of few smart cities – Kochi smart city, GIFT, Lavasa, etc	10	
8	Redevelopment of buildings : Gentrification, Land-use change, Scenario of building redevelopment globally and locally, Components of building redevelopment, Need of redevelopment, Types of redevelopment, Viability , Agencies and their role, procedures and methods. Possible pit falls and precautions. Self-redevelopment.	10	
Total		64	100

6. TERM WORK:

1. Term work will consists of minimum 10 exercises given on entire curriculum

8.IMPLEMENTATION STRATEGY (PLANNING):

4. Teaching Plan
5. Charts & Models
6. Power Point Presentations

8. REFERENCE BOOKS:

- 1.Handbook of Research Methods & Applications in Urban Economies, 2013 edited by Peter Karl, Jaime Sobrino, Edward Elgar Publishing Ltd, UK
- 2.HenakK(2008): Urban Environmental and Technology: Springer Verlag. ISBN 4431783970,9784431783978
- 3.Chambell, H.E &Corley E.A (2012), Urban Environmental Policy Analysis M.E. Sharpe Incorporated.

4. Urban Update, (Setting the agenda for Tomorrow's cities) monthly magazine by All India Institute of Local Self Government.
5. D C rules of MCGM (2012)
6. INSIGHT, the Global infrastructure magazine.
7. Maharashtra Redefining Urban Growth by KPMG (kpmg.com/in)

Text Books:

1. Nath V and Agarwal S.K , (2007) "Urbanization, Urban Development & Metropolitan Cities in India" Concept Publisher. New Delhi.
2. T.J Rho, J.H & Suh S (1989) Integrated Urban systems Modeling Theory and Applications: Springer Netherlands.

9. QUESTION PAPER PATTERN:

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C214)	Semester: IV
Course: Solid Waste Management	Group : A
Course Code : 160118	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	-	-	-	3	03	100	30	70	--	-	--	100	A	303

3. COURSE OBJECTIVES:

This course provides an understanding of technical issues and the management of solid wastes. It introduces appropriate methods of storage, collection, transfer, treatment and disposal. The course also acquaints the students with legal aspects of solid waste management.

4. COURSE OUTCOMES:

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

C214.1	Understand the types, sources, characteristic and composition of solid waste
C214.2	Identify the physical, chemical and biological properties of solid waste
C214.3	Understand the solid waste treatment methods and disposal
C214.4	Know the legal aspects of solid waste management

5. DETAILED CONTENTS:

Sr. No	Topics Section I	Period	Marks
1.	1.0Introduction 1.6 Definiton of Solid waste 1.7 Types of Solid waste	04	08
2	2.0Characteristics of Solid waste 2.1 Quantities and Composition of Solid waste 2.2 Sources of Solid waste 2.3 Physical, Chemical and Biological properties of solid waste	06	12
3	3.0Solid waste generation and collection, 3.1Handling, storage, processing and transportation 3.3 3.2 Transfer Stations	06	12
4	4.0Solid waste processing 4.1 Thermal conversion, 4.2 Biological and Chemical conversion 4.3 Land filling 4.4 Composting	08	18
	SECTION - II		

5	5.0 Solid Waste Material Recycling 5.1 Recycling materials 5.2 Source separation 5.3 Processing Recyclables 5.4 Material Recycling Facility	08	18
6	6.0 Sanitary Landfill 6.1 Site selection 6.2 Construction and Operation 6.3 Leachate and Landfill gas management 6.4 Closure of Landfill 6.5 Post Closure monitoring	10	20
7	7.0 Legal aspects of municipal solid waste collection, conveyance, treatment and disposal.	06	12
Total		48	100

6. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Assignments
3. Case Studies

7. REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
1	Tchobanoglous	Integrated solid waste	Latest	Latest	Theissen and Vigil-
2	Tchobanoglous	Solid wastes - Engineering principles and	Latest	Latest	Theissen and Eliassen. McGraw Hill Book Co.
3	Hagerty, Pavoni	Solid waste management	Latest	Latest	Heer-Van Nostrand Reinhold Co., New

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
	Total	50		50		30

1. COURSE DETAILS:

Program: CE (C215)	Semester: IV
Course: Computer Software Skill	Group : A
Course Code : 160111	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
-	4	-	-	4	--	---	--	---	50@	50**	-	100	A	044	

3. COURSE OBJECTIVES:

Have awareness of various computer software related to civil engineering.
Use the computer for their project work and presentations.
Make use of computers for editing the drawings
Make use of excel for the simple repetitive calculations of tedious nature.

4. COURSE OUTCOMES:

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

215.1	Work in a team to select a problem for project work, Apply the principles, tools and techniques to solve the problem
215.2	Review and evaluate the available literature on the chosen problem
215.3	Formulate the methodology to solve the identified problem
215.4	Prepare and present project report

5. DETAILED CONTENTS

Sr. No.	Topics
1	1.0 Introduction:
	1.1 Introduction to Computers and information technology.
	1.2 Recent Developments. Computer as a tool to perform various functions.
2	2.0 Project process in Civil Engineering:
	2.1 Various project delivery systems and their functions
	2.2 Input output model of functions.
3	3.0 Various applications of computer and their uses related to Civil Engineering for example- M.S.Office,M.S. Access etc.
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.
5	5.0 Introduction of Internet use of it and importance of use for

Civil Engineering

6. 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

7. **IMPLEMENTATION STRATEGY (PLANNING):**

- a.Computer practicals
- b.Demo of few softwares

8. **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
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively
SEMESTER-V

Sr. No.	Course Name & Code	Prerequisite Course Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/Cr)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
28	#Civil Engineering Project (160122)			6			6					50@		50**	100	A*	066
29	#Design Practice of RCC Structure (160123)		3		4		7	3	100	30	70	50@		50**	200	A*	347
30	#Project Engineering Management & Contract Administration (160126)		3	4			7	3	100	30	70	50@		50**	200	M*	347
31	#Water Resource Engineering (160127)		3		3		6	3	100	30	70	50@		50**	200	A*	336
32	#Building Maintenance Repairs & Services (160117)		3				3	3	100	30	70				100	A*	303
33	Elective (Any one)																
	Pre-stress Concrete (160129)		2				2	3	100	30	70				100	A*	202
	Construction Equipments & Techniques (160130)		2				2	3	100	30	70				100	A*	202
34	Disaster Management (160128)		2				2	3	100	30	70				100	M	202
35	Engineering Geology (160120)		3				3	3	100	30	70				100	A	303
Total			14	10	7		31	Total Paper = 05		150	350	200	0	200	900		

*: Compulsory, @: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management, # Diploma Award winning courses

Head of Department

Principal

1. COURSE DETAILS:

Program: CE (C301)	Semester: V
Course: #Civil Engineering Project	Group : A*
Course Code : 160122	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
-	6	-	-	6	--	--	--	--	50@	-	50**	100	A*	066	

3. COURSE OBJECTIVES:

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. COURSE OUTCOMES:

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

301.1	Acquire information from different sources and through literature survey and identify thrust areas.
301.2	Prepare proposal for project
301.3	Prepare notes for given topic.
301.4	Interact with peers to share thoughts
301.5	To present the work at various milestones achieved.
301.6	To write the Project Report
301.7	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, Communication Skills, Interpretation Skills and Affective domain like Attitude and Values

1. COURSE DETAILS:

Program: CE (C302#)	Semester: V
Course: #Design Practice of RCC Structures	Group : A*
Course Code : 160123	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination							Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR	
3	-	4	-	7	03	100	30	70	50@	-	50**	200	A*	347	

3. COURSE OBJECTIVES:

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. COURSE OUTCOMES:

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

C302.1#	Compute the dead load and live load on the structures.
C302.2#	Analyses the structural elements for the internal stresses by WSM & LSM.
C302.3#	Design the structural elements for collapse, serviceability and durability.
C302.4#	Do the reinforcement detailing and drawings.

5. CONTENT

Sr. No	Topics SECTION - I	Period	Marks
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 Meet Durability Requirements	03	05
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.	06	08

3	3.0Limit State of Collapse : Flexure: 3.1Moment of resistance of doubly reinforced rectangular section, design of doubly reinforced section,	04	08
4	4.0Limit State of Collapse : Flexure: 4.1Effective 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.	06	08
5	5.0Limit State of Collapse : Shear 5.1Nominal Shear Stress, Design Shear Strength of Concrete, Design of shear - reinforcement, bent - up bars, stirrups, Minimum Shear Reinforcement, Detailing.	02	05
6	6.0Limit State of Collapse : Bond & Anchorage : 6.1Development of Stress in Reinforcement, Development Length of Bars, Design bond stress, Anchoring Reinforcing Bars, Anchorage value of standard hooks and bends, lapping of bars.	02	04
7	7.0Limit state of serviceability: 7.1Control of Deflection, Basic and modified values of span to depth ratio to satisfy deflection limit. 7.2Crack control in design (No calculation of crack width)	01	02
Section II			
8	8.0Design of slab (LSM): 8.1Classification of slab, effective span, 8.2Design and detailing of One-way slab, 8.3Design and detailing of one way continuous slab (B.M and S.F. calculation from IS – B.M. & S.F. Coefficients), 8.4Design and detailing of Two way slab with corner free. 8.5Design and detailing of dog-legged stair case.	04	07
9	9.0Design of beam (LSM): 8.1Beam Sizing, computation of loads, analysis, design of simply supported beams, drawing and detailing, 8.2Computation of loads on lintel, design of lintel, drawing and detailing.	04	07
10	10.0Column (WSM): 10.1Definition, classification - Short and Slender Columns, unsupported length, effective length, slenderness limit, 10.2Minimum cover, requirement governing reinforcement and detailing, 10.3Transverse reinforcement, Transverse reinforcement design, Arrangement of transverse reinforcement, Helical	04	06

	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).		
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).	04	08
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).	04	08
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, MagnelBlaton System, Gifford Udall System	04	04
	Total	48	80

6. TERMWORK:

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.

7.0 IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Use of visual aids

8 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
6	N. Krishna Raju	Prestressed Concrete	3 rd	1995	Tata McGraw Hill

3. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Programme : Civil (C303)	Semester: V
Subject: #Project Engineering Management & Contract Administration	Code: 160126
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		
3	4	-	-		7	80	30	70	50@	-	50**	200	M*	347

3. OBJECTIVE:

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. 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. It emphasises on the following.

- (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.

4. COURSE OUTCOMES

After the successful completion of the course, the student will be able to:

C303.1	Understand project, its parameters, tools and methods of planning scheduling and controlling project.
C303.2	Understand methods of executing works, contract and its administration.
C303.3	Apply the construction safety practices to various situations at the projects.
C303.4	Understand the various methods of resolving the disputes.

5. DETAILED CONTENT:

Sr. No	Section-I	Marks	Hours
1.	Planning •Necessity of Planning •Types of Planning : Strategic & Practical Planning,	04	03

Sr. No	Section-I	Marks	Hours
	Long Range, Intermediate Range, Short Range Planning <ul style="list-style-type: none"> •Planning by Management level •Pre-tender, Post-tender Pre-construction and Detailed Construction Planning 		
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 •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 	08	09
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

Sr. No	Section-I	Marks	Hours
	Total	40	32 Hrs.

SECTION II

Chapter	Contents	Marks	Hours
1.0	Different methods of executing works	02	02
2.0	Prequalification and Contracts 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 3.1 Lump-Sum, Item Rate, Percentage Rate, Cost Plus Percentage, B.O.T. 3.2 Labour material and sub-contract for services contract	03	03
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	03	02

Chapter	Contents	Marks	Hours
	implications		
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., Gokuldham, Goregaon (E)
6.	P.M. Deshpande S. V. Joshi	Guide for Drafting Construction Contract & Tendering	I	1997	Hindustan Mudranalay, Pune

8. QUESTION PAPER PATTERN

9.Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :CE(C 304)	Semester: .V
Course: #Water Resources Engineering	Group: A*
Course Code:160127	Duration:16 Weeks

2.TEACHINGANDEXAMINATIONSCHEME:

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	3	-	-	6	03	100	30	70	50@		50**	200	A*	336

3. COURSE OBJECTIVE:

This subject is intended to teach the students concepts, principles and procedures in different treatment required to be given to the waste water for safe disposal and their suitability. The content will be dealt with various primary, secondary and Tertiary treatments, Effluent discharge standards and all the processes from collection, conveyance till safe disposal of sewage.

4.COURSE OUTCOME:

After the successful completion of the course, the student will be able to

C304.1	Apply the knowledge of water requirements of crops for different seasons in the irrigation schemes
C304.2	Select the appropriate source of water for the intended irrigation scheme
C304.3	Identify the different civil engineering works to be carried out for the irrigation schemes.
C304.4	Apply the knowledge of water requirements of crops for different seasons in the irrigation schemes and calculate volume of water that can be stored

5.CONTENT:

Sr. No	Topics Section I	Period	Marks
1.	Introduction 1.1 Importance, Definition, necessity, advantages and disadvantages, classification of irrigation systems, Methods of Irrigation.	02	04
2.	Soil Water Plant Relationship 2.1 Water Holding Holding Capacity of soil, Classification of soil water,	04	12
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	06	12

	<p>3.4 Types of Aquifers, Confined, Semi-confined, Unconfined and Perched aquifers</p> <p>3.5 Wells, definitions, types, open wells, bore holes, Strainer type tube wells, Cavity type tube wells and Slotted type tube wells</p>		
4.	<p>Water Requirements of Crops</p> <p>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</p> <p>4.2 Methods of Improving Duty of water, Commands areas and Intensity of Irrigation, Consumptive use of water, Assessment of Irrigation water.</p> <p>4.3 Problems on estimation of demand of water for a given Crop pattern, calculating reservoir capacity, design discharge etc</p>	06	10
5.	<p>Reservoir Planning</p> <p>5.1 Introduction, Classification of reservoirs, factors governing selection of site for reservoir</p> <p>5.2 Zones of Storage in Reservoir, Useful storage, Dead storage, Surcharge storage, Bank Storage, Valley storage</p> <p>5.3 Apportionment of total cost of a Multipurpose Reservoir, Equal apportionment method, Use of Facilities method, Alternative Justifiable expenditure method, Remaining Benefits method.</p> <p>5.4 Measures to Reduce Evaporation Losses in Reservoirs</p> <p>5.5 Control of Sedimentation of Reservoirs</p>	06	12
Section II			
6.	<p>6.0 Dams</p> <p>6.1 Classification of Dams based on Function, Hydraulic Design, Materials of Construction, Structural Behaviour.</p> <p>6.2 Factors affecting Selection of type of Dam, Site selection for Dam.</p> <p>6.3 Salient features of Important Dams of India (Students to prepare a report of the same, No questions to be asked)</p> <p>6.4 Forces acting on Gravity Dam</p> <p>6.5 Theoretical and Practical profile of Gravity Dam</p> <p>6.6 Openings in Dams, Waterways and Galleries, Classification of Galleries, Foundation gallery, Drainage gallery, Gate gallery, Grouting gallery, Inspection gallery</p> <p>6.7 Adits, Vaults and Shafts</p>	06	12
7.	<p>Embankment Dams</p> <p>7.1 Definition and types of Earth Dams, Rolled fill, Hydraulic fill and semi-hydraulic fill dam</p> <p>7.2 Causes of Failure of Earthen Dams, Hydraulic, Seepage and Structural failures, piping and sloughing failure</p> <p>7.3 Component parts of a Earthen Dam in Cross Section and their functions</p>	06	14
8.	<p>Spillways and Energy Dissipators</p> <p>8.1 Definition, Essential requirements of a spillway</p> <p>8.2 Classification of Spillways</p> <p>8.3 Free overfall or straight drop spillway, ogee spillway, Chute or open channel or trough spillway.</p> <p>8.4 Side channel spillway, shaft or morning glory spillway, Conduit or</p>	06	12

	tunnel spillway, and siphon spillway 8.5 Definition of Energy dissipaters, its functions.		
9.	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, Fall and Escapes, Definition 9.4 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	06	12
10.	Cross Drainage Works 10.1 definition, types, aqueduct, siphon aqueduct, super passage, level crossing, inlet or inlet and outlet		
	Total	48	100

6. TERM WORK:

1. 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.
2. Detailed design of structures like storage dams, weirs and cross drainage works are not expected from students; such details may be supplied to students.
3. There will be a practical examination consisting of sketching and oral based on the drawings prepared as above and entire course content.

7. IMPLEMENTATION STRATEGY (PLANNING) :

7. Teaching Plan
8. Site Visit to any Dam
9. Presentations
10. Use of audio visual aids/ models

8. REFERENCE BOOKS:

Sr. No	Author	Title	Edition	Year of Publication	Publisher & Address.
1	S. K. Garg.	Irrigation Engineering & Hydraulics Structures	10 th	2009	Khanna Publications
2	Priyani	Irrigation Engineering	5 th	2010	Charotar Publications
3	B.C. Punmia.	Irrigation Engineering & Hydraulic Structures	11 th	2012	Laxmi Publications
4	Dr. P. N. Modi	Irrigation Water Resources &	12 th	2013	Standard Book House

		Water Power Engg			
5	Muzumdar	Irrigation Engg	5 th	2010	Tata McGraw Hill
6	A.Benani	Irrigation Engg	4 th	2008	Often Michlow Ltd Israel
7	R. K. Sharma T. K. Sharma	Irrigation Engg.	5 th	2014	S. Chand

9.QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1. COURSE DETAILS:

Program: CE (C305)	Semester: V
Course: #Building Maintenance Repairs & Services	Group : A*
Course Code : 160117	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper duration and marks		Scheme of Examination						Grp	Scheme
L	P	D	T	CR	Hours	Marks	SSL	Paper	T/W	PR	Orals	Total		L/P/CR
3	-	-	-	3	03	100	30	70	--	-	--	100	A*	303

3. COURSE OBJECTIVES:

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

4. COURSE OUTCOMES:

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

C305.1	Understand the routine, incidental, periodic and service contract maintenance works of building structure, HVAC and external and internal electrical systems, fire detection and fire fighting.
C305.2	Identify and evaluate scientifically the root cause of delay/deterioration, plan and implement maintenance related repair works
C305.3	Develop the skill of proper supervision and correct use of materials for effective maintenance and related repair works
C305.4	Able to classify various services, understand related basics and able to upkeep of the same

5. DETAILED CONTENTS:

Sr. No.	Topics	Periods	Marks
Section – I			
1	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		
	2.4 Common problem in buildings: Leakage, dampness, RCC deterioration, façade deterioration		
3	3.0 Factors affecting durability and diagnosis	8	07

Sr. No.	Topics	Periods	Marks
	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		
4	4.0 Planning repair	4	03
	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		
5	5.0 Specifications for repair work	6	06
	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	6.0 Methodology and execution of repair work	8	10
	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		
7	7.0 Waterproofing	6	08
	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, overhead / underground tanks, rising dampness and osmosis in		

Sr. No.	Topics	Periods	Marks
	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

Sr. No.	Topics	Periods	Marks
	13.1 Staircases and lifts.		
	13.2 Requirement provisions for lift erection. Parts of lift systems.		
	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

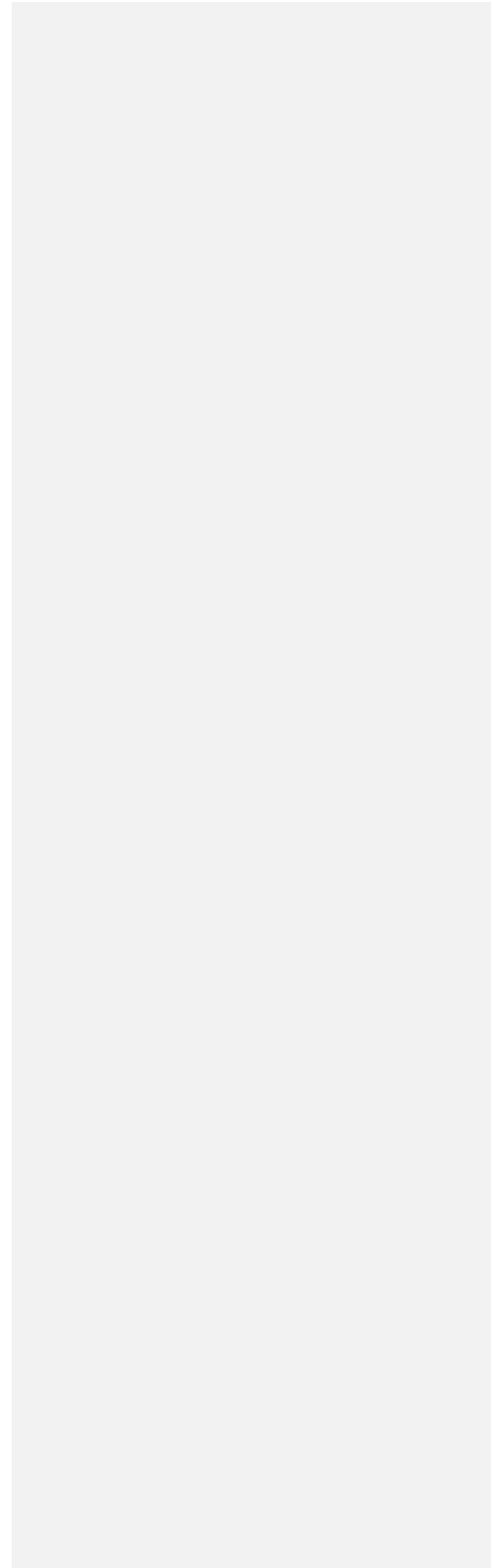
7. REFERENCE BOOKS:

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

10. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6	16		

			(4 marks each)			
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30



1.COURSE DETAILS

Program :CE (306)	Semester: V
Course: Prestressed Concrete	Group: A*
Course Code:160129	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	100	30	70	--	--		100	A*	202

3. COURSE OBJECTIVE:

This subject is from engineering application group intended to teach the students about the various pre-stressing system available, there use and precautions to be taken while using and after completion of the same in the life time of the structure.

4. COURSE OUTCOME:

C306.1	Identify the prestressed elements based on the observations.
C306.2	Differentiate between different types of pre-stressing technique
C306.3	Able analyse the losses in the pre-stressing
C306.4	Understand the design of pre-stressing

5. DETAILED CONTENTS :

SECTION – I		
1	Basic principal of Prestressed Concrete, material, used and their properties.	02
2	Definitions, Advantages of Prestressing & Limitations of Prestressing	01
3	Types of Prestressing, Source of prestressing force, External or internal prestressing, Pre-tensioning or post-tensioning.	03
4	Prestressing Systems and Devices, Pre-tensioning –Introduction, Stages, Advantages, Disadvantages ,Devices – Jacks, Anchoring devices, Harping devices Post-tensioning – Introduction, Stages, Advantages, Disadvantages Devices - Anchoring devices, Sequence of anchoring, Jacks, Couplers, Grouting	05
5	Pre-tensioning and post tensioning, Freyssinet system, Magnel Blaton System, Gifford Udall System.	01
SECTION – II		
6	Losses in pre stress Creep of concrete - Elastic shortening, Shrinkage of concrete, Relaxation of steel Friction, Anchorage slip.	06

7	Analysis of various types of sections subjected to prestress and external loads.	02	
8	General design principles: Concepts of centre of compression, kern of a section, efficiency of the section.	02	
9	Pressure line, safe cable zone, and principal tension in prestressed concrete members.	04	
10	Simple Design of prestressed concrete beams (no end block design)	06	

6.0 IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visits

7.0 REFERENCE BOOKS :

Sr. No.	Author	Title	Edition	Year of	Publisher & Address.
1	N. Krishna Raju	Prestressed Concrete	--	2006	Tata Mcgraw Hill
2	Dr. Amlan K Sengupta	Pre-stressed Concrete Design	---	2015	Indian Institute of technology, Madras

8.0 QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :CE(C 307)	Semester: V
Course: Construction Equipment & Techniques	Group: A*
Course Code:160130	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	100	30	70	--	--		100	A*	202

3. COURSE OBJECTIVE:

1. Explain different types of standard and special equipments used in the construction industry
2. Determine owning and operating costs, evaluate maintenance and repair costs.
3. Describe various equipments related to earthmoving, drilling and blasting, pile driving, pumping, stone crushing, air compressors, and equipment for moving materials.
4. Explain the complex processes involved in the construction of tunnels.

4.COURSE OUTCOME: At the end of the course the students will be able to:

C306.1	Be able to select the appropriate equipment for various construction activities, determine its optimal use and estimate its efficiency.
C306.2	Understand under water concreting.
C306.3	Identify various Pile driving equipments.
C306.4	Know various excavation equipments and compacting equipments.

5. DETAILED CONTENTS :

SECTION – I		Hrs	Mks
1	Construction equipment: Standard types of equipment, special equipment, cost of owning and operating equipment, economic life, factors affecting selection of construction equipment, balancing of equipment. Study of equipments with reference to available types and their capacities, operations and factors affecting their performance.	03	12
2	Drilling and blasting equipment, Pile driving equipment and Stone crushing equipment : Bits, jackhammers, drifters, drills, blasting material, firing charge, safety fuse, electric blasting caps, drilling patterns, transporting and handling of explosives, pile driving hammers: single acting and double acting, differential acting hammers, hydraulic and diesel hammers, vibratory pile drivers, hammer mills, roll crushers, rod and ball crushers, aggregate screens and screening plants, portable plants.	05	12
3	Earthmoving and hauling equipment: tractors and attachments, dozers and rippers, scrapers, shovels, draglines, trenching machines, clamshell, hoes, trucks and wagons, dumpers, dozers, trenching machines, rollers and compactors. Builder's hoists, forklifts, cranes, belt-conveyors, cableways, ropeways	05	14

4	Hoisting and Conveying Equipments Principle and working of Tower Cranes, Crawler Cranes, Truck-mounted cranes, Gantry Cranes, Mast Cranes, capacity and use of dumpers, tractors and trucks.	03	12
Sub -Total		16	50
SECTION - II			
5	Earth Moving Machinery Excavation equipments: Working and output of bulldozers, Scrapers, Grades, Power Shovels, JCB, Draglines. Compacting Equipments: Use of Rollers types – plain rollers, sheep footed rollers, vibratory rollers, pneumatic rollers rammer – use and working of rammers.	02	10
6	Advanced Concreting Methods Under water concreting for bridge piers and bored pile construction, Tremy method for under water concreting, procedure and equipments required for tremy method. Properties Tremix Concreting Method: Definition, Application of vacuum dewatering concreting, equipments used in tremix concreting, procedure of vacuum dewatering concreting (Tremix).	04	14
7	Advanced Construction Methods Formwork - Steel, H, Steel plates, Telescopic props, tubular formwork, Slip formwork – use of slip formwork, process of concreting with slip formwork Construction of Multi Storied Building – use of lifts, belt conveyors, pumped concrete, equipments and machinery required for construction of multi storied building, precaution & safety measures.	05	14
8	Miscellaneous Equipments and equipment management Miscellaneous Equipments: Pile driving equipment, pile hammers, selection of hammers, working of hot bitumen plant, bitumen paver, grouting equipments Equipment Management. Equipment Management: Standard equipment, special equipment, selection of equipment, owning and operating cost of construction equipment, economic life of construction equipment, preventive maintenance of equipment, break down maintenance of equipment.	05	12
Sub -Total		16	50
Total		32	100

6.IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Sketches
3. Visits

7. TEXT BOOKS AND REFERENCE BOOKS

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", 5th Edition, McGraw Hill, Singapore, 1995.
2. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of

Construction, Dhanpat Rai and Sons, 1997.

3. Varghese , P.C. Building construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2007.
4. Sheety, M.S, Concrete Technology, Theory and Practice, S. Chand and Company Ltd, New Delhi, 2005

7. REFERENCES:

1. Jha J and Sinha S.K., Construction and Foundation Engineering, Khanna Publishers, 1993.
2. Sharma S.C. “Construction Equipment and Management”, Khanna Publishers New Delhi, 1988.
3. Deodhar, S.V. “Construction Equipment and Job Planning”, Khanna Publishers, New Delhi, 1988.
4. Dr. Mahesh Varma, “Construction Equipment and its Planning and Application”, Metropolitan Book Company, New Delhi-, 1983.
5. Gambhir, M.L, Concrete Technology, Tata McGraw – Hill Publishing Company Ltd, New Delhi, 2004

8. QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :C308	Semester: V
Course: Disaster Management	Group: M
Course Code:160128	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	100	30	70	--	--		100	M	202

3. COURSE OBJECTIVE:

This subject is from management group intended to teach the students about the various disaster taking place and the safety of the structure in general and the people in particular.

4. COURSE OUTCOME:

After the successful completion of the course, the student will be able to:

C307.1	Understand different types of disaster and remedial measures.
C307.2	Learn Damage assessment.
C307.3	Know early warnings and safety measures of disasters.
C307.4	Understand Prevention, Mitigation, Preparedness, Response and Recovery.

5. DETAILED CONTENTS :

SECTION – I			
1	Disaster: Definition, Classification, Natural and Anthropogenic, Accidents, Disaster Profile of India. Geo-climatic and Social conditions, Past records, Vulnerable areas of the country, national response approach.	03	08
2	Introduction on Disaster Different Types of Disaster : A) Natural Disaster: such as Flood, Cyclone, Earthquakes, and Landslides etc. B) Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.	05	12
3	Prediction and forecasting, disaster preparedness, data base Assessment of disaster relief and Rehabilitation measures, Mobilization of men and material	03	10
4	Legal frame work, Trigger mechanism – Water, Climate and Geologically related Chemical, Industrial, Nuclear, GIS enabled Disk net	03	10
5	Activities, Agencies, Resources and Funds, Implementation and Monitoring Flood Hazard Map.	02	10
Sub – Total		16	50

SECTION – II			
6	Quick response flow chart, Emergency operation center, Emergency support functions, Disaster specific modules.	02	08
7	Risk assessment, Contingency Planning, Major Natural disasters, Earth Quake, Cyclone, Flood, Epidemics, Check list-Agencies, Personnel, Equipment, Materials, Services and Time management.	03	10
8	Risk and Vulnerability Analysis: Risk concept and analysis, Risk Reduction, Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction.	03	08
9	Disaster Preparedness: Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication, and Training, Role of Government, International and NGO Bodies, Role of IT in Disaster Preparedness, Role of Engineers on Disaster Management.	04	08
10	Rehabilitation, Reconstruction and Recovery: Reconstruction and Rehabilitation as a Means of Development, Damage Assessment, Post Disaster effects and Remedial Measures, Creation of Long-term Job Opportunities and Livelihood Options, Disaster Resistant House Construction, Sanitation and Hygiene, Education and Awareness, Dealing with Victims' Psychology, Long-term Counter Disaster Planning, Role of Educational Institute.	04	16
	Sub – Total	16	50
	Total	32	100

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.	W. Nick Carter	Disaster Management Handbook		2008	Asian Development Bank
2.	Sapir Ghua-D, Parry CV, Degomme O (Belgium) & Joshi PC, Arnold	Risk factors for mortality and injury: Post tsunami epidemiological findings from Tamil Nadu		2006	Cred

	Saulina JP (India)				
3.	Anil Sinha	Disaster Management – Lessons drawn and strategies for future.		2002	NIDM – National Institute of Disaster Management
4.	Vinod K. Sharma	Disaster Management		2001	NIDM - National Institute of Disaster Management
5.	M.C.Gupta L.C.Gupta B.K.Tamini & Vinod K. Sharma	Manual on Disaster Management in India		2000	NIDM - National Institute of Disaster Management
6.	Arun Jha & A.A.Khan	Natural Disasters in India – some recent case studies		1999	NIDM - National Institute of Disaster Management

8.QUESTION PAPER PATTERN

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks
1.	Any 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
2.	Any 4 out of 6 (4 marks each)	16			Any 1 out of 2 (6 marks each)	06
3.	Any 2 out of 3 (8 marks each)	16			Any 1 out of 2 (8 marks each)	08
4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

1.COURSE DETAILS

Program :C309	Semester: V
Course: Engineering Geology	Group:A
Course Code:160120	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	-	-	-	3	03	100	30	70	--	--		100	A	303

3.COURSE OBJECTIVE

This subject is from application group intended to teach the students about the various basics of Engineering Geology.

4.COURSE OUTCOME

After the successful completion of the course, the student will be able to:

C307.1	Understand different types of rocks encountered in Foundation Strata.
C307.2	Interpret the soil investigation report
C307.3	Understand various properties of rock
C307.4	Understand the importance of safe bearing Capacity of the 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 :	06	06

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	4.1 Study of minerals 4.2 Study of rocks 4.3 Economic mineral deposits 4.4 Outlines of Indian stratigraphy		
	SECTION 2		
5.	5.0 Engineering Geology :	04	08
	5.1 Earthquakes	04	08
	5.2 Geological investigations	06	08
	5.3 Geology of dam sites, reservoirs, roads, bridge sites and tunnels (broad out lines)	06	08
	5.4 General : Stability of hills slopes, landslides, their causes and precautions against them	04	08
	5.5 Improvement of site		
6.	Total	48	80

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IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Sketches
3. Site Visits

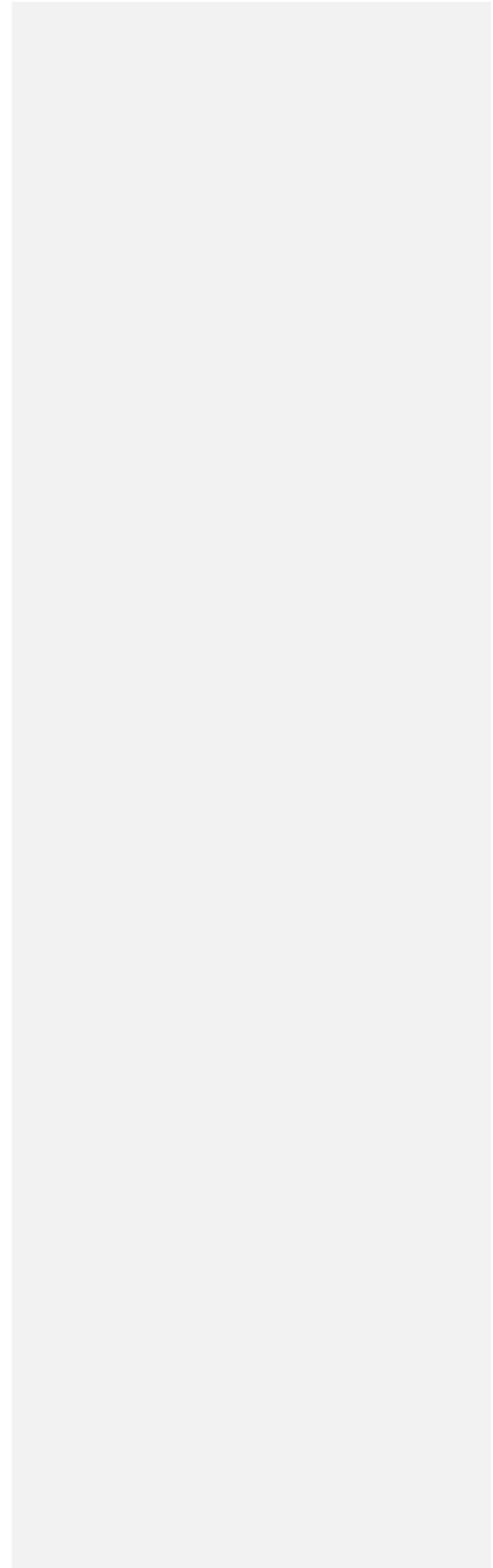
7. REFERENCE BOOKS

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 6 out of 8 (3 marks each)	18			Any 4 out of 5 (4 marks each)	16
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4.			Any 6 out of 8 (3 marks each)	18		
5.			Any 4 out of 6 (4 marks each)	16		
6.			Any 2 out of 3 (8 marks each)	16		
Total		50		50		30

Que. No.	Section I		Section II		Periodical Test	
	Bits	Marks	Bits	Marks	Bits	Marks





Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively

SEMESTER-VI

Sr. No.	Training Duration	Course. Code	Prerequisite Course. Code	Credit	Marks	Weekly Report	Quiz Test	Dissertation (Report)	Oral / Viva-Voce	Total
36#	INPLANT TRAINING 24 Weeks ***	160133		20	Maximum Marks	50 @	50 @	50 **	50 **	200
					Minimum Marks	20	20	20	20	80

Total marks to be converted out 100 for award of Diploma

*** : Total Inplant Duration 26 weeks equal to 24 weeks actual training plus 2 weeks examination and processing, @: Assessed by internal examiner, **: Assessed by external and internal examiner, # Diploma Award winning courses

Objective for inclusion of INPLANT TRAINING

The inplant training facilitate students to understand the various domains of construction industry along with work environment and the students are exposed to the latest developments in technologies.

COURSE OBJECTIVE:

- 1.To make the student conversant with construction activities, organizational behaviour and ethics.
- 2.To understand various aspectsof constructions viz. construction processes, structural design, productivity improvement, value engineering, quality control.
- 3.To analyse and solve engineering problems from construction industry.

COURSE OUTCOMES:

1. Learn and develop work culture and construction practices, to integrate theory with practice with the help of help of practitioner.
2. Enhance communication skills, to maintain discipline and ethics.
3. Understand scope, functions, working in team and job responsibility in various departments of organization and able to present the work done.
4. Develop safety and environmental awareness.
5. Learn and develop leadership and management skills.
6. Interpret and solve routine technical problems through the application of engineering principles.

Head of Department

Principal

1. Training methodology imparted for development and assessment of skills.

Students shall be sent for 24 weeks in plant training in the VI semester. Students understand basic working of industry and its work culture. In the initial weeks company personnel train the students about their manufacturing process and products. After completion of initial training, students work independently in the company. The students are involved in project implementation for onsite execution, design and drawings, use of software and similar work.

Each student performance is assessed by a company supervisor and is recorded in weekly report. The same record is maintained and assessed by the institute supervisor.

2. Formative and Summative assessment of Training component. (Methods of assessment)

Depending on the grades given by the company supervisor and also by examining the performance in the weekly report, marks are given out of 50 by the institute supervisor. Considering their work profile in the company, institute supervisor gives 5 quiz tests each of 10 marks to the students. The same are assessed by institute supervisor. The training report submitted by a student is assessed together by internal and external examiner and accordingly marks are given out of 50. Students presents the work done by them in the company and are examined by internal and external examiner together for 50 marks, constituting total 200 marks.

3. In-house monitoring of training.

Each company is visited by the institute supervisor on regular basis till the end of in plant training. Each student is monitored for performance, any difficulty, grievances and absenteeism. Accordingly corrective and preventive actions are taken.

4. Involvement of outside expert in assessment of training.

The external examiner for in plant training examination is from industry.

5. How Safety aspect will be covered during training?

Students are made aware about industrial safety norms. Before the training begins, the students are addressed by the Principal about rules, safety precautions and discipline to be maintained in the company during the training. The same is reminded by the institute supervisor on every visit. The company supervisor also takes care about students' safety.



Shri Vile Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic
 Vile Parle (W), Mumbai 400 056
TEACHING AND EXAMINATION SCHEME



PROGRAMME: CIVIL ENGINEERING (3 YEARS PROGRAM)with effect from Batch admitted in June, 2016 progressively

#AWARD WINNING SUBJECTS

Sr. No.	Course Name & Code	Prerequisite Course. Code	Scheme of Instructions & Period Per Week					Theory Paper duration & Marks		Scheme of Examination						Gr	Scheme (L/P/C r)
			L	P	D	T	Cr	Hrs	Marks	SSL	Paper	T/W	PR	OR	Total		
21	#Environmental Engineering (160112)		4	3			7	3	100	30	70	50@		50**	200	A*	437
22	#Quantity Survey, Estimation & Valuation (160114)		2	4			6	3	100	30	70	50@		50**	200	A*	246
24	#Geotechnical Engineering (160125)		3	3			6	3	100	30	70	50@		50**	200	A*	336
28	#Civil Engineering Project (160122)			6			6					50@		50**	100	A*	066
29	#Design Practice of RCC Structure (160123)		3		4		7	3	100	30	70	50@		50**	200	A*	347
30	#Project Engineering Management & Contract Administration (160126)		3	4			7	3	100	30	70	50@		50**	200	M*	347
31	#Water Resource Engineering (160127)		3		3		6	3	100	30	70	50@		50**	200	A*	336
32	#Building Maintenance Repairs & Services (160117)		3				3	3	100	30	70				100	A*	303
36#	INPLANT TRAINING (160133) 24 Weeks ***											50@		50**	100		
Nos. = 09	Total		19	20	7		46	Total Paper = 07	210	490	400	0	400	1500			

*: Compulsory, @: Assessed by internal examiner, **: Assessed by external and internal examiner, L: Lecture, P: Practical, D: Drawing, T: Tutorial, Cr: Credit, SSL: Sessional, T/W: Term Work, PR: Practical, OR: Oral, Gr: Group, B: Basic, C: Core, A: Application, M: Management, # Diploma Award winning courses

Head of Department

Principal

CREDIT SUMMARY –SCHEME 2016 (CIVIL ENGINEERING DEPARTMENT)

Semester	Compulsory Credits	Optional Credits	Total offered Credits	CREDITS FOR THE AWARD OF DIPLOMA
I	32	-	32	
II	28	02	30	
III	31	07	38	
IV	30	14	44	
V	31	07	38	
VI	-	-	20	
Total	152	30	202	160 +20 (INPLANT) = 180

SEMESTER /GROUP	BASIC		CORE		MANAGEMENT		APPLICATION		TOTAL
	C	O	C	O	C	O	C	O	
I	15	-	17	-	-	-	-	-	32
II	14	-	14	-	-	02	-	-	30
III	-	-	25	07	-	-	06	-	38
IV	-	-	4	-	-	-	26	14	44
V	-	-	-	-	07	02	22	07	38
VI	-	-	-	-	-	-	-	-	20
TOTAL	29	-	60	07	07	04	54	21	160 + 20 (INPLANT TRAINING) =180

HEAD OF DEPARTMENT

PRINCIPAL