ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

Civil Engineering

SEMESTER VI

Sr. . No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total	
1.	PCC	**23CV601T**	Steel Structures	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	**3**
2.	PCC	**23CV601P**	Steel Structures Lab	**-**	**-**	**4**	**2**	**-**	**50**	**50**	**100**	**-**
3.	PCC	**23CV602P**	Building Design & Drawing Lab	**-**	**-**	**4**	**2**	**-**	**50**	**50**	**100**	**-**
4.	PEC	**23CV603T**	Program Elective - I	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	**3**
5.	PEC	**23CV603P**	Program Elective – I Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**-**
6.	PEC	**23CV604T**	Program Elective - II	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	**3**
7.	AEC	**23AS601T**	Economics & Management	**2**	**-**	**-**	**2**	**7.5**	**7.5**	**35**	**50**	**1.5**
8.	OE	**23CV661O**	Open Elective- III	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	**3**
9.	ELC	**23CV605P**	Project - I	**-**	**-**	**4**	**2**	**-**	**50**	**50**	**100**	**-**
10.	SEC	**23CV641P**	Career Development - VI	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**-**
11.	MDM	**23CV631M**	Multidisciplinary Minor - IV	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	**3**
Total				**17**	**-**	**16**	**25**	**82.5**	**307.5**	**560**	**950**	**-**

Program Elective - I		Program Elective – I Lab		Program Elective - II		Open Elective - III	
23CV603T(i)	Advanced Reinforced Cement Concrete Structures	**23CV603P(i)**	Advanced Reinforced Cement Concrete Structures Lab	**23CV604T(i)**	Advanced Structural Analysis	**23CV661O**	Transportation Systems
23CV603T(ii)	Advanced Surveying	**23CV603P(ii)**	Advanced Surveying Lab	**23CV604T(ii)**	Air Pollution & Control	**Multidisciplinary Minor - IV**	
				23CV604T(iii)	Foundation Engineering	**23CV631M**	Introduction to Hydraulic Structures
				23CV604T(iv)	Railway Airport Docks and Harbors Engineering		

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23CV601T	Steel Structures	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
1. To understand properties of structural steel. 2. To analyze and design structural steel sections subjected to various loads. 3. To understand plastic analysis of continuous beams and portal frames.	At the end of the course, students will be able to: 1. Interpret the recommendation of IS codes pertaining to structural steel and design of fasteners. 2. Design of Moment resistant connection and axially loaded members. 3. To design laterally restrained & unrestrained beams and design of welded plate girder. 4.To analyze and design column sections and bases 5. Summarize plastic design approach.

Unit I	**[9 Hrs]**
Steel as a structural material, various grades of structural steel. Introduction to IS 800:2007,808,816,875 etc. Structural Fasteners: Design of bolted and welded connections	
Unit II	**[9 Hrs]**
Design of Moment resistant bolted and welded connection. Beam to beam, beam to column: framed connection. Design of axially loaded members.	
Unit III	**[9 Hrs]**
Design of simple and built-up beams, laterally restrained and unrestrained (symmetrical section). Design of welded plate girder, Curtailment of flange plates.	
Unit IV	**[9 Hrs]**
Design of single rolled steel section column subjected to axial load and biaxial moment including column base design. Design of axially loaded built up columns, laced and battened.	
Unit V	**[9 Hrs]**
Introduction to plastic analysis - Theorems of plastic Analysis - Design of continuous beams and portal frames using plastic design approach.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Design of Steel Structures (By Limit State Method as per IS: 800-2007)	S.S.Bhavikatti	2nd	IK Books
2	Design of steel structures (By Limit State Method as per IS: 800-2007)	N. Subramanian	2nd	Oxford University Press
3	Limit State Design of Steel Structures	S. K. Duggal	1st	Tata Mc Graw Hill Publication

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Design of steel structures	Willam T Segui	**3rd**	CENGAGE Learning
2	Design of Steel of Structures	Ramchandra .S. Virendra Ghelot	2nd	Scientific Publishers

		July 2025	**NEP 1.0**	**Applicable for 2025-26**
Chairman - BoS	**Dean – Academics**	**Date of Release**	**Version**	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CV601P	Steel Structures Lab	-	-	4	2	25	25	50

Course Objectives	Course Outcomes
1. To familiarize students with the behavior of steel structural members such as tension members, compression members, beams, and connections through experimental investigation. 2. To provide hands-on experience in conducting standard tests on steel materials and structural components, including tensile, compression, bending, and bolted/welded connection tests. 3. To develop the ability to apply relevant IS codes (e.g., IS 800-2007) in interpreting test results and evaluating structural performance. -	At the end of the course, students will be able to- 1. Design the axially loaded members. 2. Design the roof Trusses. 3. Design the laterally restrained & unrestrained beams. 4. Design the column sections and bases. 5. Design the welded Plate Girders.

Minimum four design assignments based on topics along with the detailed structural drawings on A2 size sheets.

Expt. No.	Title of the experiment
1	Tension member and compression member.
2	Roof truss, Load assessment for DL, LL and WL.
3	Built up column.
4	Beam.
5	Welded Plate Girder.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Design of Steel Structures (By Limit State Method as per IS: 800-2007)	S.S.Bhavikatti	2nd	IK Books
2	Design of steel structures (By Limit State Method as per IS: 800-2007)	N. Subramanian	2nd	Oxford University Press
3	Limit State Design of Steel Structures	S. K. Duggal	1st	Tata Mc Graw Hill Publication

References

IS: 800 – 2007 (LSM) and IS:875 (I, II, III)

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CV602P	Building Design & Drawing Lab	-	-	4	2	50	50	100

Course Objectives	Course Outcomes
To develop skills in using CAD software to produce technical drawings, understand and apply building codes and bylaws, and design functional building layouts for residential and public buildings.	At the end of the course, students will be able to- 1. Explain building bye – laws as per National Building Codes. 2. Plan and Design buildings as per the principles of planning. 3. Create & explain submission and working drawings drafted using AutoCAD. 4. Design & Set – Out layout in the field as per the drawing. Visualize & develop a perspective view of a single story building.

Expt. No.	Title of the experiment
1	Submission drawing of single storied residential building – Load Bearing Structure (Manually drafted)
2	Submission drawing of single storied residential building – Framed Structure (Manually drafted)
3	AutoCAD Sketches – minimum 5 – Building Components
4	Submission drawing of single storied residential building – Framed Structure (AutoCAD)
5	Working drawing of single storied residential building – Framed Structure (AutoCAD)
6	A Line plan of a public building on a graph sheet (A1 size).
7	Submission drawing of two storied residential building framed structure including all details and statements as per the local byelaws (AutoCAD)
8	One compulsory field exercise on layout of building
9	Understanding professional architectural drawing
10	Two-point perspective of the single storied Residential building neglecting small building elements.

Text Books

S.N	Title	Authors	Edition	Publisher
1	National Building Code	BIS	2016	Bureau of Indian Standard
2	IS 962	BIS	1989	Bureau of Indian Standard
3	Building Planning	Shah, Kale & Patki	2017	McGraw Hill Education
4	Development Control Regulations	NIT	2020	NIT

		July 2025	NEP 1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CV603T(i)	PE - I Advanced Reinforced Concrete Structures	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
1. Design interior panel of flat slab 2. To identify and design the slender column 3. To design combined footing - Rectangular and Raft 4. To design Water tank resting on ground 5. To describe the prestressing materials and prestressing systems	At the of the course, students will be able to: 1. Design interior panel of flat slab 2. Design the slender column 3. Design the combined footing 4. Design water tank resting on ground 5. Describe the prestressing materials and prestressing systems

Unit I	**[9 Hrs]**
Design of interior panel of Flat slab using Direct Design Method: Limitations, Components,Total Design moment,Distribution of moments,Shear in Flat Slab,Check for shear as per IS456:2000 Detailing of reinforcement	
Unit II	**[9 Hrs]**
Design of Slender Columns: Identify slender columns,minimum eccentricity,Additional Moments,Bi-axial moments,Safety conditions as per IS456:2000	
Unit III	**[9 Hrs]**
Design of combined footing - Rectangular type and Raft: Need,Situation,Concept,Area of footing,design for bending moment,shear force,detailing of reinforcement	
Unit IV	**[9 Hrs]**
Design of circular water tank resting on ground: Components - roof slab/ roof dome,ring beam,wall,base slab - design using IS3370 : 2021 Detailing of Reinforcement	
Unit V	**[9 Hrs]**
Introduction to Prestressed Concrete Structures: Historic development – General principles of pre-stressing –pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel and their characteristics. Methods and Systems of Pre-stressing: Pre-tensioning and posttensioning methods	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Limit State Design of Reinforced Concrete (As per IS456:2000)	Dr.B.C.Punmia,Ashok Kumar Jain,Arun Kumar Jain	2nd	Laxmi Publications (P) Limited,New Delhi
2	Limit State Theory and Design of Reinforced Concrete.IS456:2000	Dr.V.L.Shah,Late Dr S.R.Karve	1st	Structures Publications,Pune
3	Advanced R.C.C.Design (R.C.C.Volume-II)	S.S.Bhavikatti	6th	New Age International (P) Limited,New Delhi
4	Prestressed Concrete Analysis and Design	Dr. Y.R.M. Rao, J.P. Annie & P. Easwary	3rd	S.K. Kataria & Sons

Indian Standard Codes of Practice

S.N	Title	Publisher
1	IS 456:2000 - Plain and Reinforced Concrete - Code of Practice	Bureau of Indian Standards,New Delhi
2	IS 3370(Part1):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part1General Requirements	Bureau of Indian Standards,New Delhi
3	IS 3370(Part2):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part2 -Plain and Reinforced Concrete	Bureau of Indian Standards,New Delhi
4	IS 3370(Part4/Sec3):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part4 -Design Tables - Section3 Circular Tanks	Bureau of Indian Standards,New Delhi
5	IS2950(Part I) - Code of Practice for Design and Construction of Raft Foundations - Part I :Design	Bureau of Indian Standards,New Delhi

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
23CV603P(i)	PE – I Advanced Reinforced Cement Concrete Structures Lab	-	-	2	1	CA	ESE	Total
						25	25	50

Course Objectives	Course Outcomes
To design various reinforced concrete structures as per Indian code of practice.	At the end of the course, students will be able to- 1. Design of interior panel of Flat slab. 2. Design Bi-axial Slender Columns as per IS 456:2000. 3. Design footings and water tanks using Indian standards. 4. Develop the reinforcement detailing in AutoCAD. 5. Differentiate about the Pre-tensioning and posttensioning methods.

Expt. No.	Title of the experiment
1	To design of interior panel of Flat slab using Direct Design Method.
2	To design Bi-axial Slender Columns as per IS 456:2000.
3	To design rectangular combined footing.
4	To design Raft footing.
5	To design of components of circular water tank resting on ground.
6	To study the methods and systems of Pre-stressing: Pre-tensioning and posttensioning.
7	To develop the reinforcement detailing for the experiments mentioned in 1 to 5 using AutoCAD.
8	Site visit and report writing on any one live construction of reinforced concrete structure.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Limit State Design of Reinforced Concrete (As per IS456:2000)	Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	2nd	Laxmi Publications (P) Limited, New Delhi
2	Limit State Theory and Design of Reinforced Concrete.IS456:2000	Dr. V. L. Shah, Late Dr S. R. Karve	1st	Structures Publications, Pune
3	Advanced R.C.C. Design (R.C.C. Volume-II)	S. S. Bhavikatti	6th	New Age International (P) Limited, New Delhi
4	Prestressed Concrete Analysis and Design	Dr. Y.R.M. Rao, J.P. Annie & P. Easwary	3rd	S.K. Kataria & Sons

References

IS456: 2000, IS3370: 2021 and IS: 875 (I, II, III)

		July 2025	NEP 1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23CV603T(ii)	PE - I Advanced Surveying	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
At the end of course, students will be able to: 1.Summarize the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing, photogrammetry, and global positioning systems. 2.develop technical skills and competence in data and information acquisition, extraction, management and analysis, spatial and statistical modelling, mapping and visualization. 3.increase awareness of GIS and modelling tools for improving competition and business potential. 4.develop applications of environmental remote sensing and GIS which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, forestry, food and water security, disaster management, etc.	At the end of course, students will be able to: 1. Acquire the knowledge of geodetic surveying. 2. Apply the concepts of photogrammetric surveying. 3. Develop the concepts of total station. 4. Explain the utility of GIS and GPS in given civil engineering problems. 5. Describe the relevant system of remote sensing to be used for a given situation.

Unit I	**[9 Hrs]**
Triangulation: Classification of Triangulation System and its Figures, Intervisibility and Height of Stations, Satellite station and Reduction to Centre **Survey Adjustments**: Kinds of errors, Laws of accidental errors, Laws of weights, Normal equations, Determination of most probable values	
Unit II	**[9 Hrs]**
Photogrammetric Surveying: Introduction, Basic principles and Definitions, Photo-Theodolite, Determination of focal length of the lens, Aerial Camera, Scale of a Vertical Photograph, Relief Displacement, Flight planning	
Unit III	**[9 Hrs]**
Total Station: Introduction, Advantages and Disadvantages, Types, Measuring angles, Fundamental Parameters, Precautions, Setting up, Construction Layout, Measurement of Horizontal and Vertical Angles, Measurement of Distances and Coordinates	
Unit IV	**[9 Hrs]**
Geographic Information System: Introduction, Definitions, Components, Work Flow, Fundamental Operations, Data Types, Data Models, Spatial Analysis, Applications **Global Positioning System**: Introduction, Overview, Segments, Satellite ranging, Time calculation, Position calculation, Current GPS satellite constellation, Errors and their corrections, Applications	
Unit V	**[9 Hrs]**
Remote Sensing: Concept, Principles, Components, Types (Active and Passive), Characteristics of Electromagnetic Radiation, Observation Platforms, Systems, Satellite Orbital Characteristics, Data Reception, Transmission and Processing, Digital Image Processing, Sensors, Applications	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Surveying Vol. II	Dr. B.C. Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain	Sixteenth edition	Laxmi Publication- New Delhi
2	Surveying & Levelling PART 2	T.P. Kanetkar, S.V. Kulkarni	Twenty third edition	Pune Vidyarthi Griha Prakashan
3	Advanced Surveying- Total station, GIS and Remote Sensing	Satheesh Gopi. R. Sathikumar and N. Madhu	Second edition	Pearson Publication

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Higher Surveying	Chandra A.M.	Third edition	New Age International (P) Limited
2	Remote sensing and Geographical information system	Anji Reddy M	Second edition	B. S. Publications

		July 2025	NEP 1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CV603P(ii)	PE - I Advanced Surveying Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
At the end of course, students will be able to: 1.Summarize the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing, and global positioning systems. 2.develop technical skills and competence in data and information acquisition, extraction, management and analysis; spatial and statistical modelling; mapping and visualization. 3.To increase awareness of GIS and modelling tools for improving competition and business potential. 4.To develop applications of environmental remote sensing which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, forestry, food and water security, disaster management, etc.	At the end of course, students will be able to: 1. Demonstrate linear measurements of plotted points/objects by total station and GPS. 2. Demonstrate angular measurements of plotted points/objects by total station and GPS. 3. Understand the concepts of advanced surveying techniques.

Expt. No.	Title of the experiment
1	Measurement of horizontal and vertical angles using Total Station
2	Measurement of coordinates by Total Station
3	Determination of Area using Total Station
4	Determination of distance between points by Total Station
5	Location survey by Total Station
6	Determination of Area using DGPS.
7	Measurement of Latitude and Longitude using hand held GPS
8	Study of Remote Sensing

Text Books

S.N	Title	Authors	Edition	Publisher
1	Higher Surveying	Chandra A.M.	Third edition	New Age International (P) Limited

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						MSE	CA	ESE
23CV604T(iv)	PE - II Railway, Airport, Docks and Harbours Engineering	3	-	-	3	20	20	60

Course Objectives	
1. Introduce the students to Railway Engineering. 2. Summarize railway geometrics 3. Illustrate basics of airport engineering 4. Differentiate airport lighting, marking and navigational aids 5. Introduce harbours, their types and various docks.	At the of the course, students will be able to: 1. Summarize components of permanent way, their construction and maintenance. 2. Design the various geometric features of the permanent way 3. Design a layout of an airport keeping in view various aircraft characteristics 4. Design the runway, taxiway and will be able to understand airport marking, lighting and other navigational aids. 5. Understand harbours and docks with their navigation aids

Unit I	**[9 Hrs]**
Permanent Way: Classification of Rail way: lines and their track standards. Traction and Tractive Resistance, Hauling capacity and Tractive effort of locomotives, Different Types of tractions. Permanent Way: (Ideal permanent way), gauges, track section. Coning of wheels, Stresses in railway track, High speed track.	
Unit II	**[9 Hrs]**
Geometric design of permanent way: Rail types and functions, selection for rails, wear & defects, creeps of rails, long welded rails., sleepers-function, types, merits and demerits, sleeper density. Ballast cushion. Ballast section Gauge, Gradients speed, super elevation, cant deficiency, Negative super elevation, objectives of transition curves, grade compensations.	
Unit III	**[9 Hrs]**
Airport Engineering: Aircraft components and characteristics, Airport site election. modern aircrafts. **Airport obstructions**: Zoning Laws, Approach and turning Zone, clear zone, . (vertical) Clearance for Highway & Railway **Runway and taxiway design:** Wind rose, cross wind component, Runway Orientation and configuration. Basic runway length and correction, runway geometric design standards. Taxiway Layout and geometric design standards, Exit Taxiway.	
Unit IV	**[9 Hrs]**
Airport Navigational Aids: Airport layout and classification: Terminal Area, Aircraft parking, configuration and system. Aprons, Hangers, Helipads and Heliports, **Visual Aids:** AirPort marking and Lighting for runway, Taxiway and other areas. **Air traffic control:** Need, network, control aids, instrumental landing systems, Microwave loading system	
Unit V	**[9Hrs]**
Docks and Harbour systems: Components of docks and harbours, jetties, navigational aids	

Text Books

S.N	Title	Authors	Edition	Publisher
1	A text book of Railway Engineering	S.C.Saxena and S.P.Arora	-	Dhanpat Rai & Sons
2	Airport Planning and Design	S.K. Khanna, M.G.Arora	-	TATA McGraw Hill
3	Docks and Harbour Engineering	Oza and Oza		Charotar Publications

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Railway Track EngineeringEngineering	S.Mundray	-	Tata McGraw Hill
2	Planning and Design of Airport	Robort Hornjeff	-	McGraw Hill Publication

		July 2025	NEP 1.0	Applicable for 2025-26
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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23AS601T	Economics & Management	2	-	-	2	7.5	7.5	35	50

Course Objectives	Course Outcomes
At the end of course, students will be able to: The course examines how the economics, business and industrial management practices are related and how business decision is taken.	At the end of course, students will be able to: 1. Apply economic principles for business decisions by understanding production cost relationships 2. Assess impact of macroeconomics and government policies on business and economy. 3. Recognize key management, marketing, financial and HRM functions and their role in effective business decision-making

Unit I	**[10Hrs]**
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Types of Elasticity of demand, Concept of Production, Factors of Production, types of cost, cost curves,	
Unit II	**[10Hrs]**
Market Structures-Perfect competition, Monopoly, and Monopolistic competition, Functions of central bank, Inflation, Deflation, Recession, National income, GDP, GNP, Liberalization, Privatization and Globalization	
Unit III	**[10Hrs]**
Definition of management, functions of management, Functions of human resources Management, Marketing Management, Functions of Marketing Management. Methods of pricing, advertising and sales promotion. Financial Management, functions of financial management, Sources of finance.	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23CV661O	OE – III Transportation Systems	3			3	15	15	70	100

Course Objectives	Course Outcomes
1. To understand the need of Transportation system. 2. To know various Transportation systems. 3. To compare suitability of various Transportation systems.	At the end of the course, the students will be able to, 1.Classify and plan the highways systems, basic geometrics. 2.Explain railway systems with basic geometrics 3.Describe airports and their basic systems. 4.Explain docks and harbours and their basic systems 5.Discuss modern transportation systems.

Unit I	**[9 Hrs]**
Highway Systems: Principle of highway planning, road development in India, classification of road, Planning and Geometrics required for a good highway.	
Unit II	**[9 Hrs]**
Railway Systems: Railway components, geometrics, hauling capacity of a locomotive, stations and yards, signalling.	
Unit III	**[9 Hrs]**
Airport systems: Components of an airport, Runway length, Runway orientation, Runway and Taxiway marking and lighting, Instrumental Landing System;	
Unit IV	**[9 Hrs]**
Docks and Harbour systems: Components of docks and harbours, jetties, navigational aids	
Unit V	**[9 Hrs]**
Modern Systems: BRTS, Metro Systems, Intelligent Transportation Systems and Case studies of BRTS.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Highway Engineering	Khanna and Justo	-	Tata McGraw Hill
2	Railway Engineering	Saxena and Arora	-	Dhanpat Rai and Sons
3	Airport Engineering	Saxena and Saxena		McGraw Hill
4	Docks and Harbours	Oza and Oza		Charotar Publications

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CV605P	Project - I	-	-	4	2	50	50	100

Course Objectives	Course Outcomes
1. To introduce the types of projects and make the learner familiar with the project methodology. 2. To explain the process of literature review and enable students to write problem statements and set objectives to achieve solution of the problem. 3. To enable students to develop the skill of effective oral and writing communication, collaborative and team work.	**Student will be able to:** 1. Develop self-learning ability by searching and organizing information and literature related to project work. 2. Exhibit the skill to communicate effectively in both written and oral form. 3. Acquire collaborative skill and interpersonal relationship by working in a group.

Module 1 : Introduction to Project its Planning and management
- Introduction to types of academic projects
- Overview of project management principles
- Project scope, objectives and constraints
- Work break down structure
- Project scheduling

Module 2 : Literature Review
- Introduction to types of literature and their sources
- Literature management
- Methodology to Conduct a thorough literature review related to the chosen project area
- Identify existing solutions and research gaps
- Compiling findings of literature review

Module 3: Problem Definition and Objective Setting
- Clearly define the project problem and objectives
- Set measurable goals for the project

Module 4: Conceptual Design / Research area
- Preliminary Design
- Generate initial design concepts
- Select the most viable design based on evaluation criteria

Module 5: Oral communication & Technical writing
- Effective oral presentation to convey findings of preliminary project work
- Writing initial part of project thesis

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Research Methodology: Methods and Techniques	Kothari C..R.	2nd Revised Edition, 2004	New Age International Pvt Ltd
2	Design and Analysis of Experiments	Douglas C. Montgomery	9th Edition , 2017	John Wiley & Sons

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Research Methodology: A Step-by-Step Guide for Beginners	Ranjit Kumar	5th Edition , 2022	SAGE Publications
2.	Statistics for Experimenters: Design, Innovation, and Discovery	Paul D. Berger	2nd Edition ,2016	CRC Press

		July 2025	NEP 1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

CIVIL ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CV641P	Career Development - VI	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
1. The sole objective of imparting aptitude training is to make students able to critically evaluate various real-life situations by resorting to an analysis of key issues and factors. 2. This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 3. To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.	At the end of the course students will be able to 1. Solve real life problems comparison of various probabilities, Permutation and combinations to ascertain the best outcomes expected 2. Draw conclusions or Understand geometrical terminology for angles, triangles, quadrilaterals and circles with the help of formulas. 3. Analyze and interpret different forms of data, including tables, graphs, charts, and more. 4. Analyze material (information) to order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions. 5. Analyses visual information and solve problems based on visual reasoning.

Unit I	**[5Hrs]**
Aptitude:- Permutation and Combinations:- Letter Arrangement, Number Arrangement, miscellaneous questions Probability:- Color balls, Dice Problems, coins Problems, Playing Cards Problem, Miscellaneous	
Unit II	**[3Hrs]**
Aptitude:- Mensuration: - 2-Dimension Problems, 3-Dimension Problems, Area, Volume, Surface Area, Total Surface Area. Geometry:- Lines, Circle, Triangles Etc.	
Unit III	**[3Hrs]**
Aptitude:- Data Interpretation:- Tabular DI Bar Graph Line graph Pie Chart	
Unit IV	**[2Hrs]**
Aptitude:- Logical Thinking (Syllogism) and Venn Diagram problem:- Some, No, All, Some Not, Very Few, Few, Possibility Problem	
Unit V	**[2Hrs]**
Aptitude:- Non Verbal Reasoning:- Mirror Images, Water Images, Paper Cutting, Paper Folding, Fig Embedded	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publication
3	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Aggarwal		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude for CAT by Arun Sharma	Arun Sharma		

		July 2025	NEP 1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CV631M	MDM - IV Introduction to Hydraulic Structures	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
At the end of the course, students will be able to: 1. To introduce basic principles of fluid mechanics relevant to hydraulic structures. 2. To familiarize students with types, functions, and applications of common hydraulic structures. 3. To develop understanding of hydraulic design considerations, stability, and safety aspects. 4. To enable students to analyze simple hydraulic systems used in water resources engineering. 5. • To prepare students for interdisciplinary project-based applications in civil and allied fields.	At the end of the course, students will be able to: 1. Summarize fundamentals of hydraulics and their relevance to hydraulic structures. 2. Identify and describe various hydraulic structures and their components 3. Analyze flow behavior, energy dissipation, and performance of simple hydraulic systems. 4. Apply basic design principles to small-scale hydraulic structures. 5. Demonstrate interdisciplinary application of hydraulic concepts in engineering problems.

Unit I **[9 Hrs]**

Introduction to Hydraulics

Basics of fluid properties and hydrostatics, Pressure measurement, forces on surfaces, Introduction to open channel flow, Types of hydraulic structures and their importance

Unit II **[9 Hrs]**

Dams and Spillways

Functions and classification of dams Components of dam structures, Spillways: purpose, types, and energy dissipation, Basic stability concepts

Unit III **[9 Hrs]**

Weirs, Barrages, and Canal Structures

Types of weirs and their applications, Barrages and canal head regulators, Canal falls, escapes, cross-drainage structures, Flow measurement devices

Unit IV **[9 Hrs]**

Hydraulic Gates and Energy Dissipation

Types of hydraulic gates and operations, Energy dissipation structures, Still basins and hydraulic jumps, Design considerations

Unit V **[9 Hrs]**

Coastal and River Training Structures

Introduction to coastal structures: breakwaters, groynes, seawalls, River training works: guide banks, revetments, Sediment transport basics, Sustainable water resources and hydraulic structures

Text Books

S.N	Title	Authors	Edition	Publisher
1	Irrigation Engineering and Hydraulic Structures	S. K. Garg	3rd	Khanna Publishers
2	Hydraulic Structures	P. Novak, A. I. B. Moffat, C. Nalluri, R. Narayanan	4th	CRC Press

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Hydraulic Structures	Novak et al.	3rd	Taylor & Francis
2	Hydraulic Structures **or** Hydraulic Structure and Hydrodynamics	Sheng-Hong Chen's	1st	Springer Berlin Heidelberg

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