ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

NAAC Accredited with 'A' Grade

PROGRAMME SCHEME & SYLLABI 2022 – 2023

B. TECH.(Civil Engineering)

- **About the department**

  Civil Engineering is one of the oldest disciplines that got consistently evolved right from the beginning of mankind. Civil Engineers play a vital role in National Development through innovation and planning various projects, analyzing, designing and maintaining infrastructure, essential for various other disciplines. Geotechnical Engineering, Structural Engineering, Water Resources Engineering, Irrigation Engineering, Environmental Engineering, Building Design and Construction Technology, Construction Management and Computer Applications are various spheres of Civil Engineering.

  The institute introduced B.E. in Civil Engineering, in 2018 with the intake capacity as 60. The first batch of B.E. Civil Engineering is now moving to its final year. Currently, the department has six teaching faculty members with sound academic background and average teaching experience of 14 years. Students' 360-degree development to become a successful Civil Engineering Professional is the objective of the department. To fulfill the objective, the department is committed to conduct technical sessions by Industry Experts, encourage students for internship, and sign MoUs with the industries for students' training and field projects. The department is planning to provide bridge courses for technical & soft skill development of students and providing membership of professional organizations for practical exposure, under Industry – Academia Connect Practice.

- **Vision**

  To develop disciplined Civil Engineers & Administrators meeting changing technological needs and providing solutions through professional engineering practice with relevant social concerns.

- **Mission**
  - To impart knowledge for holistic career as a Civil Engineer Professional.
  - To encourage entrepreneurship through research and consultancy related to Civil Engineering projects.
  - To inculcate persistent learning of constantly upgrading tools & technology.

- **Program education objectives**

The Graduates will be able to

PEO1: Plan, analyze, design, execute and maintain Civil Engineering structures using fundamentals of Mathematics and principles in Engineering subjects, with sustainable approach.

PEO2: Handle new construction materials, tools and software in Civil Engineering oriented works.

PEO3: Practice ethically in a team with effective communication skills and Life- long learning objective to broaden the knowledge.

- **Program outcomes**

Engineering graduates will be able to

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

- **Program specific outcomes**

The students will be able to

PSO1: Achieve proficiency in Civil Engineering fields providing state of art solution according to needs of the society through research and as per the guidelines of Indian Standard Codes.

PSO2: Manage Civil Engineering projects using latest techniques of construction management with optimization of resources and sustainable approach.

PSO3: Pursue higher education for detailed knowledge and evolve adaptability for Civil Engineering industry through continued self-learning approach.

ANNEXURE – I

Credit Structure for Undergraduate program in Civil Engineering

(B. Tech Civil Engineering)

Sr. No	Category	Credits	AICTE Norms
1	Humanities, Social Sciences & Management courses	15	15
2	Basic Science courses	24	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	18	24
4	Professional core courses	61	48
5	Professional Elective courses relevant to chosen specialization/branch	16	18
6	Open subjects – Electives from other technical and /or emerging subjects	12	18
7	Project work, seminar and internship in industry or elsewhere	20	15
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]	0	0
9	Comprehensive Courses [Industry Training and Skill Development, Capstone Course]	4	0
	TOTAL	170	163

** BoS specific

Option A – Credits of (Project – I + Project –II + One Semester Internship based project)

Option B – Credits of (Project – I + Project –II + Project – III + Institutional Internship)

Teaching Scheme for First Year (Semester I and II)
Bachelor of Technology

GROUP 1: SEMESTER I / GROUP 2: SEMESTER II

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	AS101T	Engineering Physics & Material Sciences	4	1	-	5	30	70	100
2	AS101P	Engineering Physics & Material Sciences Lab	-	-	2	1	25	25	50
3	AS102T	Applied Mathematics – I	3	1	-	4	30	70	100
4	AS103T	Engineering Practices-I (Electrical & Electronics)	4		-	4	30	70	100
5	AS103P	Engineering Practices-I Lab(Electrical & Electronics)	-	-	2	1	25	25	50
6	AS104T	Logic building with C	3	-		3	30	70	50
7	AS104P	Logic building with C Lab			2	1	25	25	50
8	AS105T	Communication Skills-I	2	-	-	2	15	35	50
9	AS105P	Communication Skills-I Lab			2	1	25	25	50
10	AS106P	Sports & Yoga			2	0			
11	AS107P	Skill development (Emerging technologies)			2	0			
Total			**16**	**2**	**12**	**22**	**235**	**415**	**650**

Induction Program - 3 weeks

Teaching Scheme for First Year (Semester I and II)
Bachelor of Technology
GROUP 1: SEMESTER II / GROUP 2: SEMESTER I

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	AS201T	Engineering Chemistry & Environmental Science	4	1	-	5	30	70	100
2	AS201P	Engineering Chemistry & Environmental Science Lab	-	-	2	1	25	25	50
3	AS202T	Applied Mathematics – II	3	1	-	4	30	70	100
4	AS203T	Engineering Practices-II (Civil & Mechanical)	4		-	4	30	70	100
5	AS203P	Engineering Practices-II Lab(Civil & Mechanical)	-	-	2	1	25	25	50
6	AS204T	Problem Solving with Python	3	-	-	3	30	70	100
7	AS204P	Problem Solving with Python Lab	-	-	2	1	25	25	50
8	AS205T	Essence of Indian Knowledge Tradition	2			0			
9	AS206T	Communication Skills-II	2	-	-	2	15	35	50
10	AS206P	Communication Skills-II Lab			2	1	25	25	50
11	AS207P	Tinkering & Model Lab			2	0			
Total			**18**	**2**	**10**	**22**	**235**	**415**	**650**

*** Induction Program – 3 weeks**

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

III Semester B. Tech. (Civil Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	AS301T	Applied Mathematics – III	3	1	-	4	30	70	100
2	CV301T	Solid Mechanics	3	1	-	4	30	70	100
3	CV301P	Solid Mechanics	-	-	2	1	25	25	50
4	CV302T	Building Construction & Materials	3	-	-	3	30	70	100
5	CV302P	Building Construction & Materials	-	-	2	1	25	25	50
6	CV303T	Environmental Engineering	3	-	-	3	30	70	100
7	CV303P	Environmental Engineering	-	-	2	1	25	25	50
8	CV304T	Geotechnical Engineering-I	3	-	-	3	30	70	100
9	CV304P	Geotechnical Engineering-I	-	-	2	1	25	25	50
10	AS302T	Constitution of India	2	-	-	-	25	25	50
11	CV305P	Sports, Yoga, &Career Development *	-	-	2	-	-	-	-
Total			**17**	**2**	**10**	**21**	**275**	**475**	**750**

*****Career Development (Interpersonal Skills, Aptitude, and Logical Thinking)

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

IV Semester B. Tech. (Civil Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CV401T	Structural Analysis	3	-	-	3	30	70	100
2	CV401P	Structural Analysis	-	-	2	1	25	25	50
3	CV402P	Building Design & Drawing	-	-	4	2	50	50	100
4	CV403T	Surveying & Geomatics	3	-	-	3	30	70	100
5	CV403P	Surveying & Geomatics	-	-	2	1	25	25	50
6	CV404T	Transportation Engineering	3	-	-	3	30	70	100
7	CV404P	Transportation Engineering	-	-	2	1	25	25	50
8	CV405T	Geotechnical Engineering-II	3	-	-	3	30	70	100
9	CV406T	Hydrology & Water Resources	3	-	-	3	30	70	100
10	H 102	Universal Human Values - 2	3	-	-	3	25	25	50
11	CV407P	Technical Skill Development**	-	-	2	1	-	50	50
12	CV408T	Career Development *	2	-	-	-	-	-	-
Total			**20**	**-**	**12**	**24**	**300**	**550**	**850**

*** Career Development (Interpersonal Skills, Aptitude, and Logical Thinking)**

**** Technical Skill Development – Desirable to have Industry skill enhancement**

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

V Semester B. Tech. (Civil Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CV501T	Fluid Mechanics - I	3	-	-	3	30	70	100
2	CV501T	Fluid Mechanics - I	-	-	2	1	25	25	50
3	CV502T	Reinforced Cement Concrete Structures	3	-	-	3	30	70	100
4	CV502P	Reinforced Cement Concrete Structures	-	-	2	1	25	25	50
5	CV503T	Professional Elective - I	3	-	-	3	30	70	100
6	CV503P	Professional Elective - I	-	-	2	1	25	25	50
7	H103/4T	Foundational Humanities Elective	2	-	-	-	-	-	-
8	CV504T	Open Elective - I	3	-	-	3	30	70	100
9	CV504P	Open Elective - I	-	-	2	1	25	25	50
10	AS501T	Economics and Management	4	-	-	4	15	35	50
11	AS502T	English for Engineers	2	-	-	2	25	25	50
12	CV505P	Technical Skill Development**	-	-	2	1	-	50	50
13	CV506P	Career Development *	-	-	4	-	-	-	-
Total			**20**	**-**	**14**	**23**	**260**	**490**	**750**

*** Career Development (Interpersonal Skills, Aptitude, and Logical Thinking)**

**** Technical Skill Development – Desirable to have Industry skill enhancement**

CV503	**Professional Elective - I**
CV503(i)	Advanced Structural Analysis
CV503(ii)	Computer Applications in Civil Engineering
CV503(iii)	Advanced Surveying

CV504	**Open Elective - I**
CV504(i)	Introduction to Transportation Engineering
CV504(ii)	Construction Techniques

	Foundational Humanities Elective
H-103	Development of Societies
H 104	Philosophy

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

VI Semester B. Tech. (Civil Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CV601T	Fluid Mechanics - II	3	-	-	3	30	70	100
2	CV601P	Fluid Mechanics - II	-	-	2	1	25	25	50
3	CV602T	Steel Structures	3	1	-	4	30	70	100
4	CV602P	Steel Structures	-	-	2	1	25	25	50
5	CV603T	Professional Elective - II	3	-	-	3	30	70	100
6	CV604T	Professional Elective - III	3	-	-	3	30	70	100
7	CV605T	Open Elective-II	3	1	-	4	30	70	100
8	CV606P	Project - I	-	-	4	2	50	50	100
9	CV607P	Career Development*	-	-	4	-	-	-	-
10	CV608P	Capstone Course – I **	-	-	2	1	25	25	50
Total			**15**	**2**	**14**	**22**	**275**	**475**	**750**

* Career Development (Interpersonal Skills and Aptitude)

** Capstone Course – I (Comprehensive knowledge gained in Civil Engineering)

CV603	**Professional Elective - II**
CV603(i)	Irrigation Engineering
CV603(ii)	Air Pollution & Control
CV603(iii)	Building Services

CV604	**Professional Elective - III**
CV604(i)	Repairs & Rehabilitation of Structures
CV604(ii)	Railway, Airport and Tunnels
CV604(iii)	Solid Waste Management

CV605	**Open Elective - II**
CV605(i)	Green Building and Vastu Concepts

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

VII Semester B. Tech. (Civil Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CV701T	Estimation & Costing	3	-	-	3	30	70	100
2	CV701P	Estimation & Costing	-	-	2	1	25	25	50
3	CV702T	Construction Management & Law	3	-	-	3	30	70	100
4	CV703T	Elective - IV	2	-	-	2	30	70	100
5	CV703P	Elective - IV Lab	-	-	2	1	25	25	50
6	CV704T	Elective - V	3	-	-	3	30	70	100
7	CV705T	Open Elective - III	4	-	-	4	30	70	100
8	CV706P	Project - II	-	-	8	4	50	50	100
9	CV707P	Summer / Winter Internship *	-	-	-	2	-	-	-
10	CV708P	Capstone Course – II **	-	-	2	1	25	25	50
Total			**15**	**-**	**14**	**24**	**275**	**475**	**750**

* Summer / Winter Internship (Evaluation of Four weeks Internship Completion till 6th Semester)

** Capstone Course – II (Comprehensive knowledge gained in Civil Engineering)

CV703	Elective - IV
CV703(i)	Advanced Concrete Structures
CV703(ii)	Traffic Engineering
CV703(iii)	Remote Sensing & GIS

CV704	Elective - V
CV704(i)	Ground Improvement
CV704(ii)	Pavement Design
CV704(iii)	Advanced Steel Structures

CV705	Open Elective - III
CV705(i)	Metro Systems and Engineering

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

VIII Semester B. Tech. (Civil Engineering)

Option A

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Assessment	Total
1	CV801P	Project based on one semester internship in Industry/Research Institute/ National Laboratories/ Incubation Center	-	-	-	12	200	200	400
Total			**-**	**-**	**-**	**12**	**200**	**200**	**400**

***End Semester Examination will consist of evaluation of Seminar and Project Report**

Option B is available to students only after recommendation of the concerned Head of the department. The project & internship should contribute towards career development plan of the student.

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Assessment	Total
1	CV802P	Institutional Internship	-	-	-	6	100	100	200
2	CV803P	Project – III	-	-	-	6	100	100	200
Total			**-**	**-**	**-**	**12**	**200**	**200**	**400**

Scheme of Examination of Bachelor of Technology (Civil Engineering)

Semester Pattern

B. Tech. (Honors in Infrastructure Development)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		Total
			L	T	P		Continual Assessment	End Sem Examination	
1	CVH401T	Construction Technology	4	-	-	4	30	70	100
2	CVH501T	Advanced Concrete Technology	4	-	-	4	30	70	100
3	CVH601T	Geotechnical Investigation for Construction Projects	4	-	-	4	30	70	100
4	CVH701T	Industrial Structures	4	-	-	4	30	70	100
5	CVH801T	Intelligent Transportation System	4	-	-	4	30	70	100
Total			**20**	**-**	**-**	**20**	**150**	**350**	**500**