Veermata Jijabai Technological Institute (V.J.T.I)
(Central Technological Institute, Maharashtra State, INDIA)
H.R.Mahajani Marg, Matunga, Mumbai 400019
Tel.No. +91 22 24198101-02 Fax: +91 22 24102874
Website: www.vjti.ac.in

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

COURSE CODE	COURSE	GR	TEACHING SCHEME (HRS/WK)				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	
171CE51	INDUSTRIAL TRAINING (6 weeks in summer break after 4 semester)	A	-	-	6#	6#	-	-	-	-	-	-	-	-	75**	30	75@	30	150
171CE52	QUANTITY SURVEYING	A	3	0	2	5	3	80	32	20	100	40					25@	10	125
171CE53	WATER SUPPLY & WASTE WATER DISPOSAL	A	3	0	2	5	3	80	32	20	100	40	25*	10			25@	10	150
171SE54	SOIL MECHANICS	C	3	0	2	5	3	80	32	20	100	40					25@	10	125
171SE55	ELEMENTS OF RCC DESIGN	C	3	0	2	5	3	80	32	20	100	40			25**	10	25@	10	150
171CE56	ELECTIVE:(ANY ONE)		3	2	0	5	3	80	32	20	100	40			25**	10	25@	10	150
171CE57	PROJECT-I	A	-	-	3	3	-	-	-	-	-	-	-	-	50*	20	50@	20	100
171CE58	CONTRACTS & ACCOUNTS	A	2	1	0	3									25**	10	25@	10	50
171CE59	INDUSTRY INSTITUTE INTERACTION-I	A	0	0	2												##		
	TOTAL		**17**	**3**	**13**	**31**		400		100	**500**		**25**		**200**		**275**		**1000**

Abbreviations: B – Basic; C – Core; A – Applied; M – Management; L – Theory Lecture; T – Tutorial; P – Practical; TH – Theory Paper; MST – Mid-Semester Tests; PR – Practical Exam; OR – Oral Exam; TW- Term Work. @- Assessment by Internal Examiner * Indicates assessment by Internal Examiner, **: Assessment by External and Internal Examiner, +: Presentation/Seminar assessment by External and Internal Examiner, ##- **For Non Credit course grades (A-D) to be mentioned in the mark sheet based on the continuous assessment.**

(#): Evaluation of industrial training and its reports will be done in 5th semester and the credits for same will be included in 5th semester mark sheet. The teaching load assigned to a faculty member for guiding students in preparation of training report and its evaluation for a batch of students (equivalent to practical batch size) would be 1 hour/week in 5th semester.

Curriculum Coordinator **Head Diploma in Civil Engineering** **Dean - Diploma**

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List of Third Year
Elective Subjects
V SEMESTER

SR. NO.	SUBJECT CODE	SUBJECT TITLE
1	171CE56E1	PAVEMENT ANALYSIS & DESIGN
2	171CE56E2	DISASTER MANAGEMENT
3	171CE56E3	ENGINEERING HYDROLOGY
4	171SE56E4	ADVANCED STRUCTURAL ANALYSIS
5	171CE56E5	SOLID WASTE MANAGEMENT

Curriculum Coordinator

Head
Diploma in Civil Engineering

Dean - Diploma

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Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: FIFTH
COURSE TITLE	: QUANTITY SURVEYING
COURSE CODE	: 171CE52

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:

Quantity Surveying is core course of civil engineering programme. Civil engineer need to have some basic skills to interpret the drawing, to apply the methods of computing the quantities according to relevant I.S. In this applied technology course of Quantity surveying, efforts have been made to familiarize and to know the provision of I.S. for mode of measurement, specifications for various items of works, carrying out rate analysis and also the approximate methods of estimation. These basic skills can be developed in the students through this course.

Course Outcomes:

Student should be able to

CO1	Interpret the working drawing and find approximate cost of civil engineering structure.
CO2	Prepare check list of items of construction.
CO3	Evaluate estimate for civil engineering work.
CO4	Analyze rates of items of construction.
CO5	Take measurement of completed work.
CO6	Draw up the specification for various items of works
CO7	Valuate the building

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Course Content:

Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Introduction :	07	12	1,2	70%	30%	--
	1.1	Meaning & objectives of estimating & costing, Skills required for a good estimator.						
	1.2	Types of estimate - Approximate and Detailed, Approximate estimate - Plinth area rate method, Cubical Content method, Service Unit method, Typical bay method, Approximate Quantity method. Problems on Plinth area rate method & application of Service unit.						
	1.3	Detailed estimate types- Revised estimate, Supplementary estimate, revised & supplementary estimate and Maintenance & Repair estimate.						
	1.4	Mode of Measurements - Units of Measurements for different item of works as per IS 1200 & As per PWD specification Book. Rules of deductions for openings as per IS 1200 for brickwork, plastering, painting. Preparation of measurement and abstract sheets.						
2	2.1	General Principles and Methods of Estimation – Centre line and Long wall and short wall methods.	05	08	1,5	20%	40%	40%
	2.2	Abstracting bills of quantities, schedule items, lump sum items, prime cost, and provision for electrification, drainage & water supply, contingencies, work charged establishment, Tools & Plants						
3		Detailed Estimate:	12	20	1,2, 3 & 5	10%	20%	70%
	3.1	Procedure for taking out quantities for various items of works as per IS 1200.						
	3.2	Factors to be considered during preparation of detailed estimate – Percentage of reinforcement for various structural members, Bar bending Schedule concept.						
	3.3	Preparing detailed estimate for - a. Single storey Load bearing Structure (small residential building with one room, two rooms, Kitchen, Bath &WC) by Long Wall and short wall						

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		method and Center line method. b. Two- storied residential Framed Structure building by centre line method c. RCC work for weather-shed with lintel, slab, beam, and column with footings and staircase.						
	3.4	Earthwork quantity estimation for a road profile by mid section method, mean section area method and prismoidal method.						
		Total of section I	**24**	**40**				
4		Rate Analysis:	09	18	4	30%	20%	50%
	4.1	Meaning of term rate analysis, Factors affecting rate analysis, Overhead charges, Quantity of materials required for different item of works, Task work and task work for various items of works as per Indian Standard						
	4.2	Analysis of rates for items of civil engineering works - P.C.C., Brickwork, RCC works, Stone masonry, Plastering & Pointing, Flooring, Waterproofing, Plumbing, Shuttering and Cast in situ concrete.						
5		Specification:	09	12	6	40%	30%	30%
	5.1	Definition and Purpose						
	5.2	Types: General and Technical specifications for various items of construction – Ist Class building, earthwork in excavation of foundation trenches and back filling, lime concrete and cement concrete in foundation, RCC work, Ist class brickwork, random and course rubble masonry, DPC, plastering.						
6		Valuation:	06	10	7	20%	30%	50%
	6.1	Importance and Purpose of valuation.						
	6.2	Definitions - Depreciation, sinking fund, Salvage & Scrap value, Gross & Net yield.						
	6.3	Different methods of valuation.PWD account payment method.						
		Total of Section II	**24**	**40**				
		Total of Section I & II	**48**	**80**				

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SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction	07	70%	30%	--	12
II	Method of Estimation	05	20%	40%	40%	8
III	Detailed Estimate	12	10%	20%	70%	20
IV	Rate Analysis	09	30%	20%	50%	18
V	Specifications	09	40%	30%	30%	12
VI	Valuation	06	20%	30%	50%	10
TOTAL		48				80

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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.*

List of Practical's/Assignments/Tutorials:

Sr. No.	Practical/Assignment/ Project	Approx. Hours	CO
1	Prepare check list of items for following Civil engineering works. i) Load bearing structure ii) Framed structure iii) Road work	02	**2**
2	Prepare Market rates survey report for modern construction materials and items.	02	**2**
3	Taking out quantities of various items of work for load bearing structure	04	1,2,3 & 5
4	Taking out quantities of various items of work for R.C.C Framed structure.	04	1,2,3 & 5
5	Prepare a detailed estimate for Load bearing structure (G+ 1)	05	1,2,3 & 5
6	Prepare a detailed estimate for R.C.C Framed structure (G+ 2)	05	1,2,3 & 5
7	Prepare estimate by using approximate estimate method.	02	**1**
8	Taking out quantities of earthwork for a road profile.	02	1,2,3 & 5
9	Prepare rate analysis for at least six items of work- RCC in beams & slabs, Columns, Brick masonry, Stone masonry, Plastering & Pointing, Flooring ,	02	**4**

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	waterproofing, Plumbing, Cut & bent, Light weight blocks, RCC with fly ash with current market rates.		
10	Draft a detailed specification for at least six items of construction.	02	**6**
11	Solve any five problems on Valuation.	02	**7**
	Total	**32**	

Term Work:
Term work shall consist of record of all tutorials.

Text Books :

Sr. No.	Author	Title	Publisher and Edition
1	B. N. Dutta	Estimating & Costing in Civil Engineering	Edition 25th 2002, Publisher- UBS Publishers Distributors Pvt. Ltd. New Delhi.
2	M. Chakraborti	Estimating & Costing , Specification and Valuation in Civil Engineering	Edition-21st 2008, publisher- M. Chakraborti, 21 B, Bhabananda Road, Kolkatta-700026.

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	G.S. Birdie	Estimation & costing	Edition 6th reprint, Publisher-Dhanpatrai and sons, Delhi.
2	S.C. Rangwala,	Estimating & Costing	Edition 2002, Publisher- Charotar Publication Anand.

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

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: FIFTH
COURSE TITLE	: WATER SUPPLY AND WASTE WATER DISPOSAL
COURSE CODE	: 171CE53

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	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	--	--	25@	10	150

@-Assessment by Internal Examiner.* - Practical examination assessed by internal examiner.

Course Objectives:

This subject is intended to teach the students concepts, principles & procedures in different treatment required for water supply and waste water disposal.

Course Outcomes:

After completion of the course the student will be able to

CO1	Estimate water demand.
CO2	Analyze the working of water and waste water treatment plant.
CO3	Interpret quality of water and waste water by conducting tests on it.
CO4	Design sewers, septic tanks.
CO5	Manage water supply & its distribution.
CO6	Compare sewage disposal methods.

Course Content:

SECTION-I									
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Water Demand & Supply Scheme:**				Theory Marks		
1	1.1	**Water Demand:** Objectives of public water supply, Water Demand types, Population Forecasting, Estimation of water demand, Fluctuations in demand of water	03	06	1	35%	35%	30%
	1.2	**Water Supply Scheme:** Components of water supply scheme, Design Period.						

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2		**Quality of Water:**	02	04	3	25%	25%	50%
	2.1	**Potable, Wholesome, Contaminated Water:** Terminology						
	2.2	**Tests on Water:** Physical, Chemical and Bacteriological impurities & analysis.						
	2.3	**Drinking Water Quality Standards:** As per IS specifications.						
3		**Treatment of Water :**	14	20	2	30%	40%	30%
	3.1	**Water Treatment Plant :** Units, Flow Diagram						
	3.2	**Water Treatment Processes:** Screening, Aeration and Sedimentation: factors affecting sedimentation, Horizontal flow type sedimentation tank.						
	3.3	**Coagulation:** Coagulants and Coagulant aids, Jar test, Choice of coagulant.						
	3.4	**Filtration:** Types of filters- Rapid sand filter, Slow sand filter, Pressure filters: Construction & operation, Types of under drainage system, Back washing of rapid sand filter, Comparison between rapid sand & slow sand filter.						
	3.5	**Disinfection:** Various methods, Free and combined residual chlorine, Chlorine demand, Break point chlorination, Super chlorination, Dechlorination, Well water disinfection.						
	3.6	**Softening:** Temporary & Permanent hardness of water, reasons & comparison. Methods of removing temporary hardness- Boiling, Addition of Lime. Methods of removing permanent hardness – Lime-Soda, Zeolite process.						
	3.7	**Advanced water treatment-** Electro- dialysis, Reverse Osmosis						
4		**Transmission and Distribution :**	05	10	5	40%	30%	30%
	4.1	**Methods of water distribution systems:** Gravity, Pumping & Dual, merits, demerits.						
	4.2	**Systems of Supplying Water:** Continuous & Intermittent, Comparison						
	4.3	**Layout of Water Distribution Pipe:** Dead end, Grid Iron, Circular, Radial, their advantages & disadvantages.						
		Total of Section I	**24**	**40**				

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SECTION-II								
Unit & Sub-Unit		Topics/Sub-topics						
5		**Waste Water :**	03	06	4	50%	50%	--
	5.1	**Characteristics of Sewage:** Composition of sewage.						
	5.2	**Sewerage System:** Separate, Combined and Partially separate, Sanitary and Storm water sewers, Comparison of separate and combined system, Quantity fluctuations of sewage.						
	5.3	**Shape & Sewer Materials:** Laying of sewer, Sewer appurtenances- manholes, drop manholes.						
6		**Design of Sewer:**	05	10	4	20%	30%	50%
	6.1	**Design of Sewer:** maximum and minimum velocities to be generated in sewers, Self cleaning velocity, Non Scouring Velocity, Comparison between self cleaning & non scouring velocity, Problems on design of sewers.						
	6.2	**Aerobic and Anaerobic Process:** Comparison						
7		**Sewage Strength:**	02	04	3	50%	50%	--
	7.1	**Sewage Strength:** BOD, COD, Uses of BOD & COD test. Comparison between BOD & COD.						
8		**Sewage Treatment:**	08	10	2	20%	50%	30%
	8.1	**Sewage Treatment:** Objective, flow diagram using TF & ASP. Preliminary sewage treatment- Screens, Grit chamber, Skimming tank.						
	8.2	**Primary Treatment:** Sedimentation.						
	8.3	**Secondary or Biological Treatment:** by Trickling filters construction and working, merits and demerits of trickling filter, Activated Sludge Process (ASP). Oxidation pond, Oxidation ditch.						
	8.4	**Sludge Disposal:** Digestion of sludge, Dewatering of sludge, Sludge Drying Beds.						
9		**Low Cost Sanitation:**	03	05	4	40%	--	60%
	9.1	**Septic Tank:** Treatment and disposal of septic tank effluent.						
	9.2	**Design of Septic Tank:** Design considerations, Problems.						

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10		**Disinfection & Disposal of Sewage:**	03	05	6	60%	--	40%
	10.1	**Disinfection of Sewage:**						
	10.2	**Sewage Disposal:** Discharge of raw and treated sewage on land and water, Comparison of sewage disposal method, Sewage Sickness, Limits of dilution.						
		Total of Section II	**24**	**40**				
		Total of Section I & II	**48**	**80**				

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

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Water Demand & Supply Scheme	03	35%	35%	30%	06
II	Quality of Water	02	25%	25%	50%	04
III	Treatment of Water	14	30%	40%	30%	20
IV	Transmission and Distribution	05	40%	30%	30%	10
V	Waste Water	03	50%	50%	--	06
VI	Design of Sewer	05	20%	30%	50%	10
VII	Sewage Strength	02	50%	50%	--	04
VIII	Sewage Treatment	08	20%	50%	30%	10
IX	Low Cost Sanitation	03	40%	--	60%	05
X	Disinfection & Disposal of Sewage	03	-	40%	60%	05
	Total	**48**				**80**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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 specifie*

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List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Practicals	Approx. Hours	CO
A		**Tests on Water**		
1*	1	To determine pH of the given water sample	2	3
2*	2	To determine Total solids, Dissolved solids & suspended solids of the given water sample	2	3
3*	3	To determine Turbidity of the given water sample	2	3
4*	4	To determine Optimum Alum Dose by Jar test for the given water sample	2	3
5*	5	To determine Residual chlorine of the given water sample	2	3
6*	6	To determine Chloride content of the given water sample	2	3
7*	7	To determine Total hardness of the given water sample	2	3
8*	8	To determine Total Alkalinity of the given water sample	2	3
9*	9	To determine Dissolved Oxygen of the given water sample	2	3
B		**Tests on Waste water**		
1	1	To determine Sludge Volume Index of the given waste water sample.	2	3
2	2	To determine BOD of the given waste water sample	2	3
3	3	To determine COD of the given waste water sample	2	3
4*	4	To determine Dissolved Oxygen of the given waste water sample	2	3
5	5	To determine Total solids, Dissolved solids & Suspended solids of the given waste water sample	2	3
C		**Mini-projects**		
1		**Mini Projects**- students will work in group on following : 1. Water Supply to Mumbai City 2. Recycling of Waste Water And Its Uses. 3. Problems Due To Improper Handling of Waste Water.	4	1,2,3,4,5,6

* Minimum 8 and maximum 12 practicals/experiment/Tutorials sessions to be included in a Course term work in a term.

Note: * - Mandatory Assignment/Tutorial/Practical

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Text Books:

Sr. No.	Author	Title	Publisher and Edition
1.	S. K. Garg	Water Supply Engineering- Vol-I	Khanna Publishers , New Delhi, 25th Revised, 2014.
2.	S. K. Garg	Environmental Engineering- Vol-II	Khanna Publishers , New Delhi, 33rd Revised, 2015.
3.	Rangawala S. C.	Water supply & sanitary engineering	Charotar publications, Anand 388 001, 29th Edition : 2016

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1.	Dr. P. N. Modi	Water supply Engineering	Standard Book House, New Delhi 5th edition , 2016.
2.	Dr. P. N. Modi	Sewage treatment & disposal and waste water engineering	Standard Book House, New Delhi 4th Edition, 2010.
3.	Gurucharan Singh	Water Supply & Sanitary Engineering	Standard Publisher, 5th 2007
	Manuals		
		CPHEEO Manual on Water Supply and Treatment	Ministry Of Urban Development, May 1999.
		CPHEEO Manual on Sewerage and Sewage Treatment	Ministry Of Urban Development, May 1999.
		IS Codes	Bureau of Indian Standards
4	Websites: a)http://www.intelitek.com/engineering/civil-engineering/introduction-to-water-supply-engineering/ b) nptel.ac.in/courses/105104102/ c) nptel.ac.in/courses/105106119/ d)https://www.accessengineeringlibrary.com/browse/water-and-wastewater-engineering-design-principles-and-practice		

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Site visits:

1. Water Treatment Plant. Students will submit visit report.
2. Waste Water Treatment Plant. Students will submit visit report.

Curriculum Coordinator

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Diploma in Civil Engg.

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Civil & Env. Engg. Dept.

DIPLOMA PROGRAMME	: DIPLOMA IN CIVILENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: FIFTH
COURSE TITLE	: SOIL MECHANICS.
COURSE CODE	: 171SE54

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				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
3	-	2	5	3	80	32	20	100	40	-	-	-	-	25@	10	125

@: assessment by Internal Examiner

Course Objectives:

Students will be able to

- Understand & determine physical properties of the soil.
- Solve problems to determine properties of soil required for foundation design.
- Design simple foundations.

Course Outcomes:

Student should be able to

CO1	Identify and classify types of soil based on their index and Physical properties.
CO2	Determine the Permeability, compaction, shear strength of soil by Terzaghi's theory and its application and failure theories and its effect on foundation
CO3	Elaborate sub surface explorations and Geo-Textiles
CO4	Determine dry field intensity by different methods.
CO5	Determine bearing capacity of soil and knowing different types of foundation.

Syllabus

Course Content:

SECTION-I								
Unit	Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	1.1	**Soil, soil formation & profiles:-** Introduction, definition, description for soil formation, three phase soil system.	04	05	1	50	50	0

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2	2.1	**Weight –Volume relationship for soils- Specific Gravity and Moisture content tests** Related Technical terms and different tests.	04	05	1	34	25	41
3	3.1	**Soil identification and Description**: Types of soil classification systems & its explanation.	06	10	1	33	33	34
	3.2	Preliminary field-testsfor soil identification						
4	4.1	**Permeability**: Definition, formulae, types of permeability. Darcy's law, its formula and description.	04	10	2	28	29	43
	4.2	Constants head and falling head permeability test.						
5	5.1	**Compaction**: Introduction , Definition, Related Technical Terms	06	10	4	15	31	54
	5.2	Standard and Modified Proctor tests – Experimental set up, arrangements , result.						
	5.3	Field dry density – Definition, explanation with formulae.						
	5.4	Determination by core cutter method and sand replacement method Experimental set up, arrangements, result.						
Total of Section I			**24**	**40**				
SECTION-II								
Unit &Sub-Unit		**Topics/Sub-topics**						
6	6.1	**Shear strength of soil:** Definition : Shear Strength , Its significance in soil mechanics, Different laws : Coulomb's law of shear strength , Statement, explanation, Symbolically derivation.	06	08	2	23	31	46
	6.2	Mohr's stress circle – Description.						
	6.3	Un-drained direct shear test – Description.						
	6.4	Unconfined compression test - Description.						
	6.5	Vane shear test - Description						
7	7.1	**Consolidation:** Introduction , basic definition , its types, Spring analogy- its explanation.	05	08	2	29	29	42
	7.2	Time lags and consolidation test and its explanation.						
8	8.1	**Bearing capacity of soils:** Introduction, Defination of bearing capacity and other related technical terms. Foundation – Definition, Shallow	05	08	5	13	50	37

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		foundation and its types.						
	8.2	Net load and gross load – explanation.						
	8.3	Field plate test – set up and explanation.						
	8.4	Limitations of field plate test. Effect of water table and size of foundation.						
9	9.1	**Pile foundation:** Description with details , Types of piles.	03	04	5	23	39	38
	9.2	Field pile load test and diagram,						
	9.3	Chemical actions of soil and water on pile						
10	10.1	**Sub-surface exploration:** Introduction, its types in detail.	03	08	3	33	45	22
	10.2	Preliminary and detailed explorations						
	10.3	Undisturbed soil sampling – preparation.						
	10.4	Standard penetration test – experimental set up and detail procedure.						
	10.5	Field vane shear test						
	10.6	Dynamic cone penetration test						
11	11.1	**Geo-textiles:**	02	04	3	23	55	22
	11.2	Introduction to geo-textiles, its types & application in Civil Engineering						
Total of Section II			**24**	**40**				
Total of section I & 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).

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Teaching Hours	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
I	04	50	50	0	05
II	04	34	25	41	05
III	06	33	33	34	10
IV	04	28	29	43	10
V	06	15	31	54	10
VI	06	23	31	46	08

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VII	05	29	29	42	08
VIII	05	13	50	37	08
IX	03	23	39	38	04
X	03	33	45	22	08
XI	02	23	55	22	04
TOTAL	**48**				**80**

(Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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:

List of Practical's to be performed and Laboratory journal containing at least six experiments and any one mini project (group of 5) to be prepared and submitted:

Sr. No.	Name of Experiments	Approx. Hours	CO
1	Field Dry density and moisture content determinations by a) Core cutter method b) Sand replacement method	2	5
2	Specific gravity of soils	2	4
3	Sieve analysis	2	1
4	Atterberg's limits a) Liquid limit b) Plastic limit c) Shrinkage limit	2	1
5	U. U. direct shear test	2	2
6	C.B.R. Test	2	2
7	Compaction test Standard Proctor Compaction test	2	2
8	Falling head permeability test	2	2
9	Vane shear test	2	3
10	U.C.C. test	2	2
11	Mini Project (Any One): 1) Case- study report for shallow foundation, deep foundation or ground improvements. 2) Attending tests (field tests) and writing report .tests such as: Plate Load Test, Pile Load Test. 3) Geotechnical and geological survey – soil strata in and around Mumbai.	4	3

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Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	Dr. V.N. S. Murthy	Soil Mechanics and foundation Engg.	2009, UBS Publishers Distributors Ltd

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Dr. AlamSingh	Modern Geotechnical Engg	3rd edition,2006, CbS Publishers & Distributors
2	Dr. B.C. Punmia	Soil Mechanics and foundation Engg	2005, Laxmi publishers.
3	NPTEL Videos	http://nptel.ac.in/course.php	IIT

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	: FIFTH
COURSE TITLE	: ELEMENTS OF RCC DESIGN
COURSE CODE	: 171SE55

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	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	125

**: Assessment by External and Internal Examiner, @- Assessment by Internal Examiner.

Course Objectives:

Civil engineering essentially means dealing with structures in various ways, either as designer or contractor in maintenance field. Reinforced Cement Concrete is one of the most widely used materials of construction and this syllabus deals with basic properties of this composite material and principles on which various components of the structures are designed using this composite material. The syllabus deals with analysis and design of basic structure components which form part of most of the structures to give feel of design of basic to complex structures.

Course Outcomes: Student should be able to

CO1	Enlist materials for RCC design with various types of permissible stresses for the same.
CO2	Calculate load or moment carrying capacity of various components of a simple building.
CO3	Design various components of a simple building
CO4	Draw reinforcement detailing sketches for various components of a simple building

Syllabus

Course Content:

SECTION-I								
Unit &Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	% R Level	% U Level	% A Level
1		Materials: Grades of concrete and corresponding various permissible stresses in working stress method as per IS: 456-2000. Reinforcing material: Grades of reinforcement steel and corresponding various permissible stresses in working stress method as per IS: 456-2000.	2	4	1	21	37	42

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2		Singly reinforced sections: Elastic theory: Basic assumptions in Elastic Theory, Equivalent transformed concrete area, Neutral axis, Balanced, Under- reinforced and Over-reinforced sections, Moment of Resistance of above 3 singly reinforced sections. Design of singly reinforced balanced section for bending moment only with IS 456-2000 provisions. Reinforcement detailing sketches.	11	18	2,3, 4	24	34	41
3		Slabs: Types of slabs as per support conditions and main reinforcement direction and position: One way, two way, simply supported, continuous and cantilever. Design of one way simply supported, one way continuous and one way cantilever slabs with IS 456-2000 provisions. Reinforcement detailing of all above.	11	18	2,3, 4	14	32	54
		TOTAL OF SECTION I	24	40				
SECTION-II								
4		Shear and Bond: Shear stresses in R.C. beam section, Diagonal tension, shear reinforcement: vertical stirrups, inclined and diagonal reinforcement, Bond stresses Development length, Curtailment of reinforcement, Lap length. Design Of Shear reinforcement in beam with reinforcement detailing sketches.	6	10	2,3, 4	14	32	54
5		Beams: Analysis – Neutral axis, Moment Of Resistance and Design of singly reinforced Tee and EII beams, Effective width of the flange in isolated and continuous Tee and EII beams. Design Of Shear reinforcement in Tee and EII beam with reinforcement detailing sketches.. Doubly Reinforced Beams: Steel Beam theory.	6	10	2,3, 4	16	37	47
6		Axially loaded columns: Rectangular and circular columns, Short and Sender Columns, stress reduction factor, Load carrying capacity and Design.	6	10	2,3, 4	24	35	41
7		Design of Square and Rectangular sloped footing with reinforcement detailing sketches.	6	10	2,3, 4	30	35	35

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	Numerical problems based on analysis and design along with reinforcement detailing sketches will be asked in the examination.							
		TOTAL OF SECTION II	24	40				
		TOTAL OF SECTION I and II	48	80				

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	2	4	1	21	37	42
2	11	18	2,3,4	24	34	41
3	11	18	2,3,4	14	32	54
4	6	10	2,3,4	16	37	47
5	6	10	2,3,4	24	35	41
6	6	10	2,3,4	26	32	42
7	6	10	2,3,4	30	35	35

Term Work:

1. Project in design and drawing of a small building covering slabs, beams, columns and footing including bar bending schedule.

Students shall submit minimum of two half imperial drawing sheets based on above designs.

Sr. No.	Name Of Topic	Hours	CO
1	Design Report 1 and drawing sheet 1		
	Design and reinforcement detailing sketch of cantilever slab, One-way simply supported slab, one-way continuous slab, Ell beam , Tee beam, 3 Continuous beams with reinforcement detailing sketches of one-way continuous slab and Tee beam, Schedule of slabs and beams, general notes on drawing sheet 1	22 (2 to 4 hours for each of the individual components and drawing sheet)	2,3,4
2	Design Report 2 and Drawing sheet 2		
	Design and reinforcement detailing sketches of all columns and footings with reinforcement detailing sketch of one column and footing, Schedule of columns and footings, general notes on drawing sheet 2	10 (2 to 4 hours for each of the individual components and drawing sheet)	2,3,4

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Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	H.J. Shah	Design of reinforced concrete structures	Edition 8th, 2009 Charotar publication
2	Committee Members of BIS	IS 456-2007, Plain and reinforced Concrete - Code of Practice	Bureau Of Indian Standards, New Delhi

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	S Ramamrutham and N. Narayanan	Design of reinforced concrete structures	Edition-2006, Publisher- Dhanpat Rai & Co.
2	Vazirani and Ratwani.	Analysis, Design and detailing of structure Vol. 3	Edition- 2003, Publisher- Khanna Publishers
3	Shah & Kale	Design of reinforced concrete structures	Edition- Reprint 2007 Publisher- Structures publication
4	Committee Members of BIS	SP 34 (1987), handbook on Concrete Reinforcement and detailing	Bureau Of Indian Standards, New Delhi
5	Web site	https://nptel.ac.in/	All IITs and IISc
6	Web site	https://youtu.be/80gP3JmuhOg and many more links on you tube	www.youtube.com

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	: FIFTH
COURSE TITLE	: PAVEMENT ANALYSIS AND DESIGN
COURSE CODE	: 171CE56E1

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	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:

The purpose of this course is to introduce the concepts of design and analysis of flexible and rigid pavements. The students will gain experience with classic pavement analysis techniques.

Course Outcomes:

Student should be able to

CO1	Identify the pavement components and compare highway and airport pavements
CO2	Compute the stresses and ESWL in flexible pavements
CO3	Design the flexible pavements using empirical, semi-empirical and IRC method
CO4	Calculate the warping, friction and wheel load stresses
CO5	Design the rigid pavements by IRC method

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Pavements	06	10	1	60%	30%	10%
	1.1	Types and components of pavement						
	1.2	Factors affecting design and performance of pavements						

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	1.3	Comparison between highway and airport pavements						
	1.4	Materials used in pavements, functions and significance of subgrade properties						
2		Stress in flexible pavements	08	14	2	30%	50%	20%
	2.1	Layered system concept						
	2.2	Stresses and deflections in homogeneous masses						
	2.3	Burmister's 2-layer,3-layer theories						
	2.4	Wheel load stresses- ESWL of multiple wheels, repeated loads and EWL factor						
3		Flexible pavement design	10	16	3	10%	40%	50%
	3.1	Empirical , semi-empirical and theoretical approaches; Principles and procedure, Design, Advantages and applications of different pavement design methods						
	3.2	IRC method of design						
	3.3	Distresses in flexible pavements						

SECTION-II

Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4		Stress in rigid pavements	11	18	4	30%	50%	20%
	4.1	Types of stresses and causes						
	4.2	Factors influencing the stresses						
	4.3	General conditions in rigid pavement analysis						
	4.4	ESWL, Wheel load stresses						
	4.5	Warping stresses						
	4.6	Friction stress						

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	4.7	Combined stresses						
5		Rigid pavement design	13	22	5	10%	40%	50%
	5.1	Importance of joints in rigid pavements, Types of joints in cement concrete rigid pavements and their function						
	5.2	Joint spacing						
	5.3	Design of slab thickness						
	5.4	Design of joints						
	5.5	Details of longitudinal joints						
	5.6	Details of contraction joints						
	5.7	Details of expansion joints						
	5.8	IRC method of design						
	5.9	Distress in rigid pavements						

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	Pavements	06	10	60%	30%	10%
2	Stress in flexible pavements	08	14	30%	50%	20%
3	Flexible pavement design	10	16	10%	40%	50%
4	Stress in rigid pavements	11	18	30%	50%	20%
5	Rigid pavement design	13	22	10%	40%	50%
		48	**80**			

List of Tutorials:

Tutorial consisting on all of the topics as follow

Sr. No.	Unit	Tutorials	Approx. Hours	CO
1	1	Factors affecting of design and performance of pavements	2	1

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2*	2	Numericals based on two layer and three layer Burmister theory	2	2
3	2	Equivalent Single wheel Load (ESWL) and Equivalent Axle Load Factor	2	2
4*	3	Numericals based on CBR & IRC method of flexible pavement design	4	3
5*	3	Design of flexible pavement	2	3
6*	3	Distress in flexible pavement	2	3
7	4	Numericals based on Westguard analysis of stresses theory	4	4
8	4	Numericals based on warping stresses	2	4
9*	5	Design of Dowel bars and Joints	2	5
10*	5	Design of rigid pavement	2	5
11*	5	Distress in rigid pavement	2	5
12	3,5	Review of flexible and Rigid pavement design	2	3,5
13*	3,5	Mini Project Students will work in a group on the following topics: 1. Collection of distress data for flexible pavement 2. Collection of distress data for rigid pavement	4	3,5

* Mandatory Tutorials

Term work:

Term work shall consist record of tutorials.

Text Books:

Sr. No	Author	Title	Publisher and Edition
1	Justo, Khanna and A. Veeraragavan	Highway Engineering	Nem Chand & Bros, Roorkee, India & 10th Edition
2	L.R.Kadiyali and N.B.Lal	Principles and Practices of Highway Engineering	Khanna Publishers ,Delhi-6 & 6th Edition
3	R .Srinivasa Kumar	Pavement Design	Universities Press Publication & 1st Edition

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Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Yorder and Witezak	Principles of Pavement Design	John Wiley & Sons, New Jersey,USA,1975
2	Yaung H.Huang	Pavement Analysis and Design	Pearson Printice Hall,2004
3	Papagiannakis, A.T and E.A.Masad	Pavement Design and Materials	John Wiley & Sons, New Jersey, USA, 2008
4	IRC:37- 2012	Guidelines for the Design of Flexible Pavements	
5	IRC:58- 2011	Guidelines for Design of Plain Jointed Rigid Pavements for Highways	

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

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

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: FIFTH
COURSE TITLE	: DISASTER MANAGEMENT
COURSE CODE	: 171CE56E2

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	0	5	3	80	32	20	100	40	--	--	25**	10	25@	10	150

** - Assessment by Internal & External Examiner. @- Assessment by Internal Examiner.

Course Objectives:

It spells out the need for better disaster management which may help to bring relief immediately to the victims of the tragedy. Students will understand and appreciate the nature of disaster management, in its pre-disaster, during disaster and post disaster phases.

Course Outcomes:

After completion of the course the student will be able to

CO1	Classify different types of disaster
CO2	Calculate disaster impact
CO3	Plan disaster risk mitigation

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Introduction to Disaster Management:**				Theory Marks		
1	1.1	**Technical terms**: hazard, vulnerability, risk, accident, disaster, disaster management.	04	08	1	50%	50%	--
	1.2	**Significance and Role:** Significance of disaster management and the role of engineers in disaster management.						
2		**Types of Disasters:**	08	14	1	40%	40%	20%
	2.1	**Water & Climate:** floods, cyclones,						

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		tornadoes and hurricanes, hailstorms, cloudbursts, heat wave and cloud wave, snow avalanches, droughts, sea erosion, thunder lightning.						
	2.2	**Geological:** Landslides and mudflows, earthquakes, large fires, dam failures and dam bursts.						
	2.3	**Biological:** Epidemics, pest attacks, cattle epidemics, food poisoning.						
	2.4	**Chemical, Industrial & Nuclear:** Chemical, industrial and nuclear.						
	2.5	**Accidental:** Forest fires, urban fires, mine flooding, oil spill, major building collapse, serial bomb blasts festival related disasters, electrical disasters and fires air, road & rail accidents, ship capsizing, village fire.						
3		**Disaster Impacts**	12	18	2	40%	40%	20%
	3.1	**Disaster Impacts:** Environmental, physical, social, ecological, economical, political.						
	3.2	**Other Impacts:** Health, psycho-social issues, demographic aspects (gender, age, special needs), hazard locations, global and national disaster trends, climate change and urban disasters.						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
4		**Disaster Risk Reduction (DRR)**	14	22	3	40%	40%	20%
	4.1	**Disaster Management Cycle:** Its phases, prevention, mitigation, preparedness, relief & recovery						
	4.2	**Structural & Nonstructural Measures:** Risk analysis, Vulnerability and capacity assessment, early warning systems. Post –disaster environmental response-water, sanitation, food safety, waste management, disease control.						
	4.3	**Roles and Responsibilities of Government:** Roles & responsibility of government, Community, Local Institutions, NGOs & other stakeholders.						
	4.4	**Policies and Legislation for Disaster Risk Reduction (DRR):** Policies & legislation for DRR India, DRR programmes in India, Activities of National Disaster Management Authority.						
5		**Disasters, Environment and**						

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		Development:						
	5.1	**Factors affecting vulnerability:** factors affecting vulnerability such as impact of developmental projects, environmental modifications e.g. dams, land use changes, urbanization etc.	10	18	3	50%	30%	20%
	5.2	**Sustainable Development:** Sustainable environmental friendly recovery, Reconstruction and Development Methods.						
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms' Revised Taxonomy).								

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Disaster Management	04	50%	50%	--	08
II	Types of Disasters	08	40%	40%	20%	14
III	Disaster Impacts	12	40%	40%	20%	18
IV	Disaster Risk Reduction (DRR)	14	40%	40%	20%	22
V	Disasters, Environment and Development	10	50%	30%	20%	18
TOTAL		48	220%	200%	80%	80

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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.*

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Assignments	Approx. Hours	CO
1.	1	Introduction to Disaster Management: Technical Terms, significance & Role	1	1
2.	2	Types of Disasters	2	1

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3.	3	Disaster Impacts	2	2
4	4	Disaster Risk Reduction (DRR)	1	3
5	5	Disasters, Environment and Development:	2	3
6	6	**Mini Projects**- students will work in group on following : 1. Regional Case study- Survey of recent regional (local, State, adjoining state) disaster. Forecasts. 2. Prepare a report of above and submit it. 3. Students will visit any Government Organization/ Office to study Disaster Management. 4. Prepare a report & submit it. 5. Presentation of above mini projects.	8	1,2,3
* Minimum 4 and maximum 6 practicals/experiment/Tutorials sessions to be included in a course term work in a term.				

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1.	N. Murth D.B.	Disaster Management-Text and Case Studies.	Publisher: Deep & Deep Publications. Edition: 2007
2.	Ghosh G.K.	Disaster Management	APH publishing Corporation. Edition : 2006
3.	Singh B.K.	Handbook of Disaster Management, Techniques & Guidelines	Rajat Publication. Edition : 2008

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1.	Pradeep Sahni		Disaster Risk Reduction in South Asia, Prentice Hall Edition:2004
2.	Manual on Natural Disaster Management in India		
3.	Disaster Management Act – 2005 by M.C. Gupta.		
4.	Websites: a)nptel.ac.in/courses/105101010/downloads/Lecture37.pdf b)www.undp.org/content/dam/india/docs/disaster_management_in_india.pdf		

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

Diploma in Civil Engg.

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

DIPLOMA PROGRAMME	: DIPLOMA IN CIVIL ENGINEERING
PROGRAMME CODE	: DCE
SEMESTER	: FIFTH
COURSE TITLE	: ENGINEERING HYDROLOGY
COURSE CODE	: 171CE5[illegible]E3

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.

Objective:

The aim of the subject is to present the science and practice of irrigation engineering in a concise form comprising practically all the modern development. The input to the subject is the knowledge of survey for investigation, hydrology for calculation of yield from rainfall records for designing the storage, conveyance and outlet structures and determination of ground water flows.

Course Outcomes:

After completion of the course the student will be able to

CO 1	Measure and analyze rainfall, runoff and water losses
CO 2	Construct and analyze different hydrographs
CO 3	Use stream gauging techniques
CO 4	Determine ground water flow
CO 5	Calculate runoff and yield from catchments.

Content: Theory.

Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
01	1	Introduction	02	4	1	60%	40%	--

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	1.1	Definitions-Hydrology- Hydrological cycle, watershed-characteristics and types						
02	2	Precipitation:	08	12	1	30%	50%	20%
	2.1	Definition, Types of precipitation, measurement of precipitation in India,						
	2.2	Rainfall records, missing data, mass curve analysis, station year method.						
03	3	Water losses	6	12	1	30%	40%	30%
	3.1	Evaporation, interception, transpiration and infiltration,						
	3.2	Determination of water losses						
04	4	Rainfall – runoff process	08	12	1& 5	40%	40%	20%
	4.1	Factors affecting runoff, methods of computation of runoff, runoff hydrograph, flow duration curve, flow mass curve						
		Total of Section I	**24**	**40**				
05	5	Ground water and well hydrology	12	20	4	20%	30%	50%
	5.1	definition and occurrence of ground water, Yield, transmissibility, Aquifer and aquiclude properties, Dupuit's theory of unconfined flow						
	5.2	Methods of extraction of ground water (Types of Wells)						
	5.3	Specific capacity of well and yield of an open well. Interference among wells						
06	6	Hydrograph analysis	06	10	2 & 5	30%	40%	30%
	6.1	Unit hydrograph- definition, use and limitation, synthetic hydrograph, summation hydrograph.						
07	7	Stream gauging	06	10	3	20%	50%	30%

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	7.1	Techniques, latest methods for measuring depth, current-meter types						
		Total of Section II	**24**	**40**				
		Total	**48**	**80**				

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction	02	60%	40%	--	04
II	Precipitation	08	30%	50%	20%	12
III	Water losses	06	30%	40%	30%	12
IV	Rainfall – runoff process	08	40%	40%	20%	12
V	Ground water and well hydrology	12	20%	30%	50%	20
VI	Hydrograph analysis	06	30%	40%	30%	10
VII	Stream gauging	06	20%	50%	30%	10
TOTAL		**48**				**80**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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.*

Tutorial –

Sr. No.	Tutorial Exercise	Hours	CO
1.	Collection of meteorological data for a city in Maharashtra.	08	1,2,3,4,5
2.	Collection of data required for irrigation project.	06	1
3.	Numerical on Calculation of runoff, yield of a well.	04	4, 5

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4.	Seven assignments based on the syllabus.	14	1,2,3,4,5
	TOTAL	**32**	

Term Work- Students should submit journal of above exercises.

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1.	Sharma R.K. & Sharma T.K.	Irrigation Engineering (Including Hydrology)	S.Chand & Co.Ltd, 2nd Edition, 2004
2.	G L Asawa	Irrigation Engineering	Wiley eastern
3.	V.P. Singh	Elementary Hydrology	Prentice Hall of India Pvt. Ltd. , New Delhi-110 001,1994

Reference Books-
Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	S.K.Garg	Irrigation and Hydraulic structure	Khanna publisher, New Delhi, 1981
2	Dr.P.N.Modi	Irrigation Water Resources & Water Power Engineering	Standard Book House,7th edition,2008.
3	Varshney, Gupta & Gupta	Theory and Design of Irrigation Structures	Nem Chand & Bros
4	Dr.B.C.Punmia, Dr.Pande Brijbasi Lal	Irrigation & Water Power Engineering	Laxmi Publications 16th editions 2009.

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	: FIFTH
COURSE TITLE	: ADVANCED STRUCTURAL ANALYSIS.
COURSE CODE	171SE56E4

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	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 Internal & External Examiner @- Assessment by Internal Examiner.

Course Objectives:

As by this semester, students have undergone courses in Mechanics of Structures and Theory Of Structures, it is time to give more knowledge of the analysis of structures to the students who have a flair for analysis and design of structures. This subject provides knowledge of analysis of few more determinate structures and deflection of beams by some more methods apart from teaching some important theorems useful in study of Structural Engineering.

Course Outcomes: Student should be able to

CO1	State and explain various theorems useful in analysis and design of Structures..
CO2	Calculate deflections in beams using few more methods.
CO3	Analyze few more types of structures with different methods.

Syllabus

Course Content:

SECTION-I								
Unit &Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		General theorems : Theorems relating to elastic structures, Principle of virtual work, Strain energy in elastic structures, complementary energy, Castigliano's theorem, Betti's and Maxwell's theorems	4	6	1	30	40	30
2		Deflection of statically determinate structures: Deflection of determinate beams by Moment area and Conjugate beam methods, Principle of virtual work (unit load method) and Castigliano's theorem, Deflection of determinate pin jointed trusses by principle of virtual work	10	17	2	20	40	40

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		(unit load method).						
3		Influence lines for statically determinate structures : Influence lines for cantilever, simply supported beam, overhanging beam, criteria for maximum shear force and bending moment under moving loads for simply supported beams, absolute maximum bending moment	10	17	3	25	35	40
		TOTAL OF SECTION I	24	40				
SECTION-II								
4		Elastic arches : determination of normal thrust, shear force and bending moment for parabolic and segmental three hinged arches, Influence lines for normal thrust, shear force and bending moment for three hinged parabolic arch.	9	14	3	25	40	35
5		Strain Energy due to gradually applied load, sudden load and impact on axial force member, beam (flexure and shear) and shaft. Elongation and deflection using strain energy concept and Castigliano's theorem.	9	14	2	40	30	30
6		Struts: struts subjected to axial loads, concept of buckling, Euler's formula for strut with different support conditions, Euler's and Rankine's design formulae. Struts subjected to eccentric and lateral loads, struts with initial curvature.	6	12	3	40	25	35
	Numerical problems based on above syllabus will be asked in the examination.							
		TOTAL OF SECTION II	24	40				
		TOTAL OF SECTION I and II	48	80				

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	4	6	1	30	40	30
2	10	17	2	20	40	40
3	10	17	3	25	35	40
4	9	14	3	25	40	35
5	9	14	2	40	30	30
6	6	12	3	40	25	35

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Term Work:
Term work consisting of 20 problems covering all the topics.

Sr. No.	Name of the Tutorial	Approx. Hours	CO
1	General theorems	6	1
2	Deflection of statically determinate structures:	6	2
3	Influence lines for statically determinate structures	6	3
4	Elastic Arches	6	3
5	Strain Energy	4	2
6	Struts.	4	3

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	Structural Mechanics Vol I & II,	Junnarkar S B	Charotar Publishers,2008

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	. Structural Analysis Volume – I	Devdas Menon	Narosa Publication,2010
2	Structural Analysis Volume – I	S. Bhavikatti.	3rd edition, Vikas Publishers.,2008
3	Basic Structural Analysis	C S Reddy	Tata McGraw Hill Publishing Co. Ltd.,2001
4	Web site	http://nptel.ac.in/courses/	IIT Delhi
5	Web site	http://nptel.ac.in/courses/	IIT Chennai

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	: FIFTH
COURSE TITLE	: SOLID WASTE MANAGEMENT
COURSE CODE	: 171CE56E5

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	0	5	3	80	32	20	100	40	--	--	25**	10	25@	10	150

**- Assessment by Internal & External Examiner @- Assessment by Internal Examiner.

Course Objectives:

This course is intended to teach the students to develop following competency:
Plan segregation, collection, transportation, recycling and disposal of municipal solid waste in such a way that its impact on environment, economy and community is minimal.

Course Outcomes:

After completion of the course the students will be able to

CO1	Explain municipal solid waste management systems with respect to its physical and associated considerations in view of emerging technologies.
CO2	Outline sources, types and composition of solid waste with methods of handling, sampling and storage of solid waste.
CO3	Select the appropriate method for solid waste collection, transportation, redistribution and disposal.
CO4	Describe methods of disposal of hazardous solid waste.
CO5	Explain different solid wastes processing methods
CO6	Conclude the recent trends in reuse of solid waste.

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Sources and Composition of Municipal Solid Waste :**						
1	1.1	Introduction:	06	10	1,2	50%	30%	20%
	1.2	Sources and types of Solid Waste:						
	1.3	Composition of Solid Waste and its Determination						
	1.4	Types of materials recovered from MSW						

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2		**Properties of Municipal Solid Waste:**	06	10	1,2	50%	30%	20%
	2.1	Physical properties of Municipal Solid Waste:						
	2.2	Chemical properties of Municipal Solid Waste:						
	2.3	Biological properties of Municipal Solid Waste:						
	2.4	Transformation of Municipal Solid Waste:						
3		**Solid Waste Generation and Collection**:	06	10	3	30%	35%	35%
	3.1	Solid waste management: Functional elements of solid waste management						
	3.2	Quantities of Solid Waste:						
	3.3	Measurements and methods to measure solid waste quantities:						
	3.4	Solid waste generation and collection:						
	3.5	Factors affecting solid waste generation rate						
	3.6	Quantities of materials recovered from MSW						
4		**Handling, Separation and Storage of Solid Waste:**	06	10	2,3	25%	30%	45%
	4.1	Handling and separation of solid waste At site. Material separation by pick in, screens, float and separator and other latest devices for material separation:						
	4.2	Waste handling and separation at commercial and industrial facilities:						
	4.3	Storage of solid waste at the sources:						
		Total of Section I	**24**	**40**				
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
5		**Processing of Solid Waste:**	06	10	5	25%	25%	50%
	5.1	Processing of solid waste at residence e.g. Storage, conveying, compacting, shredding, pulping, granulating etc:						
	5.2	Processing of solid waste at commercial and industrial site						
6		**Disposal of Municipal Solid Waste:**	09	14	3	30%	50%	20%
	6.1	Combustion and energy recovery of municipal solid waste, effects of combustion, undesirable effects of combustion:						
	6.2	Landfill: Classification, planning, sitting, permitting, landfill processes, landfill design, landfill operation, use of old landfill						

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	6.3	Differentiate sanitary landfill and incineration as final disposal system for solid waste						
	6.4	Biochemical processes: Methane generation by anaerobic digestion, composting and other biochemical processes						
7		**Hazardous Solid Waste**:						
	7.1	Definition, identification and classification of hazardous solid waste. **Characteristics** Hazardous waste toxicity, reactivity, infectiousness, flammability, radioactivity, corrosiveness, irritation, bio-concentration, genetic activity, explosiveness	06	10	4	20%	60%	20%
	7.2	Bio-medical waste, its sources, generation, categories of biomedical waste, storage, transportation and symbols for bio-medical waste.						
	7.3	Technologies available for treatment of biomedical waste-autoclave, chemical disinfection, incineration, microwave disinfection, hydroclaving, encapsulation						
8		**Recent Development in Solid Waste Reuse and Disposal**						
	8.1	Power generation, building with construction materials and Best Management Practices (BMP)	03	06	6	20%	20%	60%
		Total of Section II	**24**	**40**				
		Total of Section I & II	**48**	**80**				

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

SUGGESTED SPECIFICATION TABLE WITH HOURS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Sources and Composition of Municipal Solid Waste	06	50%	30%	20%	10
II	Properties of Municipal Solid Waste	06	50%	30%	20%	10
III	Solid Waste Generation and Collection	06	30%	35%	35%	10
IV	Handling, Separation and Storage of Solid Waste	06	25%	30%	45%	10
V	Processing of Solid Waste	06	25%	25%	50%	10

40

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VI	Disposal of Municipal Solid Waste	09	30%	50%	20%	14
VII	Hazardous Solid Waste	06	20%	60%	20%	10
VIII	Recent Development in Solid Waste Reuse and Disposal	03	20%	20%	60%	06
	Total	**48**				**80**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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.*

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Assignments	Approx. Hours	CO
1*	1	Survey the MSW of your locality and Identify its sources and write composition of MSW.	4	2
2*	2	Carryout sample survey of different localities in groups listing properties of municipal solid waste.	4	2
3*	3	Survey your locality and based on it suggest methods of solid waste collection.	2	2
4*	4	Survey your locality and based on it suggest suitable methods of handling, separation and storage of solid waste.	4	3
5*	5	Identify and discuss the methods of processing different types of solid waste	2	4
6*	6	Compare different methods of disposal of MSW.	4	3
7	7	Identify methods of hazardous waste disposal during site visit and follow safety precautions.	2	3
8*	8	Write a report on visit to Mechanical process of composting plant nearby to your place.	4	1,2,3,4,5,6
9	9	Identify the different types of biomedical waste generated in hospital and then visit nearby Incineration plant.	2	6
10*	10	**Mini Projects**: students will work in group on following: 1. Explore internet for studying latest methods of handling, collecting, segregating, recycling and disposing MSW and prepare reports. 2. Prepare charts/models of different method.	4	1,2,3,4,5,6

Minimum 8 and maximum 10 practicals/experiment/Tutorials sessions to be included in a course term work in a term.

Note: * - Mandatory Assignment/Tutorial/Practical

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Text Books:

Sr. No.	Author	Title	Publisher and Edition
1.	A.D. Bhide and B.B. Sundaresan	Solid Waste Management Collection, Processing and Disposal	Latest edition
2.	N.N. Bandela and D.G. Tare	Municipal Solid Waste Management	BR Publishing Corporation ISBN: 9788176466769

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1.	G. Tchobanoglous, H. Theisen and A S. Vigil	Integrated Solid Waste Management	McGraw Hill Education, Indian Ed, 2014 ISBN: 978-9339205249
2.	Central Public Health and Environmental Engineering Organisation	Manual on Municipal Solid Waste Management	Ministry of Urban Development, GOI
3.	Websites: a) https://nptel.ac.in/courses/104103020/42 b) https://www.youtube.com/watch?v=STcFSthSJWo&list=PL3MO67NH2XxIYo-UFN8csPPnEiYVyR0TO		

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	: FIFTH
COURSE TITLE	: PROJECT-I
COURSE CODE	: 171CE57

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	3	3	-	-	-	-	-	-	-	-	50*	20	50@	20	100

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

Course Objectives:

The students passing this course should have concept to solve a specific problem from its identification and literature review till the successful solution of the same. Accordingly suitable projects will be taken by the students to study the complete aspects of a project. The project activities will provide students the exposure to handle real world life problems and their solutions.

Course Outcomes:

Student should be able to

CO1	Work in a team to identify a problem for project work
CO2	Review and evaluate the available literature on the identified problem
CO3	Formulate the methodology to solve the identified problem
CO4	Develop presentation skill
CO5	Develop a range of leadership skills and abilities such as effectively leading change, resolving conflict

Course Content:

The students in a group of 4 to 5 work on a topic related to civil engineering, approved by the head of the department under the guidance of a faculty member. It is mandatory to present and submit preliminary report based on work done in current semester. The report shall contain finalization of topic, literature survey, objectives and methodology of work. The project shall be typed or printed in spiral bound.

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	: FIFTH
COURSE TITLE	: CONTRACTS AND ACCOUNTS
COURSE CODE	: 171CE58

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
2	1	0	3	3	-	-	-	-	-	-	-	25**	10	25@	10	50

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

Course Objectives:

Students to learn facts, concepts, principles and procedure followed in the preparation of tender documents, contracts and maintaining the accounts before start of any new project. Students will also get acquainted with procedures and different forms used by PWD as well as private construction firms and will therefore be able to prepare bills and pay contractor for the work as well as penalize for defective work

Course Outcomes:

Student should be able to

CO1	Distinguish between different types of contracts
CO2	Prepare tender document for civil engineering works
CO3	State procedure of submitting and opening of tender documents
CO4	State PWD and Private Ltd. Organization account procedure

Course Content:

Unit & Sub-Unit		Topics/Sub-topics	Hours	CO	R Level	U Level	A Level
1		Contract	10	1	20%	70%	10%
	1.1	Definition of contract, Objects of contract, requirements of valid contract,					
	1.2	Types of engineering contract with advantages and disadvantages- Lump sum					

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		contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labour contract, demolition contract , target contract, negotiated contract, Management contract , Introduction to PMC.					
	1.3	Class of contractor, Registration of contractor					
	1.4	BOT Project: objectives, scope, advantages, disadvantages, examples					
2		Tender & Tender Documents	12	2,3	20%	30%	50%
	2.1	Definition of tender, necessity of tender, types of tender, Global tender					
	2.2	Tender notice, points to be included while drafting tender notice, drafting of tender notice					
	2.3	Meaning of terms: earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessity					
	2.4	Tender documents – list, schedule A,B,C,D,E & F					
	2.5	Terms related to tender documents – contract conditions: time limit, time extension, penalty, defective material and workmanship, termination of contract, suspension of work, subletting of contract, extra items, escalation, arbitration, price variation clause, defect liability period, liquidated and unliquidated damages.					
	2.6	Procedure of submitting filled in tender document , procedure of opening tender,					

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		comparative statement , scrutiny of tenders, award of contract, acceptance letter and work order					
	2.7	Unbalanced tender, ring formation					
	2.8	Introduction to e-tendering system					
3		Accounts in Public Works Department (PWD) and Private Ltd. Organization	05	4	70%	20%	10%
	3.1	Various account forms and their uses – Measurement Books, Nominal Muster Roll, Indent, Invoice, Bills, Vouchers, Cash Book, and Temporary Advance.					
4		Payment to Contractors	05	4	70%	20%	10%
	4.1	Mode of payment to the contractor- Interim Payment And Its Necessity, Advance Payment, Secured Advance, On Account Payment, Final Payment, First And Final Payment, Retention Money, Reduced Rate Payment, Petty Advance, Mobilization Advance.					

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table.*

Suggested Specification Table

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level
1	Contract	10	20%	70%	10%
2	Tender & Tender Documents	12	20%	30%	50%
3	Accounts in Public Works Department (PWD) and Private Ltd. Organization	05	70%	20%	10%
4	Payment to Contractors	05	60%	30%	10%
		32			

List of Tutorials:

Sr. No.	Unit	Tutorials	Approx. Hours	CO
1	2	Collection of tender notices published in newspapers for	02	2

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		various items of civil engineering works. (min. 5) Write salient features of them		
2	2	Drafting a tender notices for construction of a civil engineering Work (min. 2)	01	2
3	2	Collecting old set of tender document and writing a report on it	02	2
4	2	Preparation of Tender Document for the Building. (Detailed Estimate prepared for R.C.C. Building in Estimating and Costing shall be used)	03	2
5	1	Write a report on Built Operate Transfer (BOT) project (any one project)	02	1
6	3	Collect various account forms from PWD and Private Ltd. organization & writing report on it	03	4
7	3	Writing a report on store procedure and account procedure of PWD	02	4
8	3	Writing a report on store procedure and account procedure of Private Ltd. Organization	02	4

Term work:

Term work shall consist record of all tutorials.

Reference books and Websites:

Sr. No.	Name Of Book	Author	Publisher
1.	Estimating & Costing In Civil Engineering	B.N. Datta	Ubs Publishers
2.	Estimating & Costing, Specification and Valuation In Civil Engineering	M. Chakraborti	M. Chakraborti , Calcutta
3.	Estimating & Costing	S.C. Rangwala	Charotar Publication
4.	Civil Engineering Contracts and Accounts Vol I &II	B.S. Patil	Orient Longman,
5.	Estimating & Costing	G. S. Birdie	Dhanpat Rai And Sons
6.	Valuation Of Real Properties	S.C. Rangwala	Charotar Publication
7.	Construction Management &Contracts Practice	Dr.V.K.Raina	Shroff Publishers & Distributers pvt.ltd.
8.	http://www.mahapwd.com		
9.	http://www.tendersinfo.com		

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	: FIFTH
COURSE TITLE	: INDUSTRY INSTITUTE INTERACTION-I
COURSE CODE	: 171CE59

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
0	0	2												##		

- For Non credit course grades A-D to be mentioned in the mark-sheet based on the Continuous Assessment.

Course Objectives:

Technical education forms the backbone of development of any nation. The journey of cooperation between Industry and Institute has taken different forms at different times. Historically it started with simple interaction and gradually evolved to very close partnership overtime. India has one of the largest technical manpower in the world. But compared to its population, it is not significant and there is a tremendous scope of improvement in this area. Bridging the skill gap is the need of the day and decides the national development and economic growth.

It spells out the need for better interaction between educational institutes and industries which may help to bring in the students understanding the course content in a better way. Students will understand the engineering in a better way.

Course Outcomes:

After completion of the course the student / faculty will be able to

CO1	Participate in national / state level technical paper, project & quiz competition.
CO2	Enhance Industry Institution Interaction.
CO3	Learn the state of the global technology and process to add to their core technological foundation by industry expert lectures.
CO4	Keep them abreast of the scenario prevailing in their field of study.

Course Content:

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Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
						Theory Marks		
1		**Industry Liaison:** Preparing / updating a comprehensive directory of technology experts in different fields of expertise and know-how and forging continuing links with them through various means of involvement like • talks, • guest lectures, • research collaboration, • students project guidance, • seminars , • videos of various technical projects etc.	20		1,2,3,4	40	40	20
2		**Industrial Visits /Technical Exhibitions:** Encourage the students to visit • wide range of industries • technical exhibitions, to keep them abreast of the scenario prevailing in their field of study.	12		1,2,3,4	40	40	20
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms' Revised Taxonomy).								

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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.*

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Assignments	Approx. Hours	CO
1.	1	Industry Liaison: Students will prepare the report of the activity in a group of 8-10 students.	20	1,2,3,4
2.	2	Industrial Visits /Technical Exhibitions: Students will prepare the report of the activity in a group of 8-10 students.	12	1,2,3,4
		Students will submit report of 1&2 mentioned above as a Term Work.		

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

Diploma in Civil Engg.

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