Veermata Jijabai Technological Institute (V.J.T.I)

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Programme: Diploma in Civil Engineering (DCE) **Semester: III** **Implemented from: 2017**

COURSE CODE	COURSE	GR	TEACHING SCHEME (HRS/WK)				EXAMINATION SCHEME												
			L	T	P	CR	PAPER HRS	TH Max	TH Min	IST	TOTAL Max	TOTAL Min	PR Max	PR Min	OR Max	OR Min	TW Max	TW Min	TOTAL MARKS
171MA31e	MATHEMATICS III	B	3	2	0	5	3	80	32	20	100	40					25@	10	125
171CE32	ROAD AND BRIDGE ENGG.	C	3	0	2	5	3	80	32	20	100	40					25@	10	125
171CE33	SURVEYING	C	3	0	4	7	3	80	32	20	100	40	25**	10			25@	10	150
171SE34	MECHANICS OF STRUCTURES	B	3	0	2	5	3	80	32	20	100	40					25@	10	125
171SE35	CONCRETE TECHNOLOGY	C	3	0	2	5	3	80	32	20	100	40			25**	10	25@	10	150
171CE36	BUILDING DESIGN & DRAWING	C	2	0	4	6							50**	20			50@	20	100
171CE37	PROFESSIONAL PRACTICES	A	0	0	2	2											25@	10	25
	TOTAL		17	2	16	35		400		100	500		75		25		200		800

e- Indicates Mathematics-III is common for Civil and Mechanical.
Abbreviations: B – Basic; C – Core; A – Applied; M – Management; L – Theory Lecture; T – Tutorial; P – Practical; TH – Theory Paper; IST – In-Semester Test; PR – Practical Exam; OR – Oral Exam; TW- Term Work. @ : assessment by Internal Examiner, * : Indicates assessment by Internal Examiner, ** :assessment by External And Internal Examiner

Curriculum Coordinator

Head
Diploma in Civil Engineering

Civil & Env. Engg. Dept.

Dean - Diploma

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: MATHEMATICS III
COURSE CODE	: 171MA31c

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	5	3	80	32	20	100	40	-	-	-	-	25@	10	125

@: assessment by Internal Examiner

Course Objectives:

1. To make students well versed in various methods of integration for solving problems.
2. To expose students to the techniques of solving differential equations.
3. To impart knowledge of probability, statistics.

Course Outcomes:

Student should be able to

CO1	Apply formulae and different methods of integration in engineering concepts.
CO2	Apply definite integral to find area under curve and volume of solid of revolution.
CO3	Use different methods to solve differential equations.
CO4	Apply basics of statistical techniques to solve the problems.

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Integration	14	20	1	40%	40%	20%
	1.1	Definition of integration. Integration of standard functions.						
	1.2	Theorems of integration						
	1.3	Methods of Integration						
		1.3.1 Integration by substitution 1.3.2 Integration of rational functions.						

		1.3.3 Rules of partial fractions, Integration by Partial fractions. 1.3.4 Integration by parts.						
2		Definite Integral	10	20	2	30%	30%	40%
	2.1	Definition of definite integral.						
	2.2	Properties of definite integral with simple problems.						
	2.3	Applications of definite integral						
		2.3.1 Introduction to curves- circle, parabola, Ellipse, loop of the curve. 2.3.2 Area under curve. 2.3.3 Volume of solid of revolution.						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
3		Differential Equations:	12	20	3	30%	30%	40%
	3.1	Order and degree of the differential equation.						
	3.2	Formation of differential equations.						
	3.3	Solution of differential equation of first order, first degree.						
		3.3.1 Variable separable method.						
		3.3.2 Reducible to variable separable Method						
		3.3.3 Homogeneous differential equation						
		3.3.4 Exact differential equation.						
		3.3.5 Introduction of integrating factor.						
		3.3.6 Linear differential equation.						
		3.3.7 Bernoulli's differential equation.						
4		Statistics	12	20	4	40%	40%	20%
	4.1	Mean, Standard Deviation, Variance, coefficient of variation						
	4.2	Elementary Probability						
		4.2.1 Revision of set theory						
		4.2.2 Sample space, Types of events						
		4.2.3 Definition of probability						
		4.2.4 Conditional probability						
		4.2.5 Independent events						
		4.2.6 Multiplication theorem						
		4.2.7 Addition theorem.						

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Total Marks	Distribution of Theory Marks		
				R Level	U Level	A Level
1	Integration	14	20	40%	40%	20%
2	Definite Integral	10	20	30%	30%	40%
3	Differential Equations	12	20	30%	30%	40%
4	Statistics	12	20	40%	40%	20%
		48	**80**			

List of Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1	1	Integration using standard results	2	1
2	1	Integration by substitution method - I	2	1
3	1	Integration by substitution method - II	2	1
4	1	Integration of rational functions.	2	1
5	1	Integration by partial fractions.	2	1
6	1	Integration by parts.	2	1
7	2	Definite integral.	2	2
8	2	Applications of definite integrals	2	2
9	3	Order, degree and formation of the differential equation.	2	3
10	3	Solution of differential equation of first order, first degree.	2	3
11	3	Solution of Homogeneous and Exact differential equation	2	3
12	3	Solution of linear and Bernoulli's differential equation	2	3
13	4	Measures of central tendency	2	4
14	4	Measures of dispersion	2	4
15	4	Probability- I	2	4
16	4	Probability- II	2	4

Reference books :

Sr. No.	Author	Title	Publisher and Edition
1	S. P. Deshpande	Mathematics for Polytechnic	Pune Vidyarthi Griha Prakashan.
2	H.K.Dass	Advanced Engineering Mathematics	S.Chand & Company Ltd. Delhi
3	Dr.B.S.Grewal	Higher Engineering Mathematics	Khanna Publishers Delhi
4	S.C.Gupta and Kapoor	Fundamental of Mathematical Statistics	S.Chand Publications

Curriculum Coordinator | **Head Diploma in Civil Engg.** | **Dean – Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MUMBAI 400 019. Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: ROAD AND BRIDGE ENGINEERING
COURSE CODE	: 171CE32

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	0	2	5	3	80	32	20	100	40					25@	10	125

@: assessment by Internal Examiner

Course Objectives:

Highways & bridges is an applied engineering subject. Knowledge of basic concepts and principles of highways engineering will help the Civil Engineering technician to read design and drawing of proposed structures, give layout plan, traffic sign and signal and supervise the construction in plains and hills and maintain the existing roads.

The study of Bridges will cater to the needs of the technician engaged in investigation, planning and construction of bridges. The study of technology behind the layout, construction of bridges is extremely important.

Course Outcomes:

Student should be able to

CO1	Prepare geometric design for road
CO2	Classify the highway materials based on physical properties
CO3	Explain the principles of construction and maintenance of highways
CO4	Identify the roadway facilities to cater to the needs of road traffic
CO5	Summarize the different types of bridges

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Introduction	04	06	1	50%	40%	10%
	1.1	Modes of transportation systems,						

		Necessity of roads						
	1.2	Importance of road transportation						
	1.3	Development of roads in India						
	1.4	Classification of roads						
	1.5	Basic considerations governing alignment for a road in plain and hilly area						
2		Road Geometrics	08	14	1	40%	40%	20%
	2.1	Camber-definition, purpose, types, IRC specifications.						
	2.2	Kerbs, road margin, road formation, right of way, Shoulders.						
	2.3	Design speed-IRC specification.						
	2.4	Gradient-definition, types, IRC specification.						
	2.5	Sight distances -definition, types, IRC specification.						
	2.6	Extra widening on horizontal curve						
	2.7	Super elevation-definition, formula for calculating super elevation, minimum and maximum values of super elevation and methods of providing super elevation.						
	2.8	Typical road cross sections in embankment and cutting.						
	2.9	Work out problems on road geometric						
3		Road materials	06	10	2	40%	40%	20%
	3.1	Desirable properties of highway material						
	3.2	Different types of road materials in use: subgrade soil, aggregates & binders(bitumen, Tar)						
	3.3	C.B.R Test : methods of finding CBR value and its significance						
	3.4	Test on aggregates : Abrasion value, impact value ,crushing value , shape and soundness test						
	3.5	Test on bitumen: Penetration,						

		Ductility, Softening point and Viscosity test.						
4		Road construction	06	10	3	40%	50%	10%
	4.1	Types of pavement structure, function of pavement component						
	4.2	Construction procedure of bituminous roads, Bituminous surface types- prime, tack and seal coat, surface dressing.						
	4.3	Construction procedure of cement concrete roads as per IRC specifications, joints in concrete pavement, equipment used						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
5		Traffic Engineering	08	14	4	50%	40%	10%
	5.1	Traffic characteristics-road user characteristics, vehicular characteristics						
	5.2	Traffic studies - Name of various studies and their uses						
	5.3	Accident studies - objectives, causes of accident, condition and collision diagram, and measures for the reduction in accidents.						
	5.4	Traffic regulation and control devices- traffic signs, traffic signals (types, merits and demerits), IRC standards, road marking						
	5.5	Traffic islands, types of road intersections						
	5.6	Street lighting-Needs, definition, laws of illumination, factors affecting,, planning and designing.						
	5.7	Road safety audit						
6		Drainage & Maintenance of road	06	10	3	40%	50%	10%
	6.1	Requirements & Importance of Highway drainage						
	6.2	Subsurface and surface drainage						

		system of roads						
	6.3	Importance of Highway maintenance work, ordinary, routine and periodic maintenance						
	6.4	Distress in flexible pavements and maintenance measures						
	6.5	Distress in Rigid pavements and maintenance measures						
7		Bridges	10	16	5	40%	50%	10%
	7.1	Bridges - Function and component parts, Classification ,Selection of site for a bridge						
	7.2	Defines waterway, Afflux, vertical clearance, linear waterway, freeboard for bridges and culvert ,economical span, scour depth						
	7.3	Definition and Functions of pier, abutment, wing wall and approaches						
	7.4	Deck and Through bridges -Sketches and suitability of different types of Bridges ,Masonry bridges ,R.C.C beam and slab bridges, Plate girder bridges, Prestressed concrete bridges, steel trussed bridges and Suspension bridges						
	7.5	Sketches and suitability of different culverts- slab culverts, pipe culverts and box culverts, Types of cause ways – Low level causeway and high level causeway						
	7.6	Maintenance of bridges- Inspection of bridges, routine maintenance						
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

Suggested Specification Table

Unit No.	Unit Title	Teaching Hours	Total Marks	R Level	U Level	A Level
1	Introduction	04	06	50%	40%	10%
2	Road Geometrics	08	14	40%	40%	20%

3	Road materials	06	10	40%	40%	20%
4	Road construction	06	10	40%	50%	10%
5	Traffic Engineering	08	14	50%	40%	10%
6	Drainage & Maintenance of road	06	10	40%	50%	10%
7	Bridges	10	16	40%	50%	10%
		48	**80**			

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment/ Project	Approx. Hours	CO
1	3	Determination of resistance to abrasion of aggregates by Los Angel's Abrasion Testing Machine	2	2
2	3	Determination of Aggregate impact value by aggregate impact tester	2	2
3	3	Determination of Aggregate crushing value by aggregate crushing test apparatus	2	2
4	3	Determination of flakiness index and elongation index of coarse aggregate	2	2
5	3	Determination of specific gravity and water absorption of coarse aggregate.	2	2
6	3	Determination of stripping value of aggregate	2	2
7	3	Determination of C.B.R. Value of sub grade soil	2	2
8	3	Determination of Penetration Value of bitumen	2	2
9	3	Determination of softening point of bitumen	2	2
10	3	Determination of ductility of bitumen	2	2
11	3	Determination of viscosity of bitumen	2	2
12	3	Determination of bitumen content by centrifuge extractor	2	2
13	5	Mini project - Conduct an intersection volume study (field) for a peak and non-peak hours	4	4
14	4,7	A Visit report based on different types of bridges/ flyover and construction of roads in and around Mumbai	4	3,5
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term				

Term work:

Term work shall consist record of all Practicals

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MUMBAI-400 019.
Civil & Env. Engg. Dept.

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	S.K.Khanna, C.E.G.Justo & A.Veeraragavan	Highway engineering	Neem Chand & Bros. Roorkee, 10th Ed.
2	Dr. L R Kadiyali & Dr. N B Lal	High way Engineering	Khanna Publishers. Delhi
3	S P Bindra	Highway Engineering	Dhanpat Rai & Sons Delhi
4	Ponnuswamy .S	Bridge Engineering	Tata McGraw Hill,2008

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	G.V.Rao	Principle of Transportation and Highway Engineering	Tata McGraw Hill
2	N.Rajagopalan,	Bridge superstructure	Narosa Publishing House, 2006
3	Ministry of Road Transport & Highways	Specifications for Road and Bridge Works,	Fifth Edition, Indian Roads Congress, New Delhi, India, 2013.

Curriculum Coordinator **Head** **Dean - Diploma**

Diploma in Civil Engg.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MUMBAI-400 019. Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: SURVEYING
COURSE CODE	: 171CE33

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	0	4	7	3	80	32	20	100	40	25**	20			25@	10	150

**: assessment by External and Internal Examiner, @: assessment by Internal Examiner

Course Objectives:

The first step in engineering practice is surveying and the soundness of any civil engineering work is depends on reliability and accuracy of surveying. It is imperative that students should have the knowledge of surveying for preparing the plans/ maps. These plans/ maps are used for taking various decisions regarding the planning, designing, execution and construction process. At the closing stage of the course, students will able to acquire various competencies in carrying out survey and prepare plans/ maps.

Course Outcomes:

Student should be able to

CO1	Explain the principles of surveying and field procedure to conduct the survey
CO2	Record field data using traditional surveying equipment's such as compass, levels and plane table survey
CO3	Read and Interpolate the data of contours
CO4	Use theodolite for traverse surveying

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Introduction	05	08	1	20%	70%	10%
	1.1	Classification and Basic principles of surveying						

	1.2	Different types of scales						
	1.3	Chain and tape survey						
	1.4	Instruments for chain survey						
	1.5	Instruments for setting right angles						
	1.6	Chain and tape correction						
	1.7	Obstacles in chaining and ranging						
	1.8	Conventional symbols and recording of measurements in a field book						
2		Compass Survey	06	10	2	60%	30%	10%
	2.1	Introduction and purpose						
	2.2	Principles of compass survey						
	2.3	Methods of traversing						
	2.4	Types of meridians and bearings						
	2.5	Types of compass- Prismatic and Surveyor's compass						
	2.6	Computation of included angles						
	2.7	Magnetic declination and Local attraction						
	2.8	Closing error and its elimination by Bowditch's rule						
	2.9	Field procedure of compass traversing						
	2.10	Sources of errors in compass						
3		Levelling	10	16	2	60%	30%	10%
	3.1	Definitions and Terms used in leveling						
	3.2	Types of levels and leveling staff						
	3.3	Temporary adjustments of level						
	3.4	Recording and reduction of observations						
	3.5	Computation of RLs by H.I and Rise and fall method						
	3.6	Methods of leveling						

	3.7	Curvature and refraction correction,						
	3.8	Difficulties in leveling						
	3.9	Errors in leveling						
4		Contouring	03	06	3	30%	30%	40%
	4.1	Definitions						
	4.2	Object and use of contour map						
	4.3	Characteristics of contour lines						
	4.4	Methods of contouring						
	4.5	Interpolation and Sketching of contours						
	4.6	Interpretation of contour sheet						

SECTION-II

Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
5		Plane Table Survey	05	08	2	60%	30%	10%
	5.1	Plane table and its accessories						
	5.2	Temporary adjustment in plane table survey						
	5.3	Orientation of plane table						
	5.4	Methods of plane tabling- radiation, intersection, traversing						
	5.5	Errors and Precautions in plane table survey						
	5.6	Advantages and Disadvantages of plane table survey						
	5.7	Contouring in Plane Table Surveying						
6		Theodolite and its use	08	14	4	30%	30%	40%
	6.1	Components of transit theodolite and their functions						
	6.2	Definitions of technical terms used						
	6.3	Procedure to read vernier and micrometer theodolite						

	6.4	Temporary adjustments of transit theodolite						
	6.5	Fundamental axis of theodolite and their relationship						
	6.6	Measurement of horizontal and vertical angle,						
	6.7	Miscellaneous operation with theodolite- prolongation of a straight line, ranging a line, measuring a bearing of line , laying off an angle, measurement of deflection angle						
	6.8	Permanent adjustment of theodolite						
	6.9	Errors in theodolite						
7		Theodolite Traversing	07	12	4	30%	30%	40%
	7.1	Method of traversing: Included angle method, deflection angle method and fast needle method						
	7.2	Traverse computation: consecutive co-ordinates and independent co-ordinates						
	7.3	Balancing of traverse: Bowditch rule, transit rule and axis method						
	7.4	Gale's traverse table						
	7.5	Plotting of a Theodolite traverse						
	7.6	Omitted measurements						
8		Trigonometrical levelling	04	06	4	30%	30%	40%
	8.1	Introduction						
	8.2	Measurements of heights and distance in the following cases: 8.2.1 Base of the object is accessible. 8.2.2 Base of the object is inaccessible and instrument stations and the elevated objects are in the same vertical plane						

		8.2.3 Base of the object is inaccessible and instrument station and the elevated objects are not in the same vertical plane.						

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

Suggested Specification Table

Unit No.	Unit Title	Teaching Hours	Total Marks	R Level	U Level	A Level
1	Introduction	05	08	20%	70%	10%
2	Compass Survey	06	10	60%	30%	10%
3	Levelling	10	16	60%	30%	10%
4	Contouring	03	06	30%	30%	40%
5	Plane Table Survey	05	08	60%	30%	10%
6	Theodolite and its use	08	14	30%	30%	40%
7	Theodolite Traversing	07	12	30%	30%	40%
8	Trigonometrical levelling	04	06	30%	30%	40%
		48	**80**			

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment/ Project	Approx. Hours	CO
1	1	Study of various instruments used for linear measurement and minor instruments	04	1
2	2	Study of prismatic and surveyor's compass, measurement of bearings, computation of included angles	04	2
3	3	Study of Dumpy level	02	2
4	3	Differential leveling practice, reduction of level by HI and Rise and Fall method, Fly leveling	04	2
5	5	Plane table method -Radiation, Intersection and Traversing	06	2
6	6	Study of Theodolite – measurement of horizontal angle	04	4

7	6	Measurement of horizontal angle by method of repetition	04	4
8	6	Measurement of vertical angle.	02	4
9	6	Laying of an angle by method of repetition	02	4
10	6	Prolonging a straight line with the help of Theodolite and Measurement of deflection angle.	02	4
11	8	Trigonometrical levelling - One plane method and Two plane method	04	4
12	7	Two days project on Theodolite traversing and Plane table detailing	02 days	2,4
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term				

Term work:

Term work shall consist record of all Practicals and project in field book along with drawing of project work on full imperial drawing sheets.

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	N.N. Basak	Surveying and Levelling	Tata McGraw –Hill, 25th Edition 2008
2	Dr.K.R.Arora	Surveying Volume-1	Standard Book House, 15th Edition 2015
3	S. K. Duggal	Surveying and Levelling Vol. I & II	Tata Mc Graw-Hill, 2nd Edition

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	R.Subramanian	Surveying and Levelling	Oxford University Press, 1st Edition 2007
2	Kanetker & Kulkarni	Surveying and Levelling, Vol I &II	Pune Vidyarthi Griha, Pune 24th Edition

Curriculum Coordinator **Head** **Dean - Diploma**

Diploma in Civil Engg.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MUMBAI-400 019. Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVILENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: MECHANICS OF STRUCTURES
COURSE CODE	: 171SE34

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	5	3	80	32	20	100	40	-	-	-	-	25@	10	125

@ : assessment by Internal Examiner

Course Objectives:

For civil engineers it is necessary to understand stresses developed under the action of different types of forces and to calculate various elastic constants. Drawing AFD, SFD and BMD for a beam enables Civil Engineer positioning reinforcement. Understanding buckling of columns will prepare students to learn design of RCC and Steel Structures later.

Course Outcomes: Student should be able to

CO1	Explain Define and Calculate different types of forces and corresponding stressesand strains.
CO2	Explain elastic material and ductility. Explain, Define and Calculate various elastic constants. Use relations between elastic constants to Compute other unknown elastic constants.
CO3	Explain Define and Calculate shear force and bending moment at a section of beam. Draw shear force diagram and bending moment diagram, Estimate maximum SF and BM values and their positions. Explain point of contraflexure
CO4	Distinguish Define and Classify short and long columns, Compute slenderness ratio and load carrying capacity of long column. Compare load carrying capacities by Euler's and Rankine's formulae.

Course Content:

SECTION-I								
Unit &Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	% R Level	% U Level	% A Level
1	1.1	**Stress and Strain**: Hook's law. Modulus of elasticity, Modulus of rigidity, Bulk Modulus, Poisson's ratio.	9	16	1, 2	21	37	42
	1.2	Simple shear, complementary shear						
	1.3	Relation between E, G, K						

	1.4	Behavior of mild steel under tension, load extension curve, yield stress, factor of safety, working stresses						
	1.5	Stresses in composite sections under axial loading.						
2	2.1	**Axial Force, Shear Force and Bending Moment Diagrams:** Bending moments, shear force and axial forces in simply supported cantilever and overhanging beams.	8	12	1, 3	24	34	42
	2.2	Plotting of B.M.D., S.F.D., and A.F.D. for concentrated and uniformly distributed loads.						
	2.3	Relations between shear force and bending moment and intensity of load at a section,						
	2.4	Point(s) ofcontraflexure.						
3	3.1	**Simple Theory of Bending:** Flexure formula for straight prismatic beams	7	12	1, 3	15	32	53
	3.2	Principal axes and second moment of area of a section. Parallel and perpendicular axis Theorem. Application to Tee and I sections.						
	3.3	Moment of resistance						
	3.4	Simple problem in application of flexure formula						
	3.5	Flitched beams						
		TOTAL OF SECTION I	**24**	**40**				
SECTION-II								
Unit &Sub-Unit		**Topics/Sub-topics**						
4	4.1	**Shear Stresses:** Shear stress distribution formula with meaning of terms. Distributions of shear stresses across rectangular, circular, triangular, rhomboidal sections with relation between maximum and average shear stress. Shear stress distribution diagrams with important values for Tee and I sections.	7	12	1, 3	16	37	47
5	5.1	**Bending combined with axial loads**: Eccentric loading of a compression member section, middle third rule, core of a section.	9	14	1, 3	23	35	42
6	6.1	**Struts:** Euler's theoryofstrutsunderaxial loads, Its	8	14	4	26	32	42

		assumptions and limitations Euler's formula						
	6.2	Various End Conditions, effective length, slenderness ratio						
	6.3	Rankine's formula, comparison between two formulae and values obtained from them.						
		TOTAL OF SECTION II	**24**	**40**				
		TOTAL OF SECTION I and II	**48**	**80**				

Numerical Problems will be asked in the examination, based on above syllabus.

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

Unit	Hours	Marks	CO	% R Level	% U Level	% A Level
1	9	16	1,2	21	37	42
2	8	12	1,3	24	34	42
3	7	12	1,3	15	32	53
4	7	12	1,3	16	37	47
5	9	14	1,3	23	35	42
6	8	14	4	26	32	42

Term Work:
List of Practicals to be performed and Laboratory journal containing at least six experiments to be prepared and submitted.

Sr. No.	Name of Experiments	**Approx. Hours**	**CO**
1	Tension test on M.S. and HYSD(tor) Steel Bar.	4	1
2	Brienll Hardness Test on M.S., C.I. & Brass specimen	4	1
3	Izod impact test on M.S. bar and brass specimen	4	1,2
4	Torsion test on M.S specimen	4	1,2
5	Shear test on M.S., C.I. brass specimen	4	1,3
6	Transverse test on Cast Iron	4	1
7	Tension Test on Cast Iron.	4	1
8	Flexure test on ISMB Section to find. Modulusof Elasticity of steel.	4	1,3

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	S. Ramamrutham	Strength Of Materials	15th Edition 2006, DhanpatRai
2	S. B. Junnarkar	Mechanics of structures	21th Edition 2010,Charotar Publishing House

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Schaum's Series	Solved Problems in Strength Of Materials.	TATA McGraw Hill- 2008
2	C.H. Ryder.	Strength of materials	2002, Macmillan publishers
3	Web site	http://nptel.ac.in/courses/105102090/	IIT Delhi
4	Web site	http://nptel.ac.in/courses/105106116/12	IIT Madras

Curriculum Coordinator **Head** **Dean - Diploma**

Diploma in Civil Engg.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE MUMBAI-400 019. Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVILENGINEERING.
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	:CONCRETE TECHNOLOGY
COURSE CODE	:171SE35

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	5	3	80	32	20	100	40	-	-	25**	10	25@	10	150

**: assessment by External and Internal Examiner, @: assessment by Internal Examiner

Course Objectives:

Concrete is the most versatile material of construction, simple to make but most complex to understand. The cement and concrete industry is witnessing a very rapid development day to day and hence the aim of this course is to impart a professional / practical knowledge about present knowledge of concrete technology along with recent developments by understanding concrete right from its chemistry, making, placing to testing of hardened concrete

Course Outcomes: Students will be able to:

CO1	Explain the properties of coarse and fine aggregates describe chemical composition, properties, types and different tests of cement, perform the tests on cement.
CO2	Define the term concrete, explain its properties, behavior, explain concreting processes like mixing, placing, compacting, curing etc.
CO3	Produce mix design for nominal grades of concrete as per IS method and perform different tests on fresh and hardened concrete , understand use of admixtures and their applications , understand curing and shuttering of concrete.
CO4	Explain special types of concrete , determine the defects in concrete and there remedies , use equipments to perform Nondestructive Tests on Concrete.

Course Content:

SECTION-I								
Unit &Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	1.1	**Introduction:** Definition of Concrete, Advantages of concrete.	02	20	CO2	50	25	25
	1.2	Cement, composition of cement, Types of cement, Tests on cement, Setting time, fineness, strength of cement.	04		CO1			
	1.3	Aggregates and its classification, Strength of aggregate, Bulking of sand, Sieve analysis, Quarry selection, Water Quality requirements as per I.S 456-2000	06		CO1			
2	2.1	**Properties of Fresh Concrete** Workability: Factors affecting Workability, Measurement of workability, Slump test, Compaction factortest , Recommended slumps for placements in various conditions as per I.S 456-2000.	06	20	CO3	50	25	25
	2.2	Bleeding of Concrete, Water Cement ratio, Shrinkage, Creep, Durability of Concrete	03		CO2			
	2.3	Test on Concrete: Compression Test, Cube test, Cylinder Test	03		CO3			
		TOTAL OF SECTION I	**24**	**40**				

SECTION-II								
Unit &Sub-Unit		Topics/Sub-topics						
3	3.1	**Mix design:** Objectives of mix design, Mean strength, Introduction to various grades as per I.S 456-2000, Proportioning for normal mix as per I.S. Code methods	06	08	CO3	40	30	30
4	4.1	**Special types of concrete**: Ready mix concrete, Precast concrete, Vacuum concrete, Shotcrete, Lightweight concrete, High performance concrete , Micro Concrete , Polymer modified morter	06	08	CO4	50	25	25
5	5.1	**Admixtures as per I.S 456-2000:** Chemical Admixtures such as Plasticizers, Retarders, Accelerators, Water Reducing admixtures, Additives used in RMC	04	06	CO3	50	25	25
6	6.1	**Mixing and Compaction of Concrete:** Hand Mixing and Machine Mixing, Hand Compaction and Machine Compaction.	02	06	CO2	50	25	25
7	7.1	**Curing of Concrete:** Objectives and methods of Curing; Duration of curing and removal of formwork. Introduction to advanced shuttering methods.	03	06	CO3	50	25	25
8	8.1	**Defects in Concrete:** Identification and methods of repairs. Introduction to Non Destructive Tests and latest instruments for NDTs	03	06	CO4	50	25	25
		TOTAL OF SECTION II	**24**	**40**				
		TOTAL OF SECTION I & II	**48**	**80**				

Numerical Problems will be asked based on above based syllabus.

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

Unit	Hours	Marks	CO	R Level	U Level	A Level
1	12	20	1,2	**50**	**25**	**25**
2	12	20	2,3	**50**	**25**	**25**
3	06	08	3	**40**	**30**	**30**
4	06	08	4	**50**	**25**	**25**
5	04	06	3	**50**	**25**	**25**
6	802	06	2	**50**	**25**	**25**
7	03	06	3	**50**	**25**	**25**
8	03	06	4	**50**	**25**	**25**

List of Practicals:

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1		Determination of water for cement paste of normal Consistency.	2	CO1
2		Determination of Initial and Final Setting time.	2	CO1
3		Verification of Soundness of cement	2	CO1
4		Determination fineness of cement by sieving	2	CO1
5		Determination of compressive strength of cement	2	CO1
6		Determination of FM of fine and coarse aggregate.	2	CO1
7		Test on Workability of concrete: Slump cone test: Effect of W/C and A/C on slump.	2	CO3
8		Test on workability: Compaction factor test: Effect of W/C and A/C on compaction factor.	2	CO3
9		Compression test on concrete by cube and cylinder.	2	CO3
10		Flexure test on concrete	2	CO3
11		To determine proportion of ingredients for design Mix.	2	CO3
12		Non Destructive Tests on Concrete Cubes.	2	CO4
* Minimum 8 and maximum 12 practical/experiment sessions to be included in a course in a term				

Text Books:

Sr. No.	Author	Title	Publisher and Edition
01	M.Y. Sabnis	Cement Concrete Mix Design Principles and practice	Edition-2005,GMS Publications
02	M.S. Shetty	Concrete Technology	Edition-2008,S.Chand Publication

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
01	A.M. Neville	Properties of Concrete	4th edition, 1996, publisher John Wiley & Sons
02	WebSites	http://www.ncbindia.com/services/concrete-mix-design/	National Council for Cement and Building Materials.(Under the Administrative Control of Ministry of Commerce & Industry, Govt. of India)
03	Web Sites	www.youtube.com	Many publishers on different topics covering almost entire syllabus

Curriculum Coordinator | **Head** **Diploma in Civil Engg.** | **Dean - Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE MUMBAI-400 019 Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: BUILDING DESIGN & DRAWING
COURSE CODE	: 171CE36

Teaching & Examination Scheme

TEACHING SCHEME				EXAMINATION SCHEME												TOTAL MARKS
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
2	-	4	6	-	-	-	-	-	-	50**	20	-	-	50@	20	100

**: assessment by External and Internal Examiner, @: assessment by Internal Examiner

Course Objective:

Civil Engineering Diploma holder has to supervise various construction processes and execute civil engineering structures such as buildings, roads, railways, dams, bridges; etc. He has to convert design parameters, process details into pictorial views. Therefore he is required to understand and prepare the drawings, interpreted it so that he can execute the works smoothly.
Drawing helps in detailing the structures processes with quality parameter and is essential for drafting specifications and tender documents. The knowledge of this subject is useful for building construction, estimation and costing, design of structure, surveying, projects etc.

Course Outcomes: At the end of this course students will be able to

C01	Read, interpret and draw the building drawings
C02	Prepare submission drawings for the buildings.
C03	Prepare working drawings for the building.
C04	Plan various types of buildings considering the functional requirements.
C05	Apply the building rules, regulations and byelaws for planning the building

Contents:

Theory to be covered for practical's purpose:

Sr. No.	Content	CO	HRS
1.0	Introduction • Purpose of drawing. Requirement of good drawing. Different types of drawing. Difference between Layout plan and Site plan. • Symbols- Symbols of different materials used in construction, building components. • Detailed description of requirement of essential particulars for drawing a sheet. • Reading of working drawings of residential buildings.	1& 3	12
2.0	Planning Of Building • Principles of planning of Residential and Public building as per BIS: 7662 (Load bearing and RCC framed structures). • Space requirements and norms for various units of Residential and Public building. Recommended space standards for Public building (school building) as per IS 8827-1978. • Rules and byelaws of local governing authorities for construction. e.g. Building line, open spaces, FSI, Headroom, minimum room dimensions etc. • Introduction to design criteria for planning public building. • Drawing of line plans for residential and public building.	4&5	10
3.0	Types of Drawing • Development of line plan, Elevation, Section, Site Plan, Location Plan, Foundation Plan, Area statement and other details. • Significance of Submission drawing and working drawing.	2& 5	10

Practicals:

Sr. No.	Name of the Topic	Hrs	CO	R Level	U Level	A Level
1)	Read and interpret the building drawings prepared professionally of already built structures. (at least two)	2	CO1	50%	50%	
2)	Draw different types of line work used in submission drawing	2	CO1	50%	50%	
3)	Draw neat dimensional sketch- Plan & Sectional elevation of Isolated Column Footing along with details of flooring.	2	CO1	50%	50%	
4)	Basic of lines, checklist for different component of structure	2	CO1	50%	50%	

5)	Measured Drawing of an existing residential building (Load bearing) **with flat terrace,** showing Plan, Elevation, Sections, area statement, Schedule of doors and windows on Full Imperial size drawing sheet.	12	CO2	40%	30%	30%
6)	Measured Drawing of an existing residential building (Load bearing) **with Pitched roof**, showing Plan, Elevation, Sections Schedule of doors and windows , Section of pitched roof showing typical details on Full Imperial size drawing sheet.	10	CO2, CO3	40%	30%	30%
7)	Measured Drawing of an existing G+1 residential building (**Framed structure Type**), showing Plan, Elevation, Sections, Construction notes, Schedule of doors and windows, Site Plan, Details of any one typical door and window ,etc on Full Imperial size drawing sheet.	10	CO2, CO3, CO4	40%	30%	30%
8)	Draw the line plans on full imperial size graph paper for the Project work for planning of building in a group of 5-6 students may be given for different data.: Public building (G+1) : Hospital, Bank, Library, School etc.	12	CO2, CO3	40%	30%	30%
9)	Students shall do site visit and select any one of the residential building planned draw following views ***on Full Imperial size*** drawing sheet. • Typical Floor Plan • Elevation • Horizontal section passing through either kitchen or WC & bathroom and passing through staircase. • Foundation plan on Full Imperial Size Graph paper • Roof plan & Site Plan.	12	CO2, CO3, CO4, CO5	20%	30%	50%

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	Shah, Kale, Patki,	Text Book of Building Drawing	Edition 4th, Publisher-Tata McGraw- Hill.
2	Shahane,	Civil engineering drawing and design	Edition 3rd,publisher-Poona Allie Book stall.

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Malik & Mayo,	Civil Engineering Drawing	Edition 1972, Publisher-New Asian Publishers New Delhi.
2	M.Chakraborti,	Civil Engineering Drawing	Edition 3rd1999, Publisher-Bhakti Vedant Book Trust.
3	National Building Code of India, BIS,		Edition 2002, publisher- BIS.

Curriculum Coordinator **Head** **Dean - Diploma**

Diploma in Civil Engg.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE MUMBAI-400 019. Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: THIRD
COURSE TITLE	: PROFESSIONAL PRACTICES
COURSE CODE	: 171CE37

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
0	0	2	2											25@	10	25

@ : assessment by Internal Examiner

Course Objectives:

This subject will develop student as an effective member of team, developing ability and skill to perform at highest degree of quality as an individual as well as a member of core group or team. At the end of this course students will be able to

- Assimilate Information
- Developing working in team and handling people effectively
- Apply problem solving skill and task management for given projects.

Course Outcomes:

Student should be able to

CO1	Understand the techniques of collecting different data
CO2	Do literature survey through books, journals and websites
CO3	Listen and grasp the views of experts
CO4	Organize and structure the collected information

Course Content:

Unit & Sub-Unit		Topics/Sub-topics	Hours	CO	R Level	U Level	A Level
1		Introduction	4	1	40%	20%	40%
	1.1	Responsibility and Relationship of Customer and Service Provider (Contractors, Subcontractor, Consultant and Suppliers) as Per National Code of Practice for Construction Industry.					
	1.2	Engineering as a Profession- Ethics, definition of ethics.					
	1.3	Commitment to continuous Improvement					

	1.4 1.5 1.6 1.7	Case study on Customer requirement, Civil Engineers commitment and Client satisfaction. Awareness regarding Sustainable Construction Impact of Unethical Conduct Method of writing technical report Exercise:- Students shall write report based on above topic.					
2	2.1	Assimilation of Information Industry visits or Information through internet, books, journals of manufacturing process of any type of following building material and submitting report in the form of term work - Bricks, Timber, Steel, Precast member, Cement, Fiber Reinforced Plastic, molded stone, Flooring tiles, Roofing material, Bitumen or any advanced building material. Exercise:- Assimilation of information and its analysis if any, like technical specification, manufacturing details, etc.	4	2	40%	30%	30%
3	3.1	Mentoring Programme Social Work project regarding awareness of conservation of environment, Hygiene in rural or urban areas. Exercise:- Each field report to be submitted at the end of month and checked by concerned instructor, need to be submitted as Term work	10	2 & 4	25%	25%	50%
4	4.1	Leadership Exercise and Communication Skill Task to be assigned to assess technical and hand skills, leadership quality, collaborative work planning by giving any one of the below mentioned program to group of 10students. 1. Use of any one surveying instrument in field. 2. Laying of bricks in English bond. 3. Planning of Public building such as School, Hospital College Canteen, and Library. 4. Market survey. Assessment of above task to be done in the form of group discussion between groups of students.	8	2 & 4	15%	25%	60%
5		Expert Lecture on topic related to (any three) • Transportation Engineering	6	1 & 3	30%	40%	30%

		• Pollution Control • Best Practice adopted in Civil Engineering Construction. • Use of RMC in construction. • Specific Civil Engineering Application • Use of lift and escalator in High Rise building • Building byelaws for municipal areas. • New Building materials • Safety Engineering • Rain Water Harvesting Exercise:- Write summary on the guest lecturers with subject matter on its topic					
		Total	**32**				

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

Term work: - Students shall submit report / term work journal based on above topic.

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1.	Govt. of Maharashtra --	P.W.D. Hand book	-
2.	Local News papers and Events	-	-

Curriculum Coordinator **Head** **Dean - Diploma**

Diploma in Civil Engg.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MUMBAI-400 019
Civil & Env. Engg. Dept.