

**COURSE STRUCTURE
FOR
DIPLOMA IN CIVIL ENGINEERING**



**BASED ON NEP-2020, CBCS AND OBE, EFFECTIVE
FROM 2026 - 2027**



**UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF CIVIL ENGINEERING**

INSTITUTE VISION:

To emerge as a leading technical training institution and serve the nation and engineering profession with distinction by developing the most skilled human resources with comprehensive and modern training and skill sets in selected engineering disciplines and trades.

INSTITUTE MISSION

- To administer a technical training institute of the highest standard of education and training commensurate with modern engineering practices.
- To offer technical diploma and certificate courses to cater to contemporary demand and relevance to the engineering industry.
- To adopt and implement a modern curriculum of technical education and training.
- To continuously upgrade the infrastructure for practical training with new and contemporary machines and methods.
- To arrange on-the-job training and internships for the students and staff members with proper supervision.
- To liaise with industry for internships, collaboration, and arranging periodic reviews of infrastructure and training methods, and modernizing teaching and training curriculum.
- To create a special program for the youth of the State of Jharkhand to help them acquire entrepreneurial and managerial skills, manufacturing capability, career advancement training, and professional confidence.

DEPARTMENT VISION

To evolve into a premier center of academic excellence that nurtures technically proficient and socially conscious civil engineering professionals. Our vision is to empower diploma students with a blend of modern construction competencies and foundational technical skill-sets, enabling them to design and execute resilient, sustainable infrastructure. By integrating rigorous practical training with Universal Human Values, we strive to develop a skilled

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workforce dedicated to serving the nation and the engineering profession with integrity, innovation, and distinction.

DEPARTMENT MISSION

M1: Core Technical Mastery: To provide a rigorous learning environment that bridges fundamental civil engineering principles with hands-on technical skills, ensuring proficiency in core construction and supervisory practices.

M2: Technological Integration: To empower students with contemporary digital design platforms, modern surveying instruments, and smart technologies crucial for the modern infrastructure landscape.

M3: Industry Alignment & Professional Readiness: To bridge the classroom-to-field gap through intensive laboratory weightage, industry internships, and a contemporary curriculum that reflects real-world project demands.

M4: Sustainable Nation Building: To foster a deep-rooted commitment to sustainable development, safety regulations, and building bye-laws, contributing effectively to eco-friendly and resilient infrastructure.

M5: Ethical Leadership & Enterprise: To cultivate an entrepreneurial mindset and managerial competence anchored in Universal Human Values, preparing mid-level professionals to lead teams ethically.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Technical Execution and Infrastructure Supervision: Equip diploma holders with the ability to apply foundational civil engineering concepts, mathematical tools, and technical skills to supervise, execute, and manage diverse infrastructure projects effectively while ensuring optimal resource utilization.

PEO 2: Operational Analysis and Technological Integration: Enable diploma degree holders to analyze field data and engineering challenges by integrating modern surveying



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instruments, digital design software (CAD/GIS), and computational tools to ensure precision in project planning and documentation.

PEO 3: Material Quality Assessment and Structural Evaluation: Train diploma engineers to evaluate the engineering properties of materials and structural components through rigorous laboratory testing and standardized quality control methodologies, ensuring strict compliance with public policy, safety codes, and specifications.

PEO 4: Sustainable Synthesis, Professional Ethics, and Lifelong Learning: Foster an entrepreneurial mindset where diploma degree holders synthesize sustainable engineering solutions that minimize environmental impact, uphold Universal Human Values (UHV) and professional ethics, and demonstrate a commitment to lifelong learning within multidisciplinary teams.

PROGRAMME OUTCOMES (POs)

PO 1: Basic and Discipline-Specific Knowledge: Apply knowledge of basic mathematics, science, and engineering fundamentals and engineering specialization to solve well-defined civil engineering problems.

PO 2: Problem Analysis: Identify and analyze well-defined civil engineering problems using codified standard methods.

PO 3: Design/Development of Solutions: Design/develop solutions for well-defined technical problems and assist with the design of system components or processes to meet specified needs.

PO 4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate techniques to conduct standard tests and measurements.

PO 5: Engineering Practices for Society, Sustainability, and Environment: Demonstrate knowledge of the societal, health, safety, environment and ethical practices.

PO 6: Project Management: Use engineering management principles individually, as a team member, or as a leader to manage projects and effectively communicate about well-defined engineering activities

PO 7: Life-long Learning: Recognize the need for, and have the preparation to engage in, independent and life-long learning in the context of technological changes.

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PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1: Technical Execution and Field Supervision: Plan, analyze, design, execute, supervise, and manage on-site activities, and ensure quality control of infrastructural projects and their components in various areas of Civil Engineering, including Structural, Geotechnical, Water Resources, Environmental, and Transportation Engineering.

PSO 2: Technical Documentation and Code Compliance: Prepare engineering drawings, detailed estimates, tender contracts, and material test reports using digital tools. Implement the provisions made in Indian Standard Codes/ other relevant codes/ specifications/ guidelines and applicable laws, including environmental laws.

PSO 3: Sustainability, Entrepreneurship, and Career Growth: Apply modern sustainable construction practices and green building concepts, while developing entrepreneurship skills, professional ethics, and readiness for higher studies and lifelong learning.

Bhaskar *Fa* *Rajans* *Rekha Kumari* *Shilpi* *Shruti* *Rahul* *Joy* *Sojal Sarker* *Koushik* *19/06/2016* *Sourav* *Ratna* *Shouvik Das*

**Birla Institute of Technology, Mesra,
Ranchi**

(UNIVERSITY POLYTECHNIC)

Course Structure for Diploma in Engineering ALL

Based on NEP-2020, CBCS and OBE, Effective from 2026-
2027

Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits			Total Credits	
					L (Period s/ Week)	T (Period s/ Week)	P (Period s/ Week)		
					THEORY				
I.1	FIRST	BS	DBS26101	MATHEMATICS -I	3	0	0	3	
I.2			DBS26103	PHYSICS – I	3	0	0	3	
I.3			DBS26105	CHEMISTRY – I	3	0	0	3	
I.4		HS	DHS26101	COMMUNICATION SKILLS	2	0	0	2	
I.5		ES	DES26101	INTRODUCTION TO COMPUTING AND PROGRAMMING	3	0	0	3	
					LABORATORIES				
I.6		BS	DBS26102	PHYSICS LAB – I	0	0	2	1	
I.7			DBS26104	CHEMISTRY LAB - I	0	0	2	1	
I.8		ES	DES26102	COMPUTING AND PROGRAMMING LAB	0	0	2	1	
I.9			DES26104	ENGINEERING GRAPHICS	0	0	3	1.5	
I.10	M	DHS26102/ DHS26104	SPORTS AND YOGA/ NSS	0	0	2	1		
TOTAL (Theory + Labs)								19.5	
					THEORY				
II.1	SECOND	BS	DBS26201	MATHEMATICS -II	3	0	0	3	
II.2			DBS26203	PHYSICS – II	3	0	0	3	
II.3			DBS26205	CHEMISTRY – II	3	0	0	3	
II.4		ES	DES26201	BASICS OF ELECTRICAL AND ELECTRONICS	3	0	0	3	
II.5			DES26203	FUNDAMENTALS OF ENGINEERING	3	0	0	3	
II.6		M	DHS26201	ENVIRONMENTAL SCIENCE (MANDATORY)	2	0	0	0	
					LABORATORIES				
II.7		BS	DBS26202	PHYSICS LAB – II	0	0	2	1	
II.8			DBS26204	CHEMISTRY LAB – II	0	0	2	1	
II.9		ES	DES26202	BASICS OF ELECTRICAL AND ELECTRONICS LAB	0	0	2	1	
II.10			DES26204	WORKSHOP PRACTICE	0	0	3	1.5	
II.11	M	DHS26202/ DHS26204	SPORTS AND YOGA/ NSS	0	0	2	1		
TOTAL (Theory + Labs)								20.5	
GRAND TOTAL FOR FIRST YEAR								40	

Approved for signatory Rekha Kumari *Head of Institute* Palanki *Prof* Sajal Sarker *Head of Dept* 19/07/2026. *Senior Lectr.* Shouvik Das

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Course Structure for Diploma in Engineering (Civil Engineering)

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Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits			Total Credits	
					L-Lecture; P-Practical	T-Tutorial;	P		
					L (Period s/ Week)	T (Period s/ Week)	P (Period s/ Week)		
					THEORY				
III.1	THIRD	PC	DCE26301	MECHANICS OF MATERIALS	3	0	0	3	
III.2			DCE26303	HYDRAULICS	3	0	0	3	
III.3			DCE26307	BUILDING MATERIALS AND CONSTRUCTION	2	0	0	2	
III.4		ES	DES26303	ENGINEERING MATHEMATICS	3	0	0	3	
III.5		PS	DPS26361	SURVEYING	3	0	0	3	
					LABORATORIES / SESSIONALS				
III.6		PC	DCE26302	MECHANICS OF MATERIALS LABORATORY	0	0	2	1	
III.7			DCE26304	HYDRAULICS LABORATORY	0	0	2	1	
III.8			DCE26308	CIVIL ENGINEERING DRAWING	0	0	3	1.5	
III.9		PS	DPS26362	SURVEYING LABORATORY	0	0	3	1.5	
III.10	M	DSI26302	SUMMER INTERNSHIP – I	0	0	0	2		
					TOTAL (Theory + Labs)			21	
					THEORY				
IV.1	FOURTH	PC	DCE26401	CONCRETE TECHNOLOGY	2	0	0	2	
IV.2			DCE26403	GEOTECHNICAL ENGINEERING	3	0	0	3	
IV.3			DCE26405	STRUCTURAL ANALYSIS	3	0	0	3	
IV.4			DCE26407	WATER RESOURCE ENGINEERING	2	0	0	2	
IV.5		PE	DPE26461/463	PROGRAM ELECTIVE – I	3	0	0	3	
IV.6		HS	DHS26401	UNIVERSAL HUMAN VALUE-II	3	0	0	3	
IV.7		M	DHS26403	ESSENCE OF INDIAN KNOWLEDGE SYSTEM	2	0	0	0	
					LABORATORIES / SESSIONALS				
IV.8		PC	DCE26402	CONCRETE TECHNOLOGY LABORATORY	0	0	2	1	
IV.9			DCE26404	GEOTECHNICAL ENGINEERING LABORATORY	0	0	2	1	
IV.10	PE	DPE26462/464	PROGRAM ELECTIVE LAB- I	0	0	2	1		
					TOTAL (Theory + Labs)			19	
					GRAND TOTAL FOR SECOND YEAR			40	

Signature of Prof. Dr. Rakesh Kumar, Prof. Dr. Rajendra Kumar, Prof. Dr. Sohal Sarkar, Prof. Dr. Souvik Das, Prof. Dr. Souvik Das, Prof. Dr. Souvik Das

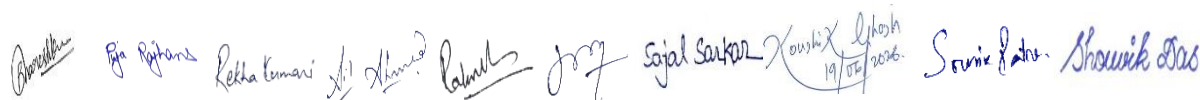
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Course Structure for Diploma in Engineering (Civil Engineering)

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Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits			Total Credits	
					L (Period s/ Week)	T (Period s/ Week)	P (Period s/ Week)		
					THEORY				
V.1	FIFTH	PC	DCE26501	DESIGN OF RCC STRUCTURES	3	0	0	3	
V.2		PE	DPE26561/563/565	PROGRAM ELECTIVE – II	3	0	0	3	
V.3			DPE26567/569/5611	PROGRAM ELECTIVE – III	3	0	0	3	
V.4		OE	DOE26561/563	OPEN ELECTIVE – I	3	0	0	3	
					LABORATORIES / SESSIONALS				
V.5		PC	DCE26502	RCC DESIGN LABORATORY	0	0	2	1	
V.6		PC	DCE26504	WATER RESOURCE ENGINEERING LABORATORY	0	0	2	1	
V.7		PR	DPR26562	MAJOR PROJECT – I	0	0	4	2	
V.8	SI	DSI26502	SUMMER INTERNSHIP – II	0	0	0	3		
TOTAL (Theory + Labs)								19	
					THEORY				
VI.1	SIXTH	PC	DCE26601	ENVIRONMENTAL AND PUBLIC HEALTH ENGINEERING	3	0	0	3	
VI.2		OE	DOE26661/663	OPEN ELECTIVE – II	3	0	0	3	
VI.3			DOE26665/667	OPEN ELECTIVE – III	3	0	0	3	
VI.4		HS	DHS26601	ENTREPRENEURSHIP AND STARTUPS	3	1	0	4	
VI.5		M	DHS26603	INDIAN CONSTITUTION	2	0	0	0	
					LABORATORIES				
VI.6		PC	DCE26602	ENVIRONMENTAL AND PUBLIC HEALTH ENGINEERING LABORATORY	0	0	2	1	
VI.7			DCE26604	ESTIMATING AND COSTING IN CIVIL ENGINEERING	0	0	2	1	
VI.8		PR	DPR26662	MAJOR PROJECT – II	0	0	8	4	
VI.9		M	DSM26662	SEMINAR	0	0	2	1	
VI.10	M	DSM26664	COMPREHENSIVE VIVA	0	0	0	1		
TOTAL (Theory + Labs)								21	
GRAND TOTAL FOR THIRD YEAR								40	



ANNEXTURE I
PROGRAM ELECTIVES (PE)*

SEMESTER	CODE NO.	NAME OF THE PE COURSES	PREREQUISITE/ CO-REQUISITE COURSES WITH CODE	L	T	P	C
PE-I							
SEM-IV	THEORY:						
	DPE26461	TRANSPORTATION ENGINEERING	DCE26305 SURVEYING	3	0	0	3
	DPE26463	HIGHWAY AND TRAFFIC ENGINEERING	DCE26305 SURVEYING	3	0	0	3
	SESSIONAL:						
	DPE26462	TRANSPORTATION ENGINEERING LABORATORY	DPE26461 TRANSPORTATION ENGINEERING	0	0	2	1
DPE26464	HIGHWAY AND TRAFFIC ENGINEERING LABORATORY	DPE26463 HIGHWAY AND TRAFFIC ENGINEERING	0	0	2	1	
PE-II							
SEM- V	THEORY:						
	DPE26561	BUILDING SERVICES AND REPAIRING	DCE26307 BUILDING MATERIALS AND CONSTRUCTION, DCE26308 CIVIL ENGINEERING DRAWING	3	0	0	3
	DPE26563	BUILDING BYE-LAWS AND PLANNING	DCE26308 CIVIL ENGINEERING DRAWING	3	0	0	3
	DPE26565	MATERIALS HANDLING	DCE26307 BUILDING MATERIALS AND CONSTRUCTION, DCE26401 CONCRETE TECHNOLOGY	3	0	0	3
PE-III							
SEM-V	THEORY:						
	DPE26567	BASICS OF STEEL DESIGN	DCE26301 MECHANICS OF MATERIALS	3	0	0	3
	DPE26569	INDUSTRIAL AND LONG-SPAN STRUCTURES	DCE26301 MECHANICS OF MATERIALS	3	0	0	3
	DPE265611	PRESTRESSED CONCRETE	DCE26301 MECHANICS OF MATERIALS, DCE26501 DESIGN OF RCC STRUCTURES	3	0	0	3

OPEN ELECTIVES (OE)*

SEMESTER	CODE NO.	NAME OF THE OE COURSES	PREREQUISITES COURSES WITH CODE	L	T	P	C
OE-I							
FIFTH	DOE26561	RENEWAL ENERGY AND ENVIRONMENT	N/A	3	0	0	3
	DOE26563	PRINCIPLES OF GEOSPATIAL ENGINEERING	N/A	3	0	0	3
OE- II							
SIXTH	DOE26661	GROUND WATER ENGINEERING	N/A	3	0	0	3
	DOE26663	ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT	N/A	3	0	0	3
OE- III							
SIXTH	DOE26665	DISASTER MANAGEMENT	N/A	3	0	0	3
	DOE26667	SMART INFRASTRUCTURE AND SUSTAINABILITY	N/A	3	0	0	3
*OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS							

