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

(Central Technological Institute, Maharashtra State, INDIA)
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Programme Name: Diploma in Civil Engineering

Programme Code	**: DCE**	**With Effect From Academic Year**	**: 2023-24**
Duration of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Sixth**	**Scheme**	**: R-2023**

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme: Actual Contact Hrs./Week CL	TL	LL	Self-Learning (Term Work + Assignment)	Notional Learning Hours /Week	Credits	Assessment Scheme: Paper Duration (Hrs.)	Theory: FA-TH (MST) Max	SA-TH (ESE) Max	SA-TH (ESE) Min	Theory Total Max	Theory Total Min	Based on LL & TL Practical: FA-PR (CA) Max	FA-PR (CA) Min	SA-PR Max	SA-PR Min	Based on Self-Learning: SLA Max	SLA Min	Total Marks
1	CONSTRUCTION MANAGEMENT	CMA	SEC	231CE61		3		2		5	2.5	3	30	70	28	100	40	25	10	25#	10			150
2	BUILDING SERVICES	BSE	SEC	231CE62	1	3		2		5	2.5	3	30	70	28	100	40	25	10	25@	10			150
3	DESIGN OF RCC AND STEEL STRUCTURES	DRS	DSC	231SE63	1	3	2		1	6	3	3	30	70	28	100	40	25	10			25	10	150
4	ELECTIVE- II	EL2	DSE	231CE64E	1	3	2			5	2.5	3	30	70	28	100	40	25	10					125
5	CONTRACTS AND ACCOUNTS	CAC	SEC	231CE65	1	2		2		4	2							25	10	50#	20			75
6	ENTREPRENEURSHIP DEVELOPMENT	EDV	DSC	231CE66				2	1	3	1.5							50	20	25@	10	25	10	100
7	PROJECT-II	PR2	INP	231CE67				6	2	8	4							100	40	100#	40			200
Total						**14**	**4**	**14**	**4**	**36**	**18**					**400**		**275**		**225**		**50**		**950**

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# Online Examination, @$ Internal Online Examination

Course Category: Discipline Specific Course Core (DSC): 2, Discipline Specific Elective (DSE) : 1, Value Education Course (VEC): 0, Intern. /Apprentice. /Project. /Community (INP): 1, Ability Enhancement Course (AEC): 0, Skill Enhancement Course (SEC): 3, Generic Elective (GE): 0

Curriculum Coordinator

Head
Diploma in Civil Engineering

VERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

Dean - Diploma

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: CONSTRUCTION MANAGEMENT**
COURSE CODE	**: 231CE61**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	-	2.5	3	30	70	28	100	40	25	10	25#	10	-	-	150

#Assessment by External Examiner.

II. COURSE OBJECTIVES:

Civil Engineer should learn the managerial processes involved in construction industries like management of labor, material and equipment to minimize the project cost and project duration and also to optimize the quality of works.

III. COURSE OUTCOMES (COs):

Students should be able to

CO1	Explain the basic stages and functions of construction management.
CO2	Apply planning and scheduling methods to manage time, cost, and resources.
CO3	Implement safety, quality, monitor and control measures in construction work.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

Section I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Construction Management**	7	10	1	40%	60%	-
1.1	Construction Scenario in India						
1.2	Classification of Construction work						
1.3	Characteristics of Construction Project						
1.4	Phases in construction management (Idea to Completion)						
1.5	Key stakeholders in construction						
1.6	Objective & Function of Construction Management						
2	**Construction Planning**	14	17	2	40%	40%	20%
2.1	Stages of project planning: pretender planning, preconstruction planning, detailed planning. Level of details. Types of Planning. Necessity of planning						
2.2	Process of development of plans and schedules: Terminology involved in planning, Activity and its types, Events and their types, Work break- down structure, activity list, estimation of duration, sequence of Activity. Problems based on it.						
2.3	Planning Tools- Bar chart, Mile stone chart, Network Diagram Critical Path Method, Activity early and late time computations, Activity on Node (AON), Types of floats and their Formula. Problems based on Total Float only.						
2.4	PERT – Basic concept PERT analysis, three-time estimate, slack, Probability of completion time for a project. Formula only.						

3	**Construction Cost**	3	8	2	20%	40%	40%
3.1	Classification of cost						
3.2	Time cost trade-off in construction projects (compression and decompression): Concept, Need and Benefits.						
3.3	Line of balance techniques: Concepts, Features, Benefits, Advantages over the CPM technique						
	Total of Section I	**24**	**35**				
Section II							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4	**Resource Constraints, Conflicts and Management**	6	10	2	40%	60%	-
4.1	Resource Constraints: Concept and Types, Resource Conflict: Concept and Effects						
4.2	Resources smoothing and leveling: Concept						
4.3	Construction Claim Management: Concept, Requirement, Benefit of effective claim management, Steps in management process(brief): Identify potential claims to Claim settlement, Emerging trends.						
5	**Site Planning and Resource Organization**	10	15	1,3	20%	40%	40%
5.1	Site: Temporary services required at the site. Preparation of Job Layout, developing site organization for different civil work. Concept of Lean Construction.						
5.2	Personnel Management: planning, organizing, staffing, motivation						
5.3	Materials Management: Concept, Function procurement Inventory and inventory control: Objective, Advantages Different Inventory						

	Control method. Benefits of ABC analysis, Inventory Cost, EOQ. (Concept Only)						
5.4	Fund- Cash flow: Concept of Inflow and outflow, sources of fund.						
6	**Project Monitoring and Control**						
6.1	Control of progress: Supervision, record keeping, periodic progress reports, and periodical progress meetings.						
6.2	Updating of plans: purpose, data required for updating, methods of updating						
6.3	Quality and Quality Control: Need for quality, Quality Control: Objectives, Functions, Advantages; Quality Assurance- Concept, Quality Assurance System; Quality Circle - Concept, Characteristics, Objectives	8	10	3	40%	40%	20%
6.4	Health, Safety, Security and Environment (HSSE): Basic site safety rules, Importance of Safety, Significance of ISO 9001 Quality Systems, Environmental Management (ISO 14001)						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. 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	Construction Management	7	40%	60%	-	10
II	Construction Planning	14	40%	40%	20%	17
III	Construction Cost	3	20%	40%	40%	8

IV	Resource Constraints, Conflicts and Management	6	40%	60%	-	10
V	Site Planning and Resource Organization	10	20%	40%	40%	15
VI	Project Monitoring and Control	8	40%	40%	20%	10
	Total	**48**				**70**

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS

Sr. no	Unit	Practical/Assignment	Approx Hrs	CO
1.	1	*Presentation on different aspects of the Construction Scenario in India	6	1
2.	2	* Flow chart and Barchart for different civil work items.	6	2
3.	2	*Preparation of a network diagram for different civil engineering works.		2
4.	2	*CPM technique on AON for different civil engineering work		2
5.	2	Develop completion time of the project by PERT technique for different civil engineering work		2
6.	3	Develop time optimization using Time-Cost Trade-off	2	2
7.	3	Case study on Line of Balance	2	2
8.	4	Explain Construction Claims and identify emerging claim management trends.	6	1
9.	5	*Preparation of Job Layout, developing site organization for civil works		1
10.	5	Case Study on Personnel Management		2
11.	5	Identify the material required for any civil engineering work and categorize the material by ABC analysis		2
12.	5	Basics of Cost Estimation using Excel or digital tool		
13.	6	Case Study on Quality and Quality Control		3
14.	6	*Presentation on Safety measures to be adopted on work sites	8	3
15.	2	Study of Project Management Software (MS Project/Primavera/BIM)	2	2
		Total	**32**	

Note: * - Mandatory Assignment/Tutorial/Practical.

Minimum 8 and maximum 12 practical/experiment sessions to be included in a course in a term.

Term Work: At least six assignment and eight problems covering entire syllabus.

VII. SUGGESTED LEARNING MATERIALS/TEXT BOOKS/ REFERENCE BOOKS & WEBSITES TEXT BOOKS:

TEXT BOOKS:

Sr. No.	Author	Title	Publisher and Edition
1	Stevens,	Techniques for construction Network scheduling	Revised edition 1990
2	B. M. Naik	Project management	Vani Educational Books
3	Chitkara K.K.,	Construction Project Management	Tata McGraw Hill Publishing Co, Ltd
4	Gahlot P.S.,	Construction Planning and Management	International Publishers, Delhi.

REFERENCE BOOKS:

Sr. No.	Author	Title	Publisher and Edition
1	P. K. Joy	Handbook of Construction Management	MacMillan Publisher India
SP-7, National Building Code of India 2016, IS code 15883-2: 2024- Construction Project Management – Guidelines.			

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	3	2	2	1	2	3	2	3	2	2	2
CO2	2	3	3	2	3	3	3	3	3	2	3
CO3	1	2	2	3	3	3	3	2	3	3	3
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

Curriculum Coordinator

Head
Diploma in Civil Engineering

Dean – Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

BOS APPROVED 23/05/2025
VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: BUILDING SERVICES**
COURSE CODE	**: 231CE62**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	-	2.5	3	30	70	28	100	40	25	10	25@	10	-	-	150

@: assessment by Internal Examiner

II. COURSE OBJECTIVES

This course equips students with essential knowledge of building services, including water supply, drainage, sanitation, fire safety, elevators, and waste management. It emphasizes the importance of designing, installing, and maintaining these systems for safe, efficient, and sustainable buildings while also covering relevant legal aspects.

III. COURSE OUTCOMES (COs)

Students should be able to

CO1	Explain various types of building services and their functional importance in civil engineering works.

CO2	To study the design and installation process of water supply, sanitary, and rainwater harvesting systems for buildings.
CO3	Explain the systems of electrical installation, vertical transportation (elevators), and firefighting in buildings.
CO4	Describe modern sustainable practices such as recycling, waste management, and green building concepts.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Introduction**	02	04	01	50%	50%	--
1.1	Building Services: Definition, Design Standards-code used.						
1.2	Types of building Services						
2	**Building Water Supply**	07	10	02	35%	35%	30%
2.1	Plumbing Engineering: Principles of plumbing, service connections for water supply, storage of water (underground & overhead), water meter (sizes & fittings)						
2.2	Air Locks: Causes, effects, and prevention						
2.3	Plumbing of High-Rise Buildings: Types of water supply systems (down take, pressure reduction valves system, multiple storage system, booster pressure tanks, hydro pneumatic systems), pumping systems						
2.4	Water Supply Pipes: Standard size of pipes available for plumbing						
3	**Sanitary Services**	10	13	02	30%	40%	30%

3.1	Sanitary Appliances: classification of fixtures (ablution fixtures and soil fixtures), bathroom accessories and fittings						
3.2	Building Drainage: General principles governing building drainage systems, plumbing stack systems (one-pipe, two-pipe, single-stack, single stack partially ventilated and hybrid systems), capacity & sizing of pipes (primary & secondary branches), siphon action and vent piping, Traps for appliances: Bottle trap, Nahani trap, Gulley trap, Air admittance valve, installation of pipes.						
4	**Recycling of Water & Waste Water**	05	08	04	30%	40%	30%
4.1	Recycling of Water: Need, Uses & Types-Storm Water, Residential, Industrial & Commercial, Grey water						
4.2	Environmental Benefits: of recycled water, Current & future trends in water recycling.						
4.3	Recycling of Waste Water: Need & Uses						
4.4	ZLD: Concept of Zero Liquid Discharge						
	Total of Section I	**24**	**35**				

SECTION – II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
5	**Rain Water Harvesting System**	05	08	04	25%	25%	50%

5.1	Introduction: Collection of runoff, pipe system, design consideration, Road surface runoff (open drain and closed drain)						
5.2	Disposal of rain water: Surface and Underground rain harvesting						
6	**Electrical Installations**	02	04	03	30%	40%	30%
6.1	Types of Wiring used in Buildings: Temporary Wirings, C.T.S./ P.V.C.						
7	**Elevators**	06	09	03	40%	25%	35%
7.1	Construction aspect of lift, types of lift, essential features of lift						
7.2	Electrical requirements, maintenance of elevators						
8	**Fire Fighting System Installations**	08	10	03	40%	30%	30%
8.1	Requirement of water, systems for fire fighting						
8.2	Training service and maintenance, safety instructions						
9	**Green Buildings**	03	04	04	35%	35%	30%
9.1	Introduction to Green Buildings, Standards and codes used for green building certification, classification of green buildings as per standards a& codes, Site Planning & Water Management, Sustainable Materials & Construction.						
9.2	Green Building Policies, Economics & SDGs (Sustainable Development Goals)						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

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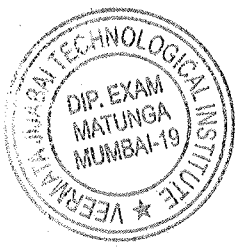

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1	Introduction	02	50%	50%	--	04
2	Building Water Supply	07	35%	35%	30%	10
3	Sanitary Services	10	30%	40%	30%	13
4	Recycling of Water & Waste Water	05	30%	40%	30%	08
5	Rain Water Harvesting System	05	25%	25%	50%	08
6	Electrical Installations	02	30%	40%	30%	04
7	Elevators	06	40%	25%	35%	09
8	Fire Fighting System Installations	08	40%	30%	30%	10
9	Green Buildings	03	35%	35%	30%	04

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1	*Study of existing municipal water supply scheme to VJTI campus.	1	2
2	*Study of types of pipes used for plumbing and sanitary services, pipe fittings, valves and tools required for fittings.	2	2
3	*Study of a Ferrule.	1	2
4	*Study of various traps used for plumbing & sanitary fixtures.	2	2
5	*Rainwater harvesting of the building	2	2
6	*Installation of W.C., commode, Nahani traps to bath/ toilet.	2	2
7	*Draw layouts, plan, elevation & section of a selected case for study. i) Indian toilet ii) Western toilet. Give dimension based on site visit.	2	2

8	Site Visit Report- Visit any building site and submit a report based on following observation: i) plumbing system ii) architectural & structural provision iii) pipe material iv) work method v) safety	6	1,2,3,4
9	*Site Visit Report to a fire-compliant building to study Firefighting systems	2	3
10	Site Visit Report of a Green-Building	2	4
11	Assignments based on the syllabus.	6	1,2,3,4
12	Mini Projects: students will work in group on following: 1. Study of plumbing system of their home. 2. Interaction with Electrical Engineer/ Contractor to understand Electrical Wiring in Buildings and submit report on it.	4	1,2,3,4
*Minimum 8 and maximum 12 practical / experiment sessions to be included in a course in a term Note: * - Mandatory Assignment/Tutorial/Practical			

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

Sr. No.	Author	Title	Publisher and Edition
1.	S.M. Patil	Building Services	Seema publications, Mumbai. 2nd Revised, 2014
2.	S. G. Deolalikar	Plumbing Design and practice	Tata McGraw Hill publishing company. 2nd Edition, 2016
3.	Sandeep Mantri	The A to Z of Practical Building Construction and it's Management	Mantri Institute of Development and Research, Pune. Latest Edition.
4.	C. R Mohan	Design & Practical Handbook on Plumbing	Standard Publishers, 1st Revised, 2010
5.	BIS	IS Codes: 4985, 1239, 14846, 10124, 12235	Bureau of Indian Standards
6.	National Building Code (NBC) 2025		

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	3	-	3	1	2	2	-	2	1
CO2	3	3	2	-	-	2	3	2	2	2	2
CO3	3	2	3	2	2	-	-	3	-	2	2
CO4	3	2	3	2	2	2	3	3	1	2	2
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

Curriculum Coordinator

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VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
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VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: DESIGN OF RCC AND STEEL STRUCTURES**
COURSE CODE	**: 231SE63**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	1	3	3	30	70	28	100	40	25	10	-	-	25	10	150

II. COURSE OBJECTIVES

The course deals with the analysis and design of basic structural components which form parts of most of the structures and design of basic to complex structures. The students will learn to practice with the latest and relevant Indian Standard codes in the design practice of RCC and steel structures.

III. COURSE OUTCOMES (COs)

Students should be able to

CO1	Apply the concept of limit state method for analysis of structural elements.
CO2	Design of various components of a RCC building using LSM.
CO3	Design of the components of structural steel using LSM

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Design of doubly reinforced section**	08	10	1,2	16 %	37%	47%
1.1	Introduction to doubly reinforced sections						
1.2	Analysis of doubly reinforced sections						
1.3	Design and detailing of doubly reinforced sections						
2	**Design of two-way slabs**	08	10	1,2	20%	40%	40%
2.1	Introduction to two-way slabs: simply supported and restrained slabs						
2.2	Analysis of two-way slab						
2.3	Design and detailing of two-way slab: Simply supported and restrained slabs						
3	**Design of RCC columns with eccentric Loads**	08	15	1,2	24 %	35 %	41 %
3.1	Introduction to uni-axially and bi-axially loaded columns						
3.2	Design and detailing of Uni-axial bending in columns						
3.3	Design and detailing of Bi-axial bending in columns						
	Total of Section I	**24**	**35**				

SECTION – II							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4	**Fundamental of steel structures**	04	04	3	30 %	35 %	35 %
4.1	Properties of structural steel as per IS Code						

4.2	Designation of structural steel sections as per IS handbook and IS:800-2007.						
4.3	Factor of safety, load factor as per IS 800: 2007.						
4.4	Introduction to Limit state design of steel						
5	**Bolted and welded connections**	05	07	3	30 %	35 %	35 %
5.1	Types of Bolts, Types of bolted joints, Failure in bolted joints						
5.2	Design strength of bolt: Bolts in shear, Bolts in Tension, Bolts in Bearing, Efficiency of Bolted Joint						
5.3	Methods of welding, Advantages and Disadvantage of welded joint, Permissible stresses in welds						
5.4	Types of welded connections						
5.5	Design of butt and fillet welded connections subjected to axial loads						
6	**Design of Steel Tension members**	05	08	4	30 %	35 %	35 %
6.1	Load carrying capacity of tension members						
6.2	Design of tension members of simple roof trusses with its riveted connection to gusset plates using various arrangements of angles						
7	**Design of Steel Compression members**	05	08	4	30 %	35 %	35 %
7.1	Load carrying capacity of roof struts						
7.2	design of simple roof trusses (strut) with its riveted connection to gusset plates.						
7.3	Design of simple and composite columns (without lacing or battens)						
8	**Design of Steel Beams**	05	08	4	30 %	35 %	35 %

8.1	Load carrying capacity of simple beams of uniform section						
8.2	Design of simple beam of uniform section						
8.3	Design of built-up beam with flange plates						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1	Design of doubly reinforced section	08	16 %	37 %	47 %	10
2	Design of two-way slabs.	08	20 %	40 %	40 %	10
3	Design of RCC columns with eccentric Load	06	24 %	35 %	41 %	15
4	Fundamentals of steel structures	04	30 %	35 %	35 %	04
5	Bolted and welded connections	05	30 %	35 %	35 %	07
6	Design of steel tension members	05	30 %	35 %	35 %	08
7	Design of Steel Compression members	05	30 %	35 %	35 %	08
8	Design of Steel beams	05	30 %	35 %	35 %	08

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1	***DESIGN REPORT I AND DRAWING SHEET 1**		
1.1	Design and reinforcement detailing sketch of doubly reinforced beam	4	1, 2
1.2	Design and reinforcement detailing sketch of two-way slab: simply supported	4	1, 2

1.3	Design and reinforcement detailing sketch of two-way slab: restrained	4	1, 2
1.4	Design and reinforcement detailing of columns: with uni-axial bending	4	1, 2
1.5	Design and reinforcement detailing of columns: with bi-axial bending	4	1, 2
2	***DESIGN REPORT II AND DRAWING SHEET 2**		
2.1	Design and detailing sketches of bolted and welded connections	4	1,3
2.2	Design and detailing sketches of steel trusses	4	1,3
2.3	Design and connection detailing sketches of steel beams	4	1,3
	Total Hours	**32**	
Note: * - Mandatory Assignment/Tutorial/Practical			

VII. SUGGESTED SELF LEARNING ASSIGNMENTS/MICRO PROJECTS/ACTIVITIES

- Procure actual working drawing/ blue print of structural design of RCC structures and write report after checking actual reinforcement placed at site.
- Enlist various software used for design and give details of working of any one software. (Example: STAAD Pro, ETABS, SAP2000)
- Collect the information of various types of connections used in actual practice.
- Write a report on the safety norms followed during RCC/Steel construction at site.

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

Textbooks:

Sr. No.	Author	Title	Publisher and Edition
1.	H.J. Shah	Design of reinforced concrete structures	12th Edition 2021, Charotar publication ISBN: 13-978-9385039478,
2.	B.C Punmia. Ashok K Jain, Arun K Jain	R.C.C Designs (Reinforced concrete structures)	Tenth edition, 2006, Lakshmi publications ISBN 13: 978-8131800942

3.	S.K. Duggal	Limit State Design of Steel Structures	Tata McGraw Hill Education Private Limited, 2017. (ISBN: 9789351343493/9351343499)
4.	N. Subramanian	Design of Steel Structures	Oxford University Press, 2011. (ISBN:9780198068815/01980 68816).

REFRENCE BOOKS/WEBSITES

Sr. No	Author	Title	Publisher
1.	Committee members of BIS	IS 456:2000, Plain and reinforced concrete-Code of practice	BIS, New Delhi
2.	Committee members of BIS	IS 800:2007, Code of practice for general construction in steel	BIS, New Delhi
3.	Committee members of BIS	SP 34 (1987) Handbook on concrete reinforcement and detailing	BIS, New Delhi
4.	Committee members of BIS	SP 16 (1978) Design aids for reinforced concrete	BIS, New Delhi
5.	Vazirani and Ratwani	Design of reinforced concrete structures	Edition-2006, Publisher-Dhanpat Rai and Co.
6.	S Ramamrutham and R Narayanan	Design of reinforced concrete structures	Edition-2006, publisher Dhanpat Rai Publication Company.
7.	B.C Punmia. Ashok K Jain, Arun K Jain	R.C.C Designs (Reinforced concrete structures)	Tenth edition, 2006, Lakshmi publications ISBN 13: 978-8131800942
8.	S Unnikrishnan Pillai, Devdas Menon	Reinforced Concrete Design	Tata McGraw Hill publications, New Delhi ISBN 13:978-0070141100
9.	Dr.V.L. Shah & Prof. Veena Gore	Limit state Design of Steel Structure	Fourth edition, 2016, Structures publications,ISBN 13:8190371754

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Sr. No	Author	Title	Publisher
10.	M R Shiyekar	Limit State Design of Steel Structures	Structures publications, Pune ISBN-13:978-8120347847
11.	P Dayarathanam	Design of Steel Structures	PHI Learning, Delhi, ISBN-13:9332516308
12.	NPTEL	Design of steel structures by LSM, video lectures, Prof. Damodar Maity, IIT Kharagpur	https://archive.nptel.ac.in/courses/105/105/105105105/

IX. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	3	3	-	3	-	3	3	3	-	2
CO2	3	3	3	-	3	-	3	3	3	-	2
CO3	3	3	3	-	3	-	3	3	3	-	2
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

Curriculum Coordinator

Head
Diploma in Civil Engineering

Dean Diploma

VJTI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

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VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: AIRPORT AND TUNNEL ENGINEERING**
COURSE CODE	**: 231CE64E1**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	2.5	3	30	70	28	100	40	25	10	-	-	-	-	125

II. COURSE OBJECTIVES:

Transportation engineering is a vital component of developing societies. It addresses the needs of technicians involved in the investigation, planning, construction, and maintenance of airports and tunnels. Each mode of transportation represents a specialized branch of engineering. This subject aims to provide fundamental knowledge about tunnels and airports, including their various types, the materials used, the functions of their components, construction methods, planning principles, and key aspects of supervision and maintenance.

III. COURSE OUTCOMES (COs)

Students should be able to

CO1	Identify the basic components, characteristics, and terminology related to airports and aircraft
CO2	Understand the principles of airport surveys, planning, and geometric design.
CO3	Classify and describe the types of tunnels, their alignment features and tunnelling methods/equipments.

CO4	Explain the concepts of drainage, ventilation, lighting, safety and maintenance practices for airports and tunnels.

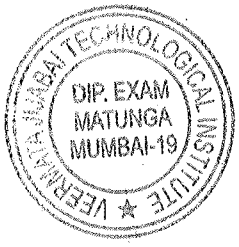
IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Introduction and Aircraft Characteristics**	04	06	1	60%	40%	-
1.1	Component parts of an airplane						
1.2	Definitions of aircraft, aerodrome, airport, airfield, landing area, terminal area, runway, gate, taxiway, apron, Aircraft weight, turning radius, wheel load & configuration.						
2	**Airport Planning and Layout**	08	15	1& 2	40%	50%	10%
2.1	Site selection						
2.2	Runway orientation & configuration						
2.3	Taxiway geometric standards, wind rose diagram, terminal buildings						
2.4	Terminal area, planning of terminal building						
2.5	Aprons of the gate position, number of gate position, aircraft parking system						
2.6	Hanger: General planning and consideration						
3	**Air traffic control and marking**	06	08	2	50%	40%	10%
3.1	Need, Air traffic control aids						
3.2	Runway marking, taxiway marking, apron marking						

4	**Airport lighting, drainage and maintenance**	06	06	1& 2	50%	50%	-
4.1	Rotating beacon, runway lighting, taxiway lighting and lighting of wind direction indicator						
4.2	Requirement of airport, design data, methods of surface & subsurface drainage						
4.3	Maintenance of Airport Pavements and Environmental Guidelines for Airport Project						
	Total of Section I	**24**	**35**				

SECTION – II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
5	**Introduction and Tunnel Surveying**	04	06	3	60%	40%	-
5.1	Definitions, Classification of tunnels, Need, Advantages & Disadvantages of tunnels						
5.2	Features, Alignment, selection of alignment, gradient, shapes & sizes of tunnels						
5.3	Explosives & Detonators: Types & application						
6	**Shafts, Mucking and Hauling**	04	04	3	60%	40%	-
6.1	Classification, Location of shafts						
6.2	Muck Cars, Loading Machines						
7	**Methods of Tunneling**	12	15	3	50%	50%	-
7.1	Methods of tunneling						



7.2	Tunneling in Rocks and Soft strata: Types and features, Tunnel Boring Machine (TBM)						
8	**Drainage, Ventilation and Safety**	04	10	3	50%	50%	-
8.1	Need, Sources of water, Ground water removal, drainage system, Ventilation Methods, features						
8.2	Causes of accidents, Safety Measures, Tunnel lighting						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1.	Introduction and Aircraft Characteristics	04	06	60%	40%	-
2.	Airport Planning and Layout	08	15	40%	50%	10%
3.	Air traffic control and marking	06	08	50%	40%	10%
4.	Airport lighting, drainage and maintenance	06	06	50%	50%	-
5.	Introduction and Tunnel Surveying	04	06	60%	40%	-
6.	Shafts, Mucking and Hauling	04	04	60%	40%	-
7.	Methods of Tunneling	12	15	50%	50%	10%
8.	Drainage, Ventilation and Safety	04	10	50%	50%	-

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.*

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VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Unit No.	Tutorials	Approximate Hours	CO
1*.	1,5	History and development of airports and tunnel, Classification of airport and tunnel	2	1&3
2*.	2	Factors affecting site selection for airport planning	2	2
3*.	2	Runway orientation and Geometric, Taxiway and Apron design	4	2
4.	3	Air traffic control and Airport Lighting	2	2&4
5*.	4	Environmental Impact of Airports	2	4
6*.	4	Recent Advancements in Airport Technology-GIS and BIM	4	2
7.	5	Tunnel surveying and Alignment	4	3
8*.	6,7	Tunnel Construction Methods	4	3
9*.	8	Ventilation, Lighting, Drainage of tunnel	4	4
10*.	5	Case studies of Tunneling Projects	4	3
*Mandatory Tutorials				

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

Sr. No.	Author	Title	Publisher and Edition
1.	Khanna and Arora	Airport Planning and Design	Nemchand Bros.,2009
2.	S.P. Chandola	Transportation Engineering	S. Chand & Co. Ltd.2001
3.	R. Shrinivasan	Harbour dock and tunnel engineering	Charotar Publishing house, Anand.

4.	T.D. Ahuja, G.S. Birdi	Roads, Railways, Bridges & Tunnels Engineering	Standard Book House,1985
5.	G. Venkatappa Rao	Airport Engineering	Tata McGraw-Hill Publishing Co. Ltd.,1992

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	1	-	1	-	1	2	-	1	1
CO2	2	1	2	-	2	-	2	3	2	2	2
CO3	2	2	2	-	2	-	2	2	-	3	2
CO4	2	1	1	-	2	1	2	2	-	3	3
Legends: - High: 03, Medium:02, Low: 01, No Mapping: -											

Curriculum Coordinator

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Diploma in Civil Engineering

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
DIP. EXAM
MATUNGA
MUMBAI-19

BOS APPROVED 23/05/2025
VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: ADVANCED THEORY OF STRUCTURES**
COURSE CODE	**: 231SE64E2**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	2.5	3	30	70	28	100	40	25	10	-	-	-	-	125

II. COURSE OBJECTIVES

This subject follows the subject of strength of materials and theory of structure taught previously. The course covers analysis of rigid joint determinate frames which prepare the students for analysis of indeterminate frames.

III. COURSE OUTCOMES (CO)

Students should be able to

CO1	Understand basic concept of structural mechanics for statically determinate structures.
CO2	Analyse the behaviour and deflection of statically indeterminate rigids joint frames under various loading and given support condition.
CO3	Analyze Influence Line Diagram for statically determinate beams.

CO4	Apply concepts of structural mechanics to analyze statically determine arches.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	**General theorems:**	06	05	1	20%	40%	40%
1.1	Theorems of principle of virtual work, strain energy in elastic structures, complementary energy, Castigliano's theorems, Maxwell-Betti's reciprocal theorem (no numerical).						
2	**Strain energy and impact loading**	09	10	1	20%	30%	50%
2.1	Resilience, Strain energy stored due to axial loading due to gradually applied load, sudden load and impact on axial force member						
3	**Analysis of determinate Frames with rigid joints**	09	10	2	20%	40%	40%
3.1	SFD, BMD and AFD of indeterminate frames with rigid joints						
	Total of Section I	**24**	**35**				

SECTION – II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
4	**Deflection of framed structures with rigid joints**	08	10	2	20%	30%	50%
4.1	Unit load method for deflection of frames						

5	**Influence lines for statically determinate structures**	08	15	3	25%	35%	40%
5.1	Influence lines for cantilever beam, simply supported beam, and overhanging beam						
5.2	Criteria for maximum shear force and bending moment under moving loads for simply supported beams, absolute maximum bending moment.						
6	**Three hinged arches**	08	10	4	25%	40%	35%
6.1	Normal thrust, shear force and bending moment for three hinged arches.						
6.2	Influence lines for normal thrust, shear force and bending moment for three hinged arches.						
	Total of Section II	**24**	**35**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1	General theorems	06	20%	40%	40%	05
2	Strain energy and impact loading	09	20%	30%	50%	10
3	Analysis of determinate Frames with rigid joints	09	20%	40%	40%	10
4	Deflection of framed structures with rigid joints	08	20%	30%	50%	10
5	Influence lines for statically determinate structures	08	25%	35%	40%	15
6	Three hinged arches	08	25%	40%	35%	10

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.

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1	Numericals on Strain energy method for different conditions	6	1
2	Numericals on analysis of determinate frames with rigid joints	6	2
3	Numericals on deflection of frames with rigid joints by unit load method	7	2
4	Numericals on influence lines for statically determinate structures	7	3
5	Numericals on three hinged arches	6	4

VII. SUGGESTED LEARNING MATERIALS:

TEXTBOOKS

Sr. No.	Author	Title	Publisher and Edition
1	S.B Junnarkar	Structural Analysis Vol.I,	Charotar Publishers, 2016. ISBN:978- 9385039270
2	S.B Junnarkar	Structural Analysis Vol.II,	Charotar Publishers, 2016. ISBN:978- 9385039270

VIII. SUGGESTED LEARNING MATERIALS: REFRENCE BOOKS/WEBSITES

Sr. No.	Author	Title	Publisher and Edition
1	Devdas Menon	Structural Analysis Volume – I	Narosa Publication, 2010. (ISBN-978- 1842653371/1842653377).

2	C.S. Reddy	Basic Structural Analysis	Publisher: Tata McGraw Hill, 2010. (ISBN1283187140/978-1283187145).
3	C.K. Wang	Intermediate Structural Analysis	McGraw Hill, 1984. (ISBN10:0070666237/978-0070666238).
4	Website	https://archive.nptel.ac.in/courses/105/106/105106050/	NPTEL, video course on Advanced structural analysis, Prof. Devdas Menon, IIT Madras
5	Website	https://archive.nptel.ac.in/courses/105/101/105101085/	NPTEL, web course on Advanced structural analysis, IIT Bombay

IX. SUGGESTED CO-PO MATRIX FORM

Cos	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	3	2	3	-	-	-	1	2	-	-	-
CO2	3	2	3	-	-	-	1	2	-	-	-
CO3	3	2	3	-	-	-	1	2	-	-	-
CO4	3	2	3	-	-	-	1	2	-	-	-
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

Curriculum Coordinator

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VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
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BOS APPROVED 23/05/2025
VI DCE R23, VJTI

DIPLOMA PROGRAMME	**DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**DCE**
SEMESTER	**SIXTH**
COURSE TITLE	**TOWN PLANNING**
COURSE CODE	**231CE64E3**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	2.5	3	30	70	28	100	40	25	10	-	-	-	-	125

II. COURSE OBJECTIVES:

This course focuses on land use, planning permissions, environmental protection, and public welfare. Students learn about urban design, including air, water, and essential infrastructure. The course covers transportation, communication, and distribution network in urban areas. It emphasizes controlling development while ensuring resource management. Overall, it prepares students to plan well-structured urban spaces.

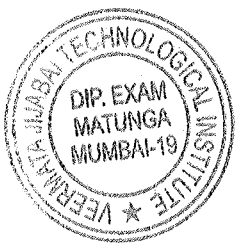
III. COURSE OUTCOMES (COs):

Students should be able to

CO1	Study the evolution of planning over time and explain its main goals, key ideas, and modern approaches.
CO2	Apply basic ecological principles to support a sustainable environment in development.
CO3	Explore modern and contemporary theories of planning.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**History of Indian Town Planning**	04	07	01	30%	40%	30%
1.1	Settlements in prehistoric, Vedic, Harappan (Dholavira, Lothal, Surkotada, Banawali, Kalibangan, Mohen Jo Daro etc.)						
1.2	Settlements and their physical forms during various dynasties up to the 18th century and during colonization (Case studies - Jaipur, New Delhi etc.), Town planning after independence (Case studies - Chandigarh, Gandhinagar etc.).						
2	**Terms and Rationales of Town Planning**	9	10	01	60%	20%	20%
2.1	Various definitions of town and country planning						
2.2	Goals and objectives of planning; Components of planning; Benefits of planning.						
2.3	Levels of planning: Regional plan, Development Plan, Town Planning Scheme						
2.4	Role of "Urban Planner" in planning and designing in relation with spatial organization, utility, demand of the area and supply.						



3	**Development Plans and Development Regulations**	08	10	02	40%	30%	30%
3.1	Definition of development plan; Types of development plans: master plan, city development plan, structure plan, district plan, action area plan, subject plan, town planning scheme, regional plan, sub-regional plan.						
3.2	Types of development control; Implications of violations of development control regulations; Conforming and Nonconforming land uses; LULU (Locally Unwanted Land Use) and NIMBY (Not in My Backyard).						
4	**Civic Surveys for Development Plan**	03	08	2,3	20%	20%	60%
4.1	Various types of civic surveys for Development Plan: Demographic, housing, land use, Water Supply & sanitation etc.						
4.2	Planning agencies for various levels of planning. Their organization and purpose (CIDCO-MHADA-MIDC, MRDA/PMRDA etc.)						
4.3	Traffic transportation system: urban road, hierarchy, traffic management.						
	Total of Section I	**24**	**35**				

SECTION – II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level

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5	**Environmental concerns in town planning**	8	10	2	30%	30%	40%
5.1	Traffic, garbage, sewage, water supply, residential, industrial and commercial zones, etc. Environmentally compatible regional development.						
5.2	Environmental impact assessment and its importance in planning.						
6	**Legislative mechanism for preparation of DP**	10	15	2,3	30%	20%	50%
6.1	MRTP Act 1966, UDPFI guidelines (for land use, infrastructure etc), SEZ, CRZ, Smart City Guidelines						
6.2	Special townships, Land Acquisition Rehabilitation and Resettlement Act 2013.						
6.3	Application of GIS, GPS, remote sensing in planning.						
7	**City Development**	6	10	3	20%	35%	45%
7.1	Compact city approach: concept, advantages and limitations; Forms of cities in developing world.						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1	History of Indian Town Planning	04	30%	40%	30%	07
2	Terms and Rationales of Town Planning	09	60%	20%	20%	10

3	Development Plans and Development Regulations	08	40%	30%	30%	10
4	Civic Surveys for DP	03	20%	20%	60%	08
5	Environmental concerns in town planning	08	30%	30%	40%	10
6	Legislative mechanism for preparation of DP	10	30%	20%	50%	15
7	City Development	06	20%	35%	45%	10

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS:

Sr. No.	Unit	Practical/Assignment/Tutorial Title	Hours	CO
1	2,3	Study of Development Plan with respect to land use, services, infrastructure, street furniture, housing etc. (group work)	10	2,3
2	2	Report on contribution of Engineers, Planners and Architects in post-independence India (individual work)	4	1,2
3	3,4	Report including drawing of any existing new towns and planned towns like new Mumbai, Gandhinagar, PCNTDA etc. (infrastructure, disaster management etc.) (individual work)	4	1,2,3
4	5,7	Smart City approaches (individual work)	8	1,2,3
5	4,5,7	Study of urban housing and housing change (group work)	6	1,2,3

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

TEXTBOOKS:

Sr. No.	Author	Title	Publisher and Edition
1.	Abir Bandopadhyaya	Text Book of Town Planning	Books & Allied Ltd (2000)

2.	G K Hiraskar	Town Planning	Dhanpat Rai Publications (2012)
3.	Rangwala	Town Planning	Charotar Book Distributors (1 January 2015)

REFERENCE BOOKS:

1.	MoUD By GoI	MRTP Act 1966, LARR Act 2013 and UDPFI Guidelines	https://www.indiacode.nic.in/handle/123456789/16117?view_type=browse
2.	Govt of Maharashtra	CIDCO, MHADA, MIDC, MMRDA, PMRDA	https://cidco.maharashtra.gov.in/
3.	F. S. Hudson	Geography of Settlements	Evans Ltd. Estover, Plymouth PL 6 7 PZ UK
4.	Biswas Hiranmay	Principles of Town Planning and Architecture	VAYU Education of India (2012)

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	-	2	1	-	-	2	-	-	-
CO2	2	2	2	2	1	-	-	2	2	-	-
CO3	2	-	2	-	-	-	-	-	-	-	-
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

Curriculum Coordinator

Head

Diploma in Civil Engineering

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

BOS APPROVED 23/05/2025
VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: SOLID WASTE MANAGEMENT**
COURSE CODE	**: 231CE64E4**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME											
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	2.5	3	30	70	28	100	40	25	10	-	-	-	-	125

II. COURSE OBJECTIVES:

With growing industrialization and urbanization, solid waste generation is a major concern in both urban and rural areas. Effective waste management is essential to maintain a clean and safe environment. Understanding the classification and characteristics of solid waste helps in selecting appropriate collection, transportation, and disposal technologies. Various disposal methods, including recycling and reuse, ensure economic and environmentally friendly waste management. Managing biomedical, construction, E-waste, and plastic waste properly is crucial. Promoting recycling, recovery, and reuse will lead to efficient waste disposal and help preserve natural resources.

III. COURSE OUTCOMES (COs)

Students should be able to

CO1	Identify the different sources of solid wastes.
CO2	Describe the relevant methods of collection and transportation of solid wastes.

CO3	Explain the processes involved in treatment and disposal of solid wastes.
CO4	Interpret the relevant laws related to solid waste management.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Fundamentals of Solid Waste Management**	04	05	01	20%	40%	--
1.1	Definition of solid waste						
1.2	Sources of solid waste, Types of solid waste; Domestic waste, commercial waste, industrial waste, market waste, agricultural waste, biomedical waste, E-waste, hazardous waste, institutional waste						
1.3	Physical and chemical characteristics of municipal solid waste						
1.4	Impact of solid waste on the environment						
1.5	Solid waste management techniques – solid waste management hierarchy, waste prevention, and waste reduction techniques						
1.6	Factors affecting solid waste generation						
2	**Storage, Collection, and Transportation of Municipal Solid Waste**	08	14	02	40%	40%	60%
2.1	Storage of solid waste						
2.2	Collection methods of solid waste						

2.3	Manual and Mechanical Tools and Equipment						
2.4	Transportation of municipal waste						
2.5	Transportation vehicles with their capacity – Working with animal carts, automobiles, tractors, or trailers, dumpers, compactor vehicles, transfer stations- meaning, necessity, location						
2.6	Role of rag pickers and their utility for society						
2.7	Organization pattern of solid waste management system, practices according to population of town or city.						
3	**Disposal of Municipal Solid Waste**	12	16	03	20%	60%	80%
3.1	Concept of composting of waste, principles of composting process, factors affecting the composting process.						
3.2	Methods of composting: A) Manual Composting – Bangalore method, Indore method B) Mechanical Composting – Dano Process C) Vermicomposting						
3.3	Landfilling techniques: Factors to be considered for site selection Landfilling methods: Area method, trench method, and ramp method Leachate and its control, biogas from landfill; Advantages and disadvantages of landfill method; Recycling of municipal solid waste						

3.4	Thermal Treatment of waste: Introduction to incineration process; Types of incinerators – Flash, multiple chamber incinerators. Products of the incineration process with their use; Pyrolysis of waste – Definition, methods						
3.5	Advantages and disadvantages of incineration process						
	Total of Section I	**24**	**35**				

SECTION – II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
4	**Biomedical Waste Management and Health Aspects and Public Involvement in Solid Waste Management**	10	14	03	40%	40%	60%
4.1	Definition of Biomedical Waste						
4.2	Sources and generation of Biomedical Waste						
4.3	Classification of Biomedical Waste						
4.4	Management technologies						
4.5	Health aspects during handling and processing						
4.6	Health problems during the time of segregation, recovery, recycling, and reuse of solid waste						
4.7	Public involvement and participation in solid waste management practices.						
5	**Industrial Waste Management and E-Waste Management**	10	14	03	40%	40%	60%

5.1	Industrial Waste Management: Variety of industrial waste.						
5.2	Collection and disposal of industrial waste.						
5.3	Control measures for industrial waste						
5.4	Recycling of industrial waste						
5.5	Definition of E-waste, varieties of E-wastes, dangers of E-waste						
5.6	Recycling of E-waste.						
5.7	Disposal of E-waste.						
6	**Legal Aspects of Solid Waste Management**	04	07	04	20%	40%	--
6.1	Legal aspects – present scenario.						
6.2	Municipal Solid Waste Management Rules, 2016.						
6.3	Biomedical Waste Management Rules, 2016.						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1	Fundamentals of Solid Waste Management	04	20%	40%	--	05
2	Storage, Collection, and Transportation of Municipal Solid Waste	08	40%	40%	60%	14
3	Disposal of Municipal Solid Waste	12	20%	60%	80%	16
4	Biomedical Waste Management and Health Aspects and Public Involvement in Solid Waste Management	10	40%	40%	60%	14

5	Industrial Waste Management and E-Waste Management	10	40%	40%	60%	14
6	Legal Aspects of Solid Waste Management	4	20%	40%	--	07

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1*	Study of the physical characteristics of various solid wastes using videos, simulations, or photos.	**02**	1
2*	Prepare a report on the methods, equipment, and specifications used for the collection and transport of solid waste.	**02**	1
3*	Study relevant materials to create a flow chart depicting operations at a solid waste transfer station.	**04**	1
4*	Prepare an organizational chart for a solid waste management agency, including population coverage, machinery, manpower, and operational pattern.	**02**	2
5*	Prepare a report on various solid waste management techniques.	**02**	2
6*	Prepare a report on solid waste disposal plant.	**04**	2
7	Prepare a report on Bio gas plant by viewing the relevant video/simulation/photographs.	**04**	3
8*	Prepare plant specifications and an action plan for vermicomposting suitable for a given building type.	04	3
9*	Prepare a report on solid waste disposal via landfill methods.	02	3

10	Prepare specifications for biomedical waste disposal based on relevant visual material.	04	3
11	Prepare a report on e-waste disposal practices.	02	3
12	Compile key provisions from CPCB and SPCB related to solid waste management.	02	4
13	Study the Municipal Solid Waste Management Rules, 2016 through relevant resources.	02	4
*Minimum 8 and maximum 12 practical / experiment sessions to be included in a course in a term Note: * - Mandatory Assignment/Tutorial/Practical			

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

Sr. No.	Author	Title	Publisher and Edition
1.	Bhide A. D.	Solid Waste Management	Indian National Scientific Documentation Centre, New Delhi Edition: 1983 ASIN: B0018MZ0CZ
2.	Techobanoglous George; Kreith, Frank	Solid Waste	McGraw Hill Publication, New Delhi Year: 2002 ISBN: 9780071356237
3.	Manjunath D. L.	Environmental Studies	Pearson Education Publication, New Delhi Year: 2006 ISBN-13: 8131709162
4.	Sasikumar K.	Solid Waste Management	PHI Learning, New Delhi, 2009 ISBN: 8120338693
5.	Khopkar S. M.	Environmental Pollution	New Age International Limited, Delhi, 2007 ISBN: 8122415075
6.	Basak Anindita	Environmental Studies	Pearson Publication, Delhi, 2009 ISBN: 8131785688, 9788131785683
7.	Rao C. S.	Environmental Pollution Control Engineering	New Age International, 2006, New Delhi ISBN-13: 9788122413854

8.	Hosetti B. B.	Prospect and Perspectives of Solid Waste Management	New Age International Publisher, 2006, New Delhi ISBN-13: 978-8122417777

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	-	-	-	1	1	2	-	-	-
CO2	3	1	2	2	2	1	1	2	-	2	2
CO3	3	2	3	2	1	1	2	2	-	2	2
CO4	3	1	-	1	-	-	1	2	-	-	2
Legends: - High: 03, Medium:02, Low: 01, No Mapping: -											

Curriculum Coordinator

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Diploma in Civil Engineering

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

BOS APPROVED 23/05/2025
VI DCE R23, VJTI

DIPLOMA PROGRAMME	**DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**DCE**
SEMESTER	**SIXTH**
COURSE TITLE	**ENGINEERING GEOLOGY**
COURSE CODE	**231CE64E5**

I. LEARNING AND ASSESSMENT SCHEME

LEARNING SCHEME					ASSESSMENT SCHEME											
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	2.5	3	30	70	28	100	40	25	10	-	-	-		125

II. COURSE OBJECTIVES:

This course teaches the basics of geology needed for engineering. It covers rocks, soil, and how natural processes affect construction. Students will learn about site investigation, groundwater, and land stability. The focus is on preventing risks, building safely, and real-life examples. It helps engineers make better decisions for construction projects.

III. COURSE OUTCOMES (COs):

Students should be able to

CO1	Identify the various Rock and Rock forming minerals as a construction material.
CO2	Describe basic geological structure and groundwater conditions influencing Civil engineering work.
CO3	Classify geological knowledge to assess site stability, slope movement and construction of Dams & Tunnels.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE:

SECTION – I							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1	**Introduction**	04	07	01	30%	50%	20%
1.1	Branches of geology useful to civil engineering, importance of geological studies in various civil engineering						
1.2	Different subdivision of geology						
1.3	Detailed study of physical properties of minerals						
1.4	Definition of Perfect crystal, crystalline, amorphous						
1.5	Methods of mineral identification, physical properties of minerals, rock forming minerals, megascopic identification of common primary & secondary minerals, study of common ore minerals - as prescribed under Practical.						
2.	**Petrology**	10	12	01	40%	40%	20%
2.1	Agents modifying the earth surface. Study of weathering and its effects on engineering properties of rocks.						
2.2	Igneous Petrology: Definition of igneous rocks, types of igneous rocks, Composition, textures, and structure						
2.3	Sedimentary Petrology: Definition of sediments, sedimentary rocks, Grain						

	size distribution of sediments, Composition, textures, and structure						
2.4	Metamorphic Petrology: Definition of metamorphism, metamorphic rock. Factors affecting metamorphism, Different kinds of metamorphism, Composition, textures, structures						
3	**Structural Geology**	06	10	02	20%	40%	40%
3.1	Unconformity, Unconformable & Conformable beds – Definition, Concept of Dip and Strike, Types of Dip and their significance, Outcrop pattern, outliers, and inliers.						
3.2	Fault: Formation, Different terminology involved, Types of faults.						
3.3	Fold: Formation, Different components, Types of folds						
3.4	Joints: Definition, Types of joints						
3.5	Geological aspects for earthquake resistant structures.						
4	**Ground water**	04	06	02	40%	60%	-
4.1	Sources & zones, aquifer, aquiclude, aquifuge, and water table						
4.2	Definition of Confined and Unconfined & Perched Aquifers						
	Total of Section I	**24**	**35**				

SECTION – II							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
5	**Rock Instability and Slope Movement**	07	10	03	20%	40%	40%
5.1	Concept of sliding blocks, Types of landslides, Causes and preventive measures for landslides						
5.2	Prevention by surface drainage, Slope reinforcement by rock bolting and rock anchoring, Retaining wall, Slope treatment						
6	**Geology of Dam and Reservoir Site**	07	8	03	20%	40%	40%
6.1	Required geological consideration for selecting dam and reservoir site, Ideal site conditions for dam, Geological conditions to be avoided						
6.2	Precautions to be taken to counteract unsuitable conditions						
7	**Tunneling**	5	8	03	20%	40%	40%
7.1	Ideal site conditions for tunneling, Geological conditions to be avoided						
7.2	Over-break, Tunneling in folded rock						
7.3	Pressure grouting for dams and tunnels						
8	**Rock Masses as Construction Material**	5	9	01	20%	40%	40%
8.1	Definition of rock masses, Main features constituting rock mass.						
8.2	Main features affecting the quality of rock engineering and design						
8.3	Measurement of velocity of sound in rock						

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8.4	Classification of rock material strength						
8.5	Core logging, Rock Quality Designation						
8.6	Common rock as building material.						
	Total of Section II	**24**	**35**				
	Total of Section I & II	**48**	**70**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level	Total Marks
1.	Introduction	04	30%	50%	20%	07
2.	Petrology	10	40%	40%	20%	12
3.	Structural Geology	06	20%	40%	40%	10
4.	Ground water	04	40%	60%	-	06
5.	Rock Instability and Slope Movement	07	20%	40%	40%	10
6.	Geology of Dam and Reservoir Site	07	20%	40%	40%	08
7.	Tunneling	05	20%	40%	40%	08
8.	Rock Masses as Construction Material	05	20%	40%	40%	09

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.*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS:

Sr. No.	Tutorials	Approx. Hours	CO
1*	**Study of physical properties of minerals.**	2	1
2*	**Identification of minerals**	10	1
	a. Silica group: Quartz, Amethyst, Opal		
	b. Feldspar group: Orthoclase, Plagioclase		

	c. Cryptocrystalline group: Jasper		
	d. Carbonate group: Calcite		
	e. Element group: Graphite		
	f. Pyroxene group: Talc		
	g. Mica group: Muscovite		
	h. Amphibole group: Asbestos, Olivine, Hornblende		
	i. Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum		
3*	**Identification of rocks (Igneous Petrology)**	8	2
	Granite and its varieties, Syenite, Rhyolite, Pumice		
	a. Obsidian, Scoria, Pegmatite, Volcanic Tuff		
	b. Gabbro, Dolerite, Basalt and its varieties, Trachyte		
4*	**Identification of rocks (Sedimentary Petrology)**: Conglomerate, Breccia, Sandstone and its varieties, Laterite, Limestone and its varieties, Shales and its varieties	4	2
5*	**Identification of rocks (Metamorphic Petrology)**: Marble, Slate, Gneiss and its varieties, Schist and its varieties, Quartzite, Phyllite	4	2
6*	**Mini Project:** Study of different building stone from various formations in the Indian peninsula	4	4,5

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

TEXTBOOKS:

Sr. No	Author	Title	Publisher and Edition
1.	Dr. R.B. Gupte	Text Book of Engineering Geology	Pune Vidyarthi Griha Revised edition 2005
2.	Kesavalu	Text Book of Engineering Geology	MacMillan
3.	P.K. Mukherjee	A Textbook of Geology	11th Edition, Publisher World Press

4.	Parbin Singh	Text Book of Engineering and General Geology	S.K. Kataria & Sons

REFERENCE BOOKS:

Sr. No.	Author	Title	Publisher and Edition
1.	Emmons, Thiel, Stauffer, Allison	Geology Principle and Processes	McGraw-Hill Book Company
2.	J.C. Harvey	Geology For Geotechnical Engineers	Cambridge University Press
3.	F.G.H. Blyth	Geology for Engineers	Publisher Edward Arnold & Co.
4.	Rober R. Compton	Manual of Field Geology	Edition 1968, Wiley Eastern University

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	-	2	1			2	-	-	-
CO2	2	2	2	2				2	2	-	2
CO3	2	2	2	2	1			2	-	2	-
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

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

Diploma in Civil Engineering

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

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VI DCE R23, VJTI

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: 231CE65**
COURSE CODE	**: CONTRACTS AND ACCOUNTS**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
2	-	2	-	2	-	-	-	-	-	-	25	10	50#	20	-	-	75

#: assessment by External Examiner

II. COURSE OBJECTIVES:

Understanding tendering, contracts, and financial management is essential for effective project execution. This course equips students with the knowledge of preparing tender documents, maintaining accounts, and following procedures used by PWD and private firms. It enables them to prepare bills, process contractor payments, and enforce penalties for defective work, ensuring efficiency and accountability in construction projects.

III. COURSE OUTCOMES (CO):

Students should be able to

CO1	Explain various types of engineering contracts and their applications.
CO2	Study of tender notices and tender documents for civil engineering works.
CO3	State the procedure for submission, opening, and evaluation of tenders.
CO4	Describe the accounting and payment procedures used in PWD and private organizations.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

Unit & Sub-Unit	Topics/Sub-topics	Hours	CO	R Level	U Level	A Level
1	**Contract**	10	01	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 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 tenders, 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, 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**					
3.1	Various account forms and their uses Measurement Books, Nominal Muster Roll, Indent, Invoice, Bills, Vouchers, Cash Book, and Temporary Advance.	05	4	70%	20%	10%
4	**Payment to Contractors**					
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	05	4	70%	20%	10%

	Payment, Petty Advance, Mobilization Advance.					
	Total	**32**				

V. SUGGESTED SPECIFICATION TABLE (Theory)

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	70%	20%	10%

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*

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1	*Collection of tender notices published in newspapers/internet for various items of civil engineering works. (min. 5) Write salient features of them	**02**	2
2	*Drafting a tender notice for construction of a civil engineering Work (min. 2)	**01**	2
3	*Collecting old set of tender documents and writing a report on it	**02**	2

4	*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	*Write a report on Built Operate Transfer (BOT) project (any one project)	**02**	1
6	Collect various account forms from PWD and Private Ltd. organization & writing report on it	**03**	4
7	*Writing a report on store procedure and account procedure of PWD	**02**	4
8	Writing a report on store procedure and account procedure of Private Ltd. Organization	02	4

Note: * - Mandatory Assignment/Tutorial/Practical

VII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFERENCE BOOKS/WEBSITES

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

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

VIII. SUGGESTED CO-PO MATRIX FORM

COs	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	-	-	1	-	2	1	-	1	1
CO2	2	2	2	-	2	1	2	2	-	1	2
CO3	2	1	2	-	2	-	1	2	-	1	2
CO4	2	-	1	-	2	-	1	2	-	1	2
Legends: - High: 03, Medium:02, Low: 01, No Mapping: -											

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

Diploma in Civil Engineering

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
DIP. EXAM
MATUNGA
MUMBAI-19

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: ENTREPRENEURSHIP DEVELOPMENT**
COURSE CODE	**: 231CE66**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	1	1.5	-	-	-	-	-	-	50	20	25@	10	25	10	100

@: assessment by Internal Examiner

II. COURSE OBJECTIVES:

Engineers can play very important role in economic development of the nation and wealth creation by innovation and entrepreneurship. This course aims to develop among the engineering student's awareness and abilities to be entrepreneurs.

III. COURSE OUTCOMES (CO):

Students should be able to

CO1	Identify personal entrepreneurial qualities.
CO2	Collect and use information from stakeholders to set up a start-up.
CO3	Understand the support systems available for new Start up.
CO4	Understand engineering economics concepts and prepare a basic project plan for managing an enterprise effectively.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

Unit & Sub-Unit	Topics/Sub-topics	Hours	CO	R Level	U Level	A Level
1	**Introduction to Entrepreneurship Development**	05	01	70%	30%	-
1.1	Entrepreneurship as a Career; Meaning and importance of entrepreneurship, Advantages and challenges of choosing entrepreneurship, Scope and opportunities – local and global					
1.2	Qualities of a Successful Entrepreneur					
1.3	Types of Enterprises: manufacturing, service and trading					
2	**Startup Selection Process**	10	02	40%	60%	-
2.1	Product / Service Selection: Selection of suitable product or service – process and core competence, product/service life cycle, new product or service development, creativity and innovation in modification or development, understanding product mortality curve.					
2.2	Process Selection: Technology life cycle, factors affecting process and location selection, basic cost considerations, forms of transformation, and material handling requirements.					
2.3	Market Study Procedures: Designing questionnaires, sampling methods, conducting market research, data collection and analysis for decision making.					
3	**Support System for Startup**	06	03	80%	20%	-
3.1	Categorization of MSME: Classification of Micro, Small, and Medium Enterprises (MSME) based on investment and turnover; concept of ancillary industries and their importance.					

3.2	Government Support Systems: Major agencies supporting startups and entrepreneurship - Maharashtra Centre for Entrepreneurship Development (MCED), National Institute for Micro, Small and Medium Enterprises (NI-MSME), Prime Minister Employment Generation Programme (PMEGP), Directorate of Industries (DI), Khadi and Village Industries Commission (KVIC).					
3.3	Support Agencies and Services: Agencies providing entrepreneurship guidance, training, registration, technical consultation, technology transfer, quality control, marketing, and financial assistance.					
3.4	Basic Financial Indicators: Concept and calculation of Breakeven Point (BEP), Return on Investment (ROI), and Return on Sales (ROS).					
4	**Engineering Economics**					
4.1	Fundamentals concept-demand and supply, cost & revenue					
4.2	Price & income, consumer behavior demand, elasticity of demand, demand forecasting					
4.3	Cost aspects, cost volume- Net Present Value, Payback, profit analysis, break-even analysis and its applications to decision making	05	04	40%	50%	10%
4.4	Engineering economics- equivalence, value of time, annual equivalence cost, Market conditions, technological considerations under competitive economical and global business environment. Market structure and Pricing output					
5	**Managing Enterprise**	06	04	40%	40%	20%

5.1	Techno-Commercial Feasibility: Concept of feasibility study, preparation of feasibility report, and basic evaluation criteria for project viability.					
5.2	Ownership and Finance: Types of ownership, sources of capital, importance of budgeting, and matching an entrepreneur's capability with the selected project.					
5.3	Unique Selling Proposition (USP): Identification of USP and steps for developing an effective marketing plan to promote products or services.					
5.4	Risk Management: Planning for calculated risk-taking, starting low-cost projects, futuristic planning, understanding startup cycle and ecosystem.					
5.5	Incubation Centres and Accelerators: Role, functions, and procedures for availing support from incubation centres and startup accelerators.					
	Total	**32**				

V. SUGGESTED SPECIFICATION TABLE:

Unit No.	Unit Title	Teaching Hours	R Level	U Level	A Level
1	Introduction to Entrepreneurship Development	05	70%	30%	-
2	Startup Selection Process	10	40%	60%	-
3	Support System for Startup	06	80%	20%	-
4	Engineering Economics	05	40%	50%	10%
5	Managing Enterprise	06	40%	40%	20%

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 specific.

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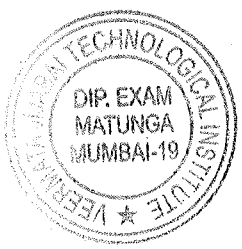

VI. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS/SELF LEARNING:

Sr. No.	Practical/Assignment/Tutorial Title	Hours	CO
1	*Preparation of report on entrepreneurship as a career	4	1
2	*Case study on 'Risks associated with enterprise'.	2	1
3	*Preparation of report on 'Development of new Product'	4	1,2
4	Preparation of Report on 'Process selection' for new startup	2	1,2,3
5	Market research for setting up new Start up	4	2,3
6	A Case study on 'Technology life cycle' of any successful entrepreneur.	2	3
7	*Preparation of report on 'Information for setting up new startup' from MCED/MSME/KVIC etc	4	3,4
8	*Preparation of report on Interaction with Construction Entrepreneur.	4	3
9	*A case study based on 'Unique selling Proposition (USP) of any well-established enterprise.	4	4
10	*Prepare project report for starting new startup using 'Atal incubation center (AIC).	4	1,2,3,4

VII. SUGGESTED LEARNING MATERIALS TEXT BOOKS/REFERENCE BOOKS/WEBSITES:

Sr. No.	Author	Title	Publisher and Edition
1.	Khanna S. S	Entrepreneurial Development	Publisher S. Chand, 1999 edition, 2006 Reprint
2.	Jha K. N	Construction Project Management	Publisher Pearson, 2011
3.	Colombo Plan Staff College for Technician Education	Entrepreneurship Development	Publisher Tata McGraw-Hill, 1st reprint, 1999
4.	Ryasri, Ramana Murthy	Engineering Economics and financial accounting (ASCENT SERIES)	A, V.V Publisher Tata McGraw Hill

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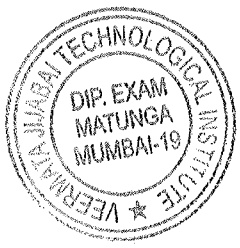

5.	Colin Barrow, Robert Brown and Liz Clarke	The successful Entrepreneur's Guidebook	Publisher Kogan page India

LEARNING WEBSITES & PORTALS

Sr. No.	Link/Portal	Description
1.	https://niesbud.nic.in/Publication.html	The National Institute for Entrepreneurship and Small Business Development Publications
2.	https://www.nabard.org/Tenders.aspx?cid=501andid=24	Government Schemes
3.	http://www.startupindia.gov.in/pdffile.php?title=Start up%20India%20Action%20Planandtype=Actionandq =Action%20Plan.pdfandcontent_type=Actionandsub menupoint=action	Startup India

VIII. SUGGESTED CO-PO MATRIX FORM:

CO	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO- 1	PSO- 2	PSO- 3	PSO- 4
CO1	2	-	2	-	-	3	2	-	-	-	-
CO2	2	2	2	2	-	3	2	-	-	-	-
CO3	2	2	2	2	-	3	2	-	-	-	-
CO4	2	2	2	2	-	3	2	-	-	-	-
Legends: - High:03, Medium:02, Low:01, No Mapping: -											

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

Diploma in Civil Engineering

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VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ DIP. EXAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	**: DIPLOMA IN CIVIL ENGINEERING**
PROGRAMME CODE	**: DCE**
SEMESTER	**: SIXTH**
COURSE TITLE	**: PROJECT-II**
COURSE CODE	**: 231CE67**

I. LEARNING AND ASSESSMENT SCHEME:

LEARNING SCHEME					ASSESSMENT SCHEME												
CL	TL	LL	Self learning	CR	PAPER HRS	FA-TH (MST)	SA-TH (ESE)		TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
						Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
-	-	6	-	4	-	-	-	-	-	-	100	40	100 #	40	-	-	200

#: assessment by External Examiner

II. COURSE OBJECTIVES:

The project enables students to identify and understand research problems, apply knowledge through paper writing and presentations, and analyze feedback to improve performance. It helps them evaluate ideas critically and create innovative solutions in their chosen area, fostering confidence, creativity, and readiness for interviews or entrepreneurial ventures.

III. COURSE OUTCOMES (CO):

Students should be able to

CO1	Review and evaluate the available literature on the identified problem
CO2	Apply the principles, tool and techniques to solve the identified problem
CO3	Analyze data to produce useful information and to draw conclusions by systematic deduction
CO4	Develop a range of leadership skills and abilities of resolving conflict, communicate results and analysis in written and oral form

IV. GENERAL GUIDELINES FOR PROJECT PREPARATION, PRESENTATION AND SUBMISSION OF THE FINAL PROJECT REPORT

a) Batches of students/sometimes individuals shall be formed for projects as decided by the Project Supervisor. The Project Supervisor shall be a faculty of the respective department.

b) Students shall Identify the problem statement and finalize the topic for the project in consultation with their faculty supervisors.

c) Students shall study and assess the feasibility of different solutions and the financial implications.

d) Students should collect relevant data from different sources books / internet / market / suppliers / experts through surveys / interviews). Students shall prepare required drawings/ designs and detailed plans for the successful execution of the work.

e) Students shall present their work on the project at the end of the term in front of the expert panel as framed by the department. They shall submit their ppts to their Project Supervisors for records.

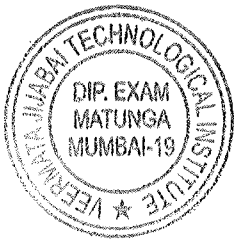
f) Students shall submit two copies of their final Project Reports bound in Maroon colour hardbound book format to their Project Supervisor. One copy shall be retained by the Supervisor and the other copy shall be kept with the Department Head. Students may prepare multiple copies for their own records as required.

1.Organization of the Project report

The report shall be presented in a number of chapters, starting with Introduction and ending with Summary and Conclusions. Each of the other chapters will have a precise title reflecting the contents of the chapter.

A chapter can be subdivided into sections, subsections and sub-subsections so as to present the content discretely and with due emphasis.

When the work comprises two or more mutually independent investigations, the report may be divided into two or more parts, each with an appropriate title. However, the numbering of chapters will be continuous right through, for example Part 1 may comprise Chapters 2-5, Part Two, Chapters



6-9. The report shall be presented in following sequence:

1. Title sheet
2. Dedication sheet (if desired)
3. Declaration of the Candidate
4. Approval Sheet
5. Abstract
6. Table of contents
7. List of tables (if desired)
8. List of Figures (if desired)
9. Abbreviations / Notations / Nomenclature (if desired)
10. Chapter One: Introduction
11. Chapter Two: Literature Review
12. Chapter/s: Report of Materials and Methods used in the Project work
13. Chapter: Results & Discussions
14. Chapter: Summary & Conclusions
15. Appendix / Appendices (if any)
16. References
17. Acknowledgements

Maroon Hard Binding

Front Cover

The front cover shall contain the following details:

- Full title of report in 6 mm 22 point's size font properly centered and positioned at the top.
- Full name of the candidate/s in 4.5 mm 15 point's size font properly centered at the middle of the page.
- A 40 mm dia replica of the Institute emblem followed by the name of department, name of the Institute and the year of submission, each in a separate line and properly centered and located at the bottom of page.
- All lettering shall be embossed in gold.

Side of the Hardbound Cover

- The Diploma awarded e.g. DCE / DEE / DELNE / DME / DCHE / DTE , the name of the candidate and the year of submission shall also be embossed on the bound (side) in gold.

- Blank Sheets In addition to the white sheets (binding requirement) two white sheets shall be put at the beginning and the end of the thesis.

1. Title Sheet

This shall be the first printed page of the report and shall contain the submission statement:
The Project Report submitted in partial fulfillment of the requirements of the Diploma in (name of the Diploma awarded), by (the name of candidate) and Roll No. (of the candidate), name(s) of the Project Supervisor / Co- supervisor (s) / Co-Guide(s) (if any), Department, Institute and year of submission.

Sample copy of the 'Title Sheet' is appended (Specimen 'A')

2. Dedication Sheet

If the candidate so desires(s) he may dedicate his/her thesis, which statement shall follow the title page. If included, this shall form the page 1 of the auxiliary sheets but shall not have a page number.

3. Declaration of the Candidate

A declaration of Academic honesty and integrity is required to be included along with every report before the approval sheet.

The format of this declaration is given in Specimen `B' attached.

4. Approval Sheet

In the absence of a dedication sheet this will form the first page and in that case shall not have a page number. Otherwise, this will bear the number two in Roman lower case "ii" at the center of the footer.

Sample copy of the 'Approval Sheet' is appended (Specimen `C')

5. Abstract

The 500 word abstract shall highlight the important features of the report and shall correspond to the electronic version to be submitted to the Library for inclusion in the website. The Abstract in the project report, however, shall have two more parts, namely, the layout of the thesis giving a brief chapter wise description of the work and the key words.

6. Table of Contents

The contents shall follow the Abstract and shall enlist the titles of the chapters, section and subsection using decimal notation, as in the text, with corresponding page number against them, flushed to the right.

7. & 8. List of Figures and Tables

Two separate lists of Figure captions and Table titles along with their numbers and corresponding page numbers against them shall follow the Contents.

9. Abbreviation Notation and Nomenclature

In general no abbreviations should be used in the text except for Technical terms. A complete and comprehensive list of all abbreviations, notations and nomenclature including Greek alphabets with subscripts and superscripts shall be provided after the list of tables and figures. (As far as possible, generally accepted symbols and notation should be used).

10. Introduction

The title of Chapter 1 shall be Introduction. It shall justify and highlight the problem posed, define the topic and explain the aim and scope of the work presented in the thesis. It may also highlight the significant contributions from the investigation.

11. Review of Literature

This shall normally form Chapter 2 and shall present a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation. The extent and emphasis of the chapter shall depend on the nature of the investigation.

12. Report of Materials and Methods used in the Project work

The reporting on the investigation shall be presented in one or more chapters with appropriate chapter titles. Due importance shall be given to experimental setups, procedures adopted, techniques developed, methodologies developed and adopted.

While important derivations / formulae should normally be presented in the text of these chapters, extensive and long treatments, copious details and tedious information, detailed results in tabular and graphical forms may be presented in Appendices.

- Representative data in tables and figures may, however, be included in appropriate chapters.
- Figures and tables should be presented immediately following their first mention in the text. Short tables and figures (say, less than half the writing area of the

page) should be presented within the text, while large tables and figures may be presented in separate pages.

- Equations should form separate lines with appropriate paragraph separation above and below the equation line, with equation numbers flushed to the right.

13. Results and Discussions

This shall form the penultimate chapter of the thesis and shall include a thorough evaluation of the investigation carried out and bring out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

14. Summary and Conclusions

This will be the final chapter of the thesis. A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the Results and Discussions Chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of the chapter.

15. Appendix

Detailed information, lengthy derivations, raw experimental observations etc. are to be presented in the separate appendices, which shall be numbered in Roman Capitals (e.g. "Appendix IV"). Since reference can be drawn to published / unpublished literature in the appendices these should precede

the "Literature Cited" section.

16. References / Literature Cited

This should follow the Appendices, if any, otherwise the Summary and Conclusions Chapter. The candidates shall follow the style of citation and style of listing in one of the standard journals in the subject area consistently throughout his / her thesis, for example, IEEE in the Department of Electrical Engineering, Materials Transactions in Department of Metallurgical Engineering and Materials Science. However, the names of all the authors along with their initials and the full title of the article /monogram / book etc. have to be given in addition to the journals / publishers, volume, number, pages(s)and year of publication. Citation from websites should include the names(s) of author(s) (including the initials), full title of the article, website reference and when last accessed. Reference to personal communications, similarly, shall include the author, title of the communication (if any) and date of receipt.

Publications by the candidate, articles, technical notes etc. in the topic of the thesis published by the candidate may be separately listed after the literature cited. This may also be included in the contents. The candidates may also include reprints of his / her publications after the literature citation.

Format for Entry in reference / Bibliography:

For paper published in Journal:

Name/s of Author/s, (Year of Publication), "Title of the paper", Title of the Journal,
Volume No, page no e.g.

Berny, J. (1889), "A new distribution function for risk analysis", Journal of the Operational Research Society, Vol. 40, pp.1121-7

For text/reference book:

Name/s of Author/s, (Year of Publication), Title of the book, Name of Publisher, Place e.g.

Canavos, G.C. (1984), Applied probability and statistical methods, Little, Brown & Company, Boston

For Thesis / Dissertation:

Name of the researcher, (Year of submission), Name of University, Place e.g.

Dey, P.K. (1997), "Symbiosis of organizational re-engineering for effective implementation of projects" Doctoral thesis, Jadavpur University, Calcutta

17. Acknowledgements

The acknowledgments by the candidate shall follow the citation of literature, signed by him/her, with date.

THESIS FORMAT

1.1 Paper

1.1.1 Quality

The thesis shall be printed / xeroxed on white bond paper, whiteness 95% or above, weight 70 gram or more per square meter.

1.1.2 Size

The size of the paper shall be standard A 4; height 297 mm, width 210 mm.

1.1.3 Type, Setting, Text Processing and Printing

The text shall be printed with Portrait orientation employing laser-jet or Inkjet printer, the text having been processed using a standard text processor. The standard font shall be Times New Roman of 12 pts with 1.5 line spacing and Justified alignment.

1.1.4 Page Format

The Printed Sheets shall have the following written area and margins:

Top Margin 15 mm

Head Height 3 mm

Head Separation 12 mm

Bottom Margin 22 mm

Footer 3 mm

Foot Separation 10 mm

Text Height 245 mm

Text Width 160 mm

When header is not used the top margin shall be 30 mm. Left and Right margins

The candidates shall have the options of single- or double-sided printing.

- Single sided/odd number page (in double sided printing)

  Left Margin 30mm

  Right Margin 20 mm

- Double sided even numbered page

Left Margin 20mm

Right Margin 30mm

1.1.5 Pagination

Page numbering in the text of the thesis shall be Hindu Arabic numerals at the center of the footer. But when the candidate opts for header style the page number shall appear at the right and left top corner for the odd and even number pages, respectively.

Page number "1" for the first page of the Introduction chapter shall not appear in print, only the second page will bear the number "2".

The subsequent chapters shall begin on a fresh page (fresh odd number page in case of double-sided printing). When header style is chosen the first page of each chapter will not have the header and the page number shall be printed at the center of the footer.

Pagination for pages before the Introduction chapter shall be in lower case Roman numerals, e.g., "iv".

1.1.6 Header

When the header style is chosen, the header can have the Chapter number and Section number (e.g., Chapter 2, Section 3) on even numbered page headers and Chapter title or Section title on the odd numbered page header.

1.1.7 Footer

The Footer shall contain title, student name and page numbers in following format

Report Title *Student Name* *Page Number*

1.1.8 Paragraph format

Vertical space between paragraphs shall be about 2.5 line spacing. The first line of each paragraph should normally be indented by five characters or 12mm. A candidate may, however, choose not to indent if (s) he has provided sufficient paragraph separation.

A paragraph should normally comprise more than one line. A single line of a paragraph shall not be left at the top or bottom of a page (that is, no windows or orphans should be left). The word at the right end of the first line of a page or paragraph should, as far as possible, not be hyphenated.

1.2 Chapter and Section Format

1.2.1 Chapter

Each chapter shall begin on a fresh page (odd number page in case of double sided printing) with an additional top margin of about 75mm. Chapter number (in Hindu Arabic) and title shall be printed at the center of the line in 6mm font size (18pt) in bold face using both upper and lower case (all capitals or small capitals shall not be used). A vertical gap of about 25mm shall be left between the Chapter number and Chapter title lines and between chapter title line and the first paragraph.

1.2.2 Sections and Subsections

A chapter can be divided into Sections, Subsections and Sub-subsections so as to present different concepts separately. Sections and subsections can be numbered using decimal points, e.g. 2.2 for the second section in Chapter 2 and 2.3.4 for the fourth Subsection in third Section of Chapter 2. Chapters, Sections and Subsections shall be included in the contents with page numbers flushed to the right. Further subsections need not be numbered or included in the contents.

The Section and Subsection titles along with their numbers in 5 and 4mm (16 and 14 pt) fonts, respectively, in bold face shall be flushed to the left (not centered) with 15 mm space above and below these lines.

In further subdivisions character size of 3 and 3.5 with bold face, small caps, all caps and italics may be used for the titles flushed left or centered. These shall not feature in the contents.

1.2.3 Table / Figure Format

As far as possible tables and figures should be presented in portrait style. Small size table and figures (less than half of writing area of a page) should be incorporated within the text, while larger ones may be presented on separate pages. Table and figures shall be numbered chapter wise. For example, the fourth figure in chapter 5 will bear the number Figure 5.4 or Fig 5.4

Table number and title will be placed above the table while the figure number and caption will be located below the figure. Reference for Tables and Figures reproduced from elsewhere shall be cited in the last and separate line in the table and figure caption,

e.g. (after McGregor [12]).

2 Auxiliary Format

2.1 Binding

The evaluation copies of the thesis / dissertation / report may be spiral bound or soft bound. The final hard bound copies to be submitted after the viva-voce examination will be accepted during the submission of report with the Maroon colour binding.

Typographical guidelines for Project Report:

Following is the suggestive format for preparing the Project report. Actual report may differ slightly depending upon the nature of project. The project report may contain the following

a) The project report shall be computer typed (English-British) and printed on A4 size paper.

b) Text Font -Times New Roman (TNR), Size-12 point

c) Subsection heading TNR- 12 point bold normal

d) Section heading TNR- 12 capital bold

e) Chapter Name/ Topic Name – TNR- 14 Capital

f) All text should be justified. (Settings in the Paragraph)

g) The report must be typed with 1.5 spacing with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom.

h) The project report must be hardbound in maroon colour. The name of the candidate, diploma (department), year of submission, name of the institute shall be printed on the cover [Refer sample sheet (outer cover)]

i) The training report, the title page should be given first then the Certificate followed by the acknowledgment and then contents with page numbers.

Specimen 'A': Title Sheet

Title of the diploma programme: (examples)

Diploma in Civil Engineering (DCE), Diploma in Electrical Engineering (DEE), Diploma in Electronics Engineering (DElnE), Diploma in Mechanical Engineering (DME), Diploma in Chemical Engineering (DchE)Diploma in Textile Engineering (DTE)

Project Report Titled
(Title of the Report)

submitted in partial fulfillment of
the requirements of

Diploma in (branch)

by

(Name of the student)
(Registration number)

under the guidance of
(Name of the Supervisor)

(Name of the Department)

Veermata Jijabai Technological Institute

Mumbai 400 019

(Year of Submission)

Specimen `B' Declaration of the Candidate

Declaration of the Candidate

I declare that this written submission represents my ideas in my own words, where others' ideas or words have been included. I have adequately cited and referenced the original sources.

I also declare that I have adhered to all principles of academic honesty, integrity and have not misrepresented or fabricated or falsified any idea/ data/ fact/ source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Signature of the candidate :_____

Name of the candidate:_____

Registration Number: _____

Date:_____

Specimen 'C' Approval Sheet

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MATUNGA
MUMBAI-19

CERTIFICATE

This is to certify that (Name of the Student), a student of (name of the Programme), has completed the Project report entitled "(Title of the project)" to our satisfaction.

The project report submitted by (Name of the student) is approved for the Diploma in (branch) Engineering (short form of branch).

(Name & Signature)
Supervisor

(Name & Signature)
External Examiner

(Name & Signature)
Co- Supervisor

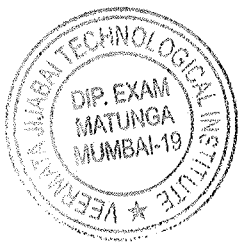
(Name & Signature)
Head, Name of Department

Date:_____

Place:_____

I. ASSESSMENTS METHODOLOGIES /TOOLS

1. Formative assessment (Assessment for Learning)



B. Suggestive RUBRICS for assessment

Academic year: 20___-20___

Title of the Project: _____

Marks: Max 100, Min 40

Based on the following criteria

Sr No	Criteria	Marks 100
1	Selection of Topic	10
2	Literature review and data collection	25
3	Quality of preparation during the Project period	15
4	Time Management	15
5	Innovativeness of the Topic	10
6	Stages of development of the action plan	25
5	Seminar Presentation report	10

Name of Supervisor : _____

Signature of Supervisor : _____

B. Suggestive RUBRICS for summative assessment

Academic year : 20___-20___

Title of the Project: _____

Marks : Max 100, Min 40

Based on the following

The summative assessment of the students shall be based on the Presentation of the Project at the End of the Term in the form of Powerpoint presentation, Project report and Assessment by the External Examiner. Out of the Total 100 marks 50 marks shall be allotted by the Supervisor and 50 marks will be awarded by the External Examiner on the basis of the following criteria. The total marks of 20 shown in the column below shall be equally divided between the Supervisor and the External Examiner.

Sr No	Criteria	Marks 100
1	Quality of information/Knowledge/Creativity/Innovation presented in the Project Work.	20
2	Type of the project (Industrial / Practically implemented / Study etc.)	20
3	Response to the question during the presentation	20
4	Response to the question during seminar presentation	20
5	Quality / Timely submission of the Final Project report	20

Name of Supervisor: _____ Name of External Examiner: _____

Signature of Supervisor: _____ Signature of External Examiner: _____

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

Diploma in Civil Engineering

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

BOS APPROVED 23/05/2025
VI DCE R23, VJTI

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE, MATUNGA, MUMBAI 400 019

Mechanical Engineering Department

MANUSCRIPT RECORD (May 2026)

Sr.No.	DATE	CLASS	SUBJECT	Name of the faculty	No. of Sets received	Date
1	04.05.2026	IV DME	Manufacturing Processes II (234 ME-42)	S S TAYADE	2	23.04.2026
2	04.05.2026	IV DME	Manufacturing Processes II 174 ME-44)	R.O. Bhagawat	2	28.04.2026
3	05.05.2026	II DME	Mathematics II (234 MA-21)	Gaurav Sawant / Shruti P./ Ayushi / Sneha	3	27.04.2026
4	18.05.2026	II DME	Mathematics II (174 MA-21b)	Gaurav Sawant / Shruti P./ Ayushi / Sneha	2	27.04.2026
5	05.05.2026	VI DME	Machine Design (234 ME-61)	Yogesh Ingle	2	28.04.2026
6	05.05.2026	VI DME	Machine Design (174 ME-61)	Yogesh Ingle	2	28/4/2026
7	06.05.2026	IV DME	Thermodynamics & Heat Transfer (234 ME-41)	Dinesh Pol	1	30.04.2026
8	06.05.2026	IV DME	Thermodynamics & Heat Transfer (174 ME-43)	Dinesh Pol	1	30.04.2026
9	07.05.2026	II DME	Chemistry (234 CH-22)	N.N. Wankhede	3	04.05.2026
10	07.05.2026	VI DME	Industrial Management(234 ME-63)	R.O. Bhagawat	3	28.04.2026
11	07.05.2026	VI DME	Industrial Management(234 ME-63)	R.O. Bhagawat	3	28.04.2026
12	08.05.2026	IV DME	Fluid Power & Mechanics (234 ME-43)	A K Gawde	3	28.04.2026
13	08.05.2026	IV DME	Fluid Mechanics & Machinery (174 ME-45)	A K Gawde	2	28.04.2026
14	11.05.2026	II DME	Basics of Electrical & Electronics Engineering (234 EE-25)	Sanjivani Gaikwad	3	29.4.2026
15	20.05.2026	II DME	Engineering Mechanicss (174 SE-25)	Mada Saraswathi	1	07.05.2026
16	11.05.2026	VI DME	Refrigeration and Air Conditioning (234 ME-62)	V.B. Wagh	3	06.05.2026
17	11.05.2026	VI DME	Refrigeration and Air Conditioning (174 ME-62)	V.B. Wagh	2	06.05.2026
18	12.05.2026	IV DME	Mechanical Measurement (234 ME-44)	S S TAYADE	3	23.04.2026
19	12.05.2026	IV DME	Measurement & Control (174 ME-42)	S S TAYADE	2	23.04.2026
20	13.05.2026	II DME	Engineering Grahpics (234 ME-24)	Jagruti D	3	30.04.2026
21	13.05.2026	VI DME	Automobile Engg. (234 ME 64E2)	V.M. Barethiye	2	12.05.2026
22	13.05.2026	VI DME	Power Plant Engg ((234 ME 64E5)	V.N. Palaskar	3	29.04.2026
23	13.05.2026	VI DME	Power Plant Engg ((174 MEE7)	V.N. Palaskar	3	29.04.2026
24	14.05.2026	IV DME	Computer Aided Production Drawing (234 ME-45)	V.B. Wagh	1	06.05.2026
25	14.05.2026	IV DME	Mathematics II (174 MA-21b)	S Agrawal	2	27.04.2026
26	15.05.2026	II DME	Mechanics of Solids I (234 ME-23)	R.S. Kadge	3	08.05.2026
27	15.05.2026	II DME	Engineering Drawing II (174 ME-26)	Jagruti D	2	06.05.2026