



**SIR PADAMPAT SINGHANIA UNIVERSITY**

**UDAIPUR**

**School of Engineering**

**Department of Civil Engineering**

**Vision**

To establish an outstanding center of national and international reputation that brings out civil engineers with high technical competencies; to offer specialized courses dealing with the contemporary issues and cater to the societal needs; to promote consultancy and high-end research to meet the current and future challenges in the field of civil engineering.

**Mission**

To serve the society by imparting quality of education and skills to its students.

To prepare our students to be the technical, business and global leaders of tomorrow by inculcating technical, communication skills and teamwork.

To promote research and consultancy for industrial and societal needs.

To instill moral, ethical and professionalism values among the students.

**B. Tech. Degree Programme**

**Course Structure**

**(2021-2025)**

## Overview

Civil Engineering is one of the oldest engineering disciplines which is primarily responsible for the construction of society's infrastructure (e.g., buildings, roads, dams, canals, etc.). Civil engineers play a vital role in the progress and development of the modern society by designing, constructing, maintaining, and managing infrastructure. The civil engineer must acquire a specific set of skills and knowledge to fulfil its mandate to benefit the society. Civil engineers play a key role in planning, designing and supervising construction projects such as roads (Expressways, national and state highways), railway infrastructure, metro rail infrastructure, bridges (railways and highways), airports, dams, canals, tunnels, water supply, and wastewater systems.

## Programme Educational Objectives (PEO's)

PEO1 To make students proficient in the fundamentals of necessary mathematical tools, scientific basics, and fundamental knowledge in the context of Civil Engineering.

PEO2 To impart required skills to the students so that they can apply it in developing safe, sustainable, economical, and environmentally sound solutions to Civil Engineering problems.

PEO3 To enable students professionally in their careers through continued development of technical and management skills and assumption of roles and responsibility in professional service.

PEO4 To make the students eligible for employment as a practicing engineer in fields such as building planning, designing, managing, & quality testing of construction materials.

## Program Outcomes (PO's)

**PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: 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.

**PO3: 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.

**PO4: 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.

**PO5: 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.

**PO6: 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.

**PO7: 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.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: 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.

**PO11: 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.

**PO12: 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.

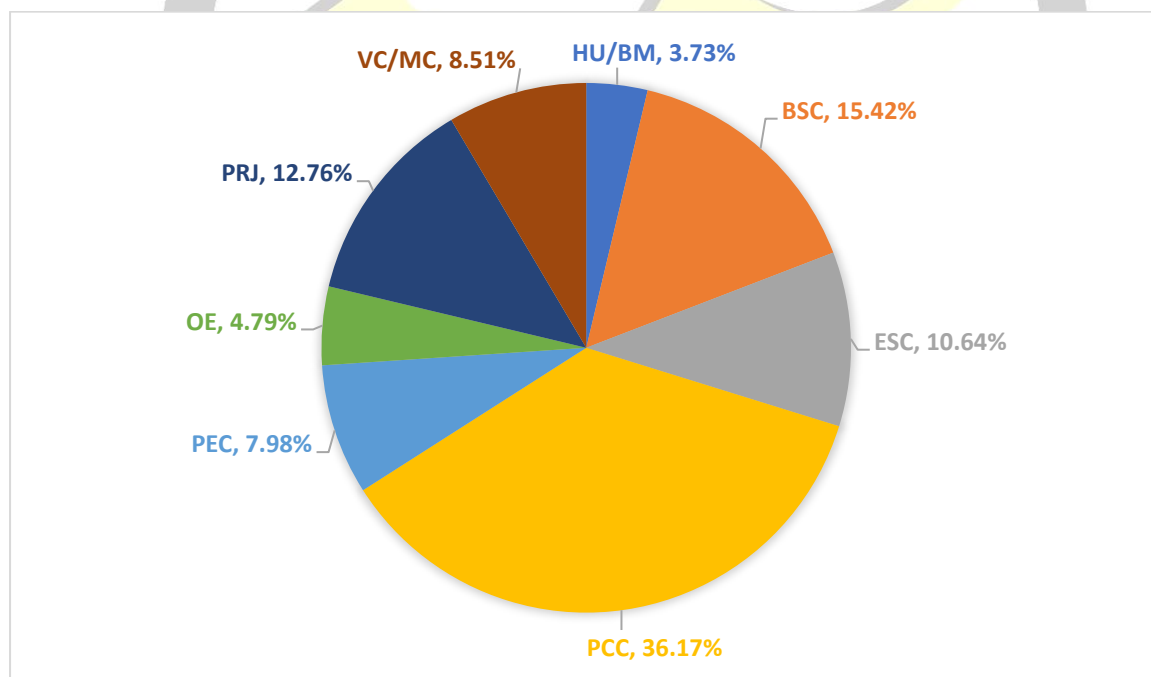
### **Program Specific Outcomes (PSO's)**

**PSO 1:** The ability to Identify, formulate, analyze, and design sustainable solutions to solve complex civil engineering problems by applying advanced tools, techniques, and software's to meet societal needs.

**PSO 2:** The ability to demonstrate knowledge of various engineering and management techniques for effective construction and management of infrastructure facilities.

## Credit Structure

Sr. No.	Category	Credits (%)
1	Humanities and Social Sciences including Management courses (HU/BM)	07 (3.73%)
2	Basic Science courses (BSC)	29 (15.42%)
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	20 (10.64%)
4	Professional core courses (PCC)	68 (36.17%)
5	Professional Elective courses relevant to chosen specialization/branch (PEC)	15 (7.98%)
6	Open subjects – Electives from other technical and /or emerging subjects (OE)	09 (4.79%)
7	Project work, seminar and internship in industry or elsewhere (PRJ)	24 (12.76%)
8	Mandatory Courses [Environmental Sciences, Induction training, Anandam etc.] (MC)/Value addition courses (VC)	16 (8.51%)
Total Credits		188



## Distribution of Total Credits & Contact Hours in all Semesters

S. No.	Semester	Credits/Semester	Contact hours/week (after assigning Term Work/Active learning component)
1	I	22	25
2	II	28	31/32
3	III	25	26
4	IV	23	22
5	V	26	25
6	VI	25	22
7	VII	27	16
8	VIII	12	-
<b>Total</b>		<b>188</b>	<b>-</b>

## Course Structure: B. Tech. 2021-2025

### Semester - I

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Hrs/Week
1	PH-100X	BSC	Physics-I*	3	0	1	0	4	14
	CH-1004		Chemistry-I	3	0	1	0	4	
	MA-1004		Mathematics-I	3	1	0	0	4	
2	ME-1201	ESC	Workshop Practice-I	0	0	1	0	1	2
3	CS-1201	ESC	C Programming	2	0	1	0	3	4
4	EC-1201	ESC	Introduction to IOT	0	0	1	0	1	2
5	HU-1011	HUMC	Professional and Business Communication	2	1	0	0	3	3
6	AM-2001	VC	Anandam – an exercise of trusteeship	-	-	-	2	2	-
<b>Total</b>								<b>22</b>	<b>25</b>

\*Options for Physics-I (Choose anyone)

PH-1003: Introduction to Electromagnetic Theory

PH-1004: Introduction to Mechanics

PH-1005: Oscillation, Waves and Optics

PH-1006: Quantum Mechanics for Engineers

PH-1007: Semiconductor Physics

## Semester - II

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Hrs/Week
1	BM-1114 BM-1115 BM-1116	HUMC	<b>(Options to choose any One)</b> 1) Business Ethics 2) Business Environment 3) Principles of Management	1	0	0	0	1	1
2	PH-100X CH-100X MA-100X	BSC	<b>(Option to Choose any Two)</b> 1) Physics-II* 2) Chemistry-II** 3) Advanced Mathematics***	3 3 3	0 0 1	1 1 0	0 0 0	4 4 4	9/10
3	BT-0001	BSC	Biology for Engineers	1	0	0	0	1	1
4	ME-1203	ESC	Engineering Drawing	0	0	2	1	3	4
5	CS-1202 EC-1202 ME-1202 CE-1101	ESC	<b>Engineering Science course:</b> Workshop Practice-II <b>(Options to choose any Two)</b> 1) Computer Workshop 2) Electronics and Electrical Engineering Workshop 3) Mechanical Engineering Workshop 4) Civil Engineering Workshop	0 0	0 0	1 1	0 0	1 1	4
6	EC-1203	ESC	Basics of Electrical and Electronics Engineering (BEEE)	3	0	1	0	4	5
7	CS-1203 CS-1204 CS-1205	ESC	Computational Fundamentals <b>(Options to choose any one)</b> 1) Scilab Programming 2) Advanced Excel Computing 3) Introduction to Python Programming	0	0	1	1	2	2
8	HU-1012 HU-1013	HUMC	<b>(Options to choose any One)</b> 1) Oral and Written Communication Skills 2) Public Speaking	0	3	0	0	3	3
9	CH-1002	BSC	Environmental Studies	2	0	0	0	2	2
10	AM-2002	VC	Anandam – an exercise of trusteeship	-	-	-	2	2	-
<b>Total</b>								<b>28</b>	<b>31/32</b>

\*Options for Physics-II (Subject List same as Sem I, exclude the subject chosen in Sem. I)

PH-1003: Introduction to Electromagnetic Theory

PH-1004: Introduction to Mechanics

PH-1005: Oscillation, Waves and Optics

PH-1006: Quantum Mechanics for Engineers

PH-1007: Semiconductor Physics

\*\*Options for Chemistry-II:

1. Chemistry-II (CH-1005)

2. Organic Chemistry for BT (CH-1006)

\*\*\*Options for Advanced Mathematics:

1. Mathematics-II (MA-1005)

2. Data analytics & Interpretation (MA-1006)



### Semester - III

S. No.	Category	Course Code	Course Title	L	T	P	S	Credit(s)	Contact Hours
1	BSC	MA-2010	Advanced Engineering Mathematics - I	3	1	0	0	4	4
2	ESC	CE-0201	Introduction to Civil Engineering	3	0	0	0	3	3
3	PCC	CE-1202	Strength of Materials	3	0	0	0	3	3
4	PCC	CE-1203	Strength of Materials Lab	0	0	1	0	1	2
5	PCC	CE-1204	Engineering Geology	3	0	0	0	3	3
6	PCC	CE-1205	Engineering Geology Lab	0	0	1	0	1	2
7	PCC	CE-1206	Fluid Mechanics	3	0	0	0	3	3
8	PCC	CE-1207	Fluid Mechanics Lab	0	0	1	0	1	2
9	PCC	CE-1208	Building Design & Drawing	2	0	0	1	3	2
10	PCC	CE-1209	Building Design & Drawing Lab	0	0	1	0	1	2
11	VC	AM-2003	Anandam-an exercise of trusteeship	-	-	-	2	2	-
Total Credits								25	
Total Contact hours/week								26	



### Semester - IV

S. No.	Category	Course Code	Course Title	L	T	P	S	Credits	Contact Hours
1	BSC	MA-2014	Advanced Engineering Mathematics - II	3	1	0	0	4	4
2	PCC	CE-3210	Surveying	3	0	0	0	3	3
3	PCC	CE-3211	Surveying Lab	0	0	1	0	1	2
4	PCC	CE-4212	Structural Analysis	3	0	0	1	4	3
5	PCC	CE-4213	Structural Analysis Lab	0	0	1	0	1	2
6	PCC	CE-3214	Building Materials & Construction Technology	3	0	0	1	4	3
7	PCC	CE-3215	Building Materials & Construction Technology Lab	0	0	1	0	1	2
8	PEC	CE-XXXX	Department Level Optional Course - I	3	0	0	0	3	3
9	VC	AM-2004	Anandam-an exercise of trusteeship	-	-	-	2	2	-
Total Credits								23	-
Total Contact hours/week							22		

## Semester - V

S. No.	Category	Course Code	Course Title	L	T	P	S	Credit(s)	Contact Hours
1	PCC	CE-2301	Theory of Reinforced Concrete Structures	3	1	0	1	5	4
2	PCC	CE-3302	Geotechnical Engineering	3	0	0	0	3	3
3	PCC	CE-3303	Geotechnical Engineering Lab	0	0	1	0	1	2
4	PCC	CE-2304	Applied Hydraulics	3	0	0	0	3	3
5	PCC	CE-2305	Applied Hydraulics Lab	0	0	1	0	1	2
6	PCC	CE-2306	Transportation Engineering	3	0	0	1	4	3
7	PCC	CE-2307	Transportation Engineering Lab	0	0	1	0	1	2
8	PEC	CE-XXXX	Department Level Optional Course - II	3	0	0	0	3	3
9	OEC	XX-XXXX	University Level Open Elective-I	3	0	0	0	3	3
10	VC	AM-2005	Anandam-an exercise of trusteeship	-	-	-	2	2	-
Total Credits								26	-
Total Contact hours/week								25	

## Semester - VI

S. No.	Category	Course Code	Course Title	L	T	P	S	Credit(s)	Contact Hours
1	PCC	CE-3308	Design and Drawing of Steel Structures	3	0	0	1	4	3
2	PCC	CE-3309	Design and Drawing of Steel Structures Lab	0	0	1	0	1	2
3	PCC	CE-2310	Environmental Engineering	3	0	0	0	3	3
4	PCC	CE-2311	Environmental Engineering Lab	0	0	1	0	1	2
5	PCC	CE-3312	Water Resource Engineering	3	1	0	0	4	4
6	ESC	CE-2313	Software Applications in Civil Engineering	0	0	1	0	1	2
7	PEC	CE-XXXX	Department Level Optional Course – III	3	0	0	0	3	3
8	PRJ	CE-4100	Minor Project	0	0	0	3	3	-
9	OEC	XX-XXXX	University Level Optional Course-II	3	0	0	0	3	3
10	VC	AM-2006	Anandam-an exercise of trusteeship	-	-	-	2	2	-
Total Credits								25	-
Total Contact hours/week								22	

## Semester - VII

S. No.	Category	Course Code	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	PCC	CE-3401	Quantity Survey Estimation and Valuation	3	1	0	0	4	4
2	PCC	CE-2402	Construction Engineering & Management	2	1	0	0	3	3
3	PEC	CE-XXXX	Departmental Level Optional Course – IV	3	0	0	0	3	3
4	PEC	CE-XXXX	Departmental Level Optional Course – V	3	0	0	0	3	3
5	OEC	XX-XXXX	University Level Optional Course – III	3	0	0	0	3	3
6	PRJ	CE-4200	Major Project	0	0	0	6	6	-
7	PRJ	CE-3300	Summer Internship	-	-	-	3	3	-
8	VC	AM-2007	Anandam-an exercise of trusteeship	-	-	-	2	2	-
Total Credits								27	-
Total Contact hours/week								16	

## Semester - VIII

S. No.	Category	Course Code	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	PRJ	CE-4300	Thesis/Industrial Training	-	-	0	12	12	-
Total Credits								12	-



### List of Department Level Optional Course(s) - I

S. No.	Course Code	Course Title	L	T	P	S	Credit(s)
1	CE-1021	Civil Engineering- Societal & Global Impact	3	0	0	0	3
2	CE-1022	Sustainability Concepts in Civil Engineering	3	0	0	0	3

#### List of Department Level Optional Course(s) - II

S. No.	Course Code	Course Title	L	T	P	S	Credit(s)
1	CE-1031	Supplementary Cementitious Materials	3	0	0	0	3
2	CE-1032	Green Building & Technologies	3	0	0	0	3

#### List of Department Level Optional Course(s) - III

S. No.	Course Code	Course Title	L	T	P	S	Credit(s)
1	CE-3033	Pavement Design	3	0	0	0	3
2	CE-3034	Bridge Engineering	3	0	0	0	3
3	CE-3035	Repair & Rehabilitation of Structures	3	0	0	0	3

#### List of Department Level Optional Course(s) - IV

S. No.	Course Code	Course Title	L	T	P	S	Credit(s)
1	CE-3041	Prestressed Concrete & Industrial Structures	3	0	0	0	3
2	CE-2042	Urban Transportation Planning	3	0	0	0	3
3	CE-3043	Solid Waste Management	3	0	0	0	3

**List of Department Level Optional Course(s) - V**

S. No.	Course Code	Course Title	L	T	P	S	Credit(s)
1	CE-3044	Contracts Management	3	0	0	0	3
2	CE-2045	Ground Improvement Techniques	3	0	0	0	3
3	CE-3046	Design of Foundations & Retaining Structures	3	0	0	0	3

**List of University Level Optional Course(s) – I**

S. No.	Course Code	Course Title	L	T	P	Credit(s)
1	HU-3011	Fun with Drama	3	0	0	3
2	HU-3012	Indian Writings in English	3	0	0	3
3	HU-3013	Language through Literature & Films	3	0	0	3
4	MA-3001	Mathematical Statistics	3	0	0	3
5	PH-3204	Chaos in Engineering Systems	3	0	0	3
6	BT-2351	Bioprocess Engineering	3	0	0	3
7	EC-2290	Battery Management Systems	3	0	0	3



8	EE-2290	Non-Conventional Energy Sources	3	0	0	3
9	EE-2291	Applications of Power Electronics In Renewable Energy	2	0	1	3
10	EE-2293	Advanced Electrical Machines	3	0	0	3
11	CS-3001	Simulation & Modelling	3	0	0	3
12	CS-3002	Text Analytics	3	0	0	3
13	ME-1204	Economics for Engineers	3	0	0	3
14	ME-1205	Technology & Society	3	0	0	3

### List of University Level Optional Course(s) – II

S. No.	Course Code	Course Title	L	T	P	Credit(s)
1	HU-3014	Intercultural Communication	3	0	0	3
2	HU-3015	Interview Skills	3	0	0	3
3	MA-3004	Modern Algebra	3	0	0	3
4	PH-3202	Nanomaterials	3	0	0	3
5	CS-3003	Management Information System	3	0	0	3
6	CS-3004	Cyber Security and Laws	3	0	0	3
7	EC-2291	Building IoT Applications	2	0	1	3
8	CE-3047	Disaster Management and Mitigation Measures	3	0	0	3
9	EE-2294	Energy Audit & Management	3	0	0	3
10	EE-2295	Distributed Generation & Microgrid	3	0	0	3
11	ME-3233	Solar Energy and Application	3	0	0	3
12	ME-3234	Project Management	3	0	0	3

**List of University Level Optional Course(s) – III**

S. No.	Course Code	Course Title	L	T	P	Credit(s)
1	HU-3016	Interpersonal Communication	3	0	0	3
2	HU-3017	Soft Skills	3	0	0	3
3	HU-2011	Professional Mannerisms and Grooming	3	0	0	3
4	MA-3002	Optimization Techniques	3	0	0	3
5	MA-3003	Graph Theory	3	0	0	3
6	MA-3005	Special Functions	3	0	0	3
7	BM-2203	Strategic Management	3	0	0	3
8	BM-2102	Basics of Financial Services	3	0	0	3
9	BM-2201	Business Planning & Entrepreneurial Management	3	0	0	3
10	CS-4001	Research Methodology	3	0	0	3
11	CS-4002	Digital Business Management	3	0	0	3
12	EC-2293	Robotics & Automation	2	0	1	3
13	CE-3048	Environmental Management	3	0	0	3
14	EE-2296	Testing of Electrical Equipment	3	0	0	3
15	EE-2297	Control System Components	3	0	0	3
16	ME-4203	Flexible Manufacturing System	3	0	0	3
17	ME-3235	Operation Research	3	0	0	3
18	BT-2351	Green Technology	3	0	0	3
19	PH-3101	Molecular Spectroscopy	3	0	0	3
20	CH-2101	Medicinal plants in drug discovery	3	0	0	3

### Value-Added Courses (Optional)

S. No.	Semester	Course Code	Course Title	L	T	P	S	Credit(s)
1	II	EP-2001	Project Endeavour	-	-	-	1	3
2	III	EP-2002	Project Endeavour	-	-	-	1	3
3	IV	EP-4001	Project Endeavour	-	-	-	2	3
4	V	EP-2003	Project Endeavour	-	-	-	1	3
5	VI	EP-4002	Project Endeavour	-	-	-	2	3
6	VII	EP-2004	Project Endeavour	-	-	-	1	3
7	VIII	EP-4003	Project Endeavour	-	-	-	2	3