



**Shirpur Education Society's**

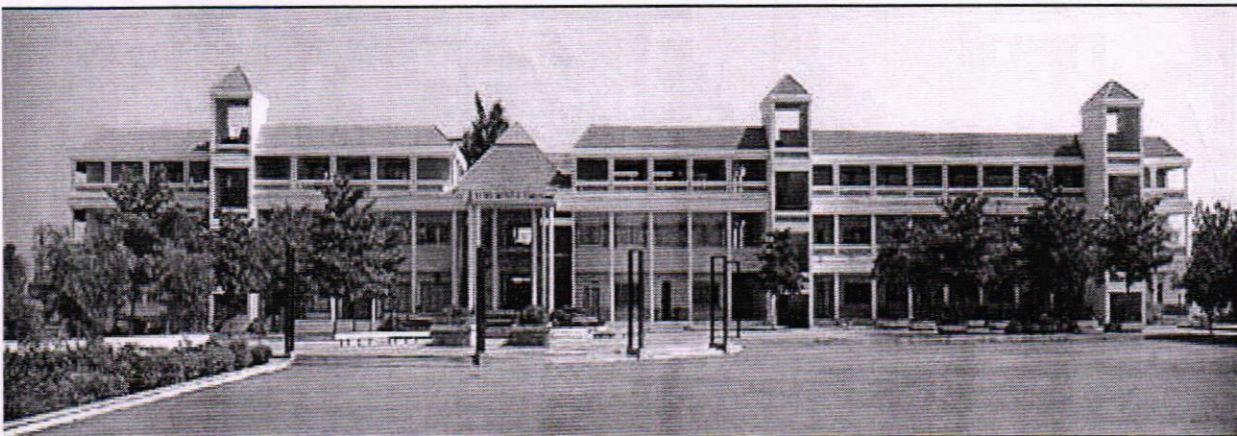
**R. C. Patel Institute of Technology, Shirpur**

**(An Autonomous Institute)**

**Honors Degree Programme In Civil Engineering**

**Second Year B. Tech**

**With effect from Year 2024-25 (Scheme-2023)**



**Shahada Road, Near Nimzari Naka Shirpur Maharashtra 425405 Ph:  
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**S. Y. B. Tech Civil Engineering - HONORS TRACK 1 - Structural Engineering (SEM-IV)**


Sr. No	Course Category	Course Code	Course Title	Teaching Scheme		Evaluation Scheme					Total [A + Average (B, C) + D]	Credit
				L	T	P	Continuous Assessment		ESE [D]			
							TA [A]	Term Test-1 [B]		Term Test-2 [C]		
1	H1	RCP23VCH1401	Advanced Concrete Technology	3	-	-	20	20	20	60	100	3
2	H1	RCP23VLH1401	Advanced Concrete Technology Lab	-	-	2	25	-	-	25	50	1
<b>Total</b>				<b>3</b>	<b>-</b>	<b>2</b>	<b>45</b>	<b>20</b>	<b>20</b>	<b>85</b>	<b>150</b>	<b>4</b>

**S. Y. B. Tech Civil Engineering - HONORS TRACK 2 - Environmental Engineering (SEM-IV)**


Sr. No	Course Category	Course Code	Course Title	Teaching Scheme		Evaluation Scheme					Total [A + Average (B, C) + D]	Credit
				L	T	P	Continuous Assessment		ESE [D]			
							TA [A]	Term Test-1 [B]		Term Test-2 [C]		
1	H2	RCP23VCH2401	Advanced Water and Waste Water Treatment	3	-	-	20	20	20	60	100	3
2	H2	RCP23VLH2401	Advanced Water and Waste Water Treatment Lab	-	-	2	25	-	-	25	50	1
<b>Total</b>				<b>3</b>	<b>-</b>	<b>2</b>	<b>45</b>	<b>20</b>	<b>20</b>	<b>85</b>	<b>150</b>	<b>4</b>

**S. Y. B. Tech Civil Engineering - HONORS TRACK 3 - Smart City & Construction Management (SEM-IV)**

Sr. No	Course Category	Course Code	Course Title	Teaching Scheme		Evaluation Scheme					Total [A + Average (B, C) + D]	Credit
				L	T	P	Continuous Assessment		ESE [D]			
							TA [A]	Term Test-1 [B]		Term Test-2 [C]		
1	H3	RCP23VCH3401	Smart Infrastructure	3	-	-	20	20	20	60	100	3
<b>Total</b>				<b>3</b>	<b>-</b>	<b>-</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>60</b>	<b>100</b>	<b>3</b>

Prepared by 

Dean Academic/Dy. Director 

Checked by 

C.O.E. 

BOS Chairman 

Director 







# Advanced Concrete Technology (RCP23VCH1401)

Teaching Scheme  
Lectures : 03 Hrs/week  
Tutorial: 00 Hr/week  
Credit : 03

Examination Scheme  
Term Test: 20 Marks  
Teacher Assessment: 20 Marks  
End Sem Exam: 60 Marks  
Total Marks: 100 Marks

**Pre-requisite – Concrete Technology**

## Course Objectives

1. To study advanced techniques in concrete production and testing.
2. To learn about the different types of special concretes and their applications.
3. To explore the durability aspects of concrete and its long-term performance.
4. To investigate the latest developments in concrete technology and their practical implications.

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Identify the properties and performance characteristics of concrete components.	2	Understand
CO2	Students will be able to understand the durability of concrete	3	Evaluate
CO3	Recognize the use and benefits of various types of special concretes.	2	Create
CO4	Implement recent advancements in concrete technology in practical scenarios.	3	Evaluate





# Course Contents

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## **Unit- I Properties of Concrete and its Ingredients**

**06 Hrs.**

Properties of Fresh and hardened concrete and quality control in concrete construction Workability, factors affecting workability. Hardened Concrete: Strength, elasticity, shrinkage, creep and Rheology of Concrete

## **Unit- II Durability of concrete**

**06 Hrs.**

Durability of Concrete: Alkali aggregate reaction, reinforcement corrosion, freezing and thawing, etc. Impact of Admixtures in durability of concrete.

## **Unit- III Fiber-reinforced concrete**

**06 Hrs.**

Fiber-reinforced concrete- Properties of constituent materials- Mix proportions, mixing and Casting methods - Mechanical properties of fiber reinforced concrete- applications of fiber Reinforced concretes. Light weight concrete- Introduction- properties of light weight concrete

## **Unit- IV Special Concrete**

**06Hrs.**

High Strength concrete, high performance concrete, Self-Compacting Concrete Polymer concrete, Roller compacted concrete, Ferro cement concrete.

### **Reference books: -**

1. Concrete Technology by A.N. Neville, J.J. Brooks, Addition Wesley
2. Concrete Technology by R.S. Varshney, Oxford & I B H.
3. Concrete Technology by P Kumar Mehta, GujratAmbuja

### **Text books: -**

1. Concrete Technology by M. S. Shetty, S Chand Publication.
2. Concrete Technology by M. L. Gambhir, TMH Publication.
3. Concrete Technology by S.V.Deodhar, Central Techno Publication
4. Concrete Technology by N.V. Nayak& A.K. Jain, Narosa Publishing House Pvt. Ltd.

### **Evaluation Scheme:**

#### **Continuous Assessment (A):**

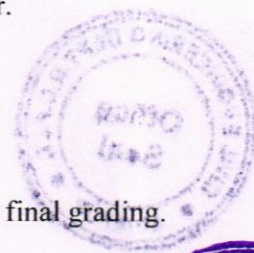
Subject teacher will declare Teacher Assessment criteria at the start of Semester.

#### **Continuous Assessment (B):**

1. Two term tests of 30 marks each will be conducted during the semester.
2. Total duration allotted for writing each of the paper is 1.0 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

#### **End Semester Examination (C):**

1. Question Paper will be based on 65 marks
2. Total duration allotted for writing the paper is 2 hr.





# Advanced Concrete Technology Laboratory (RCP23VLH1401)

Teaching Scheme  
Practical: 02 Hrs./week  
Credit : 01

Examination Scheme  
Teacher Assessment: 25 Marks  
End Sem Exam : 25 Marks  
Total Marks: 50Marks

**Pre-requisite – Concrete Technology.**

## Course Objectives

1. To study properties of fresh & hardened concrete.
2. To explore the durability aspects of concrete and its long-term performance.
3. To investigate the latest developments in concrete technology and their practical implications.

Upon successful completion of this course the student will be able to

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Identify the properties of fresh & Hardened concrete	2	Understand
CO2	Students will be able to understand the durability of concrete	3	Evaluate
CO3	Recognize the use of various types of special concretes.	2	Create
CO4	Implement recent advancements in concrete technology in practical scenarios.	3	Evaluate



# Course Contents

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## List of Experiments

Term work shall consist of performing minimum five experimental sets from the list below.

- 1) Study the temperature impact on Testing of Cement:
  - a) Consistency b) Setting Time
- 2) Testing of Aggregates: (Mixing with different aggregate)
- 3) Workability Tests: a) Slump b) Compaction,
- 4) Prepare mix of any Special concrete
- 5) Strength Tests on Concrete: a) Compression b) Flexure, c) Split & Tensile Test,
- 6) Non-destructive Testing for Concrete.

## Evaluation Scheme:

### Continuous Assessment (A):

Laboratory work shall consist of minimum 5 experiments and subject specific lab assignment/  
Case study

The distribution of marks shall be as follows:

1. Performance in Experiments: 05 Marks
2. Journal Submission: 05 Marks
3. Viva-voce: 05 Marks
4. Subject Specific Lab Assignment/Case Study: 10 Marks

The final certification and acceptance of laboratory journal/manual/report will be subject to Satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the Teacher assessment.

### End Semester Examination (C):

Oral / Practical examination will be based on the entire syllabus including, the practical's performed During laboratory sessions.





# Advanced water and waste water Treatment (RCP23VCH2401)

Teaching Scheme  
Lectures : 03 Hrs/week  
Tutorial: 00 Hr/week  
Credit : 03

Examination Scheme  
Term Test: 20Marks  
Teacher Assessment: 20 Marks  
End Sem Exam: 60Marks  
Total Marks: 100Marks

**Pre-requisite – Chemistry, Biology, Physics, Mathematics, Environmental Science,**

### Course Objectives

1. Understanding of Advanced Treatment Processes including physical, chemical, and biological processes.
2. Students able to Learn apply advanced treatment technologies to different types of water and wastewater to meet specific quality standards and regulatory requirements.
3. Problem-Solving and Critical Thinking: Enhance problem-solving and critical thinking skills related to the challenges faced in advanced water and wastewater treatment.

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Students will be able to understand Comprehensive Knowledge: Demonstrate a thorough understanding of advanced water and wastewater treatment technologies, including physical, chemical, and biological processes.	2	Understand
CO2	Students will be able to do Quality Assessment: Assess water quality and interpret data to ensure compliance with environmental regulations and standards.	3	Evaluate
CO3	solving and critical thinking skills related to the challenges faced in advanced water and wastewater treatment	2	Create





# Course Contents

## Unit- I

06 Hrs.

Importance of sewerage system. General History of water supply and sewerage system in India. Definitions, environment and its effect on public health, global environmental sanitation history, problem of environmental sanitation in India.

## Unit-II

08 Hrs.

Communicable Disease: Disease and immunity, communicable, diseases source, Mode of Transfer, Control of communicable diseases.

## Unit-III

08 Hrs.

Miscellaneous water purification processes: Removal of Iron and manganese, Removal of taste and odor. Removal of Fluorides. Treatment of saline water.

## Unit-IV

06 Hrs.

Corrosion: Theory and principles of corrosion, Factors influencing corrosion. Methods of protection. Latest methods of water treatment.

### Reference Books:

1. Wastewater treatment, disposal and reuse: Metcalf & Eddy Inc.
2. Wastewater treatment technology by S J Arceiwala.
3. Wastewater treatment system by Hammer.
4. Wastewater treatment manual by CPHEEO

### Evaluation Scheme:

#### Continuous Assessment (A):

Subject teacher will declare Teacher Assessment criteria at the start of Semester.

#### Continuous Assessment (B):

1. Two term tests of 30 marks each will be conducted during the semester.
2. Total duration allotted for writing each of the paper is 1.15 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

#### End Semester Examination (C):

1. Question Paper will be based on entire syllabus summing up to 65 marks
2. Total duration allotted for writing the paper is 2 hr.





# Advanced water and waste water Treatment Laboratory (RCP23VLH2401)

Teaching Scheme  
Practical: 02 Hrs./week  
Credit : 01

Examination Scheme  
Teacher Assessment: 25 Marks  
End Sem Exam: 25 Marks  
Total Marks: 50Marks

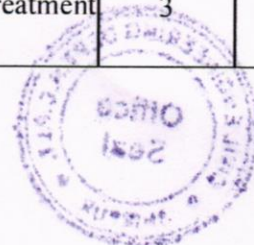
**Pre-requisite –**

**Course Objectives**

This course aims to equip students with the skills and knowledge necessary to:

1. **Practical Application of Theoretical Knowledge:** Provide hands-on experience in applying the theoretical concepts learned in advanced water and wastewater treatment courses.
2. **Data Collection and Analysis:** Teach students how to accurately collect, analyze, and interpret data related to water and wastewater treatment processes.
3. **Understanding Treatment Processes:** Enhance understanding of the operational principles and performance of different physical, chemical, and biological treatment processes through laboratory experiments.

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Hands-On Experience: Gain practical experience in operating laboratory equipment and conducting experiments related to water and wastewater treatment processes.	2	Understand
CO2	Technical Proficiency: Demonstrate proficiency in using advanced laboratory techniques for analyzing water and wastewater quality parameters.	3	Apply , Evaluate
CO3	Application of Knowledge: Apply the knowledge gained from laboratory experiments to real-world water and wastewater treatment challenges	3	Apply , Evaluate



# Course Contents

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## List of Experiment

It shall be based on above syllabus and will consist of At least three numbers

- i) Preparation of standard solutions.
- ii) Characteristics of wastewater of major industries in India.
- iii) Typical problems with wastewater treatment of major industries.
- iv) Pollution impact of major industries on wet land and soil.

## Guidelines for Continuous Assessment (A):

ICA shall be based on continuous evaluation of student's performance throughout the semester and term work prepared by the students in the form of journal.

Guidelines for ESE:

Oral / Practical examination will be based on the entire syllabus including, the practical's performed during practical sessions.





# Smart Infrastructure (RCP23VCH3401)

Teaching Scheme  
Lectures : 03 Hrs/week  
Tutorial: 00 Hr/week  
Credit : 03

Examination Scheme  
Term Test: 20Marks  
Teacher Assessment: 20 Marks  
End Sem Exam: 60Marks  
Total Marks: 100Marks

**Pre-requisite – Chemistry, Biology, Physics, Mathematics, Environmental Science,**

## Course Objectives

1. To develop a basic understanding about various types of Infrastructure and Smart city.
2. To enable the students to apply the basic need and planning concept to solve various Infrastructure problems

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Students will be able to understand the fundamental concepts of smart infrastructure	2	Understand
CO2	Students will be able to evaluate the effectiveness and challenges of various smart infrastructure Technologies	3	Evaluate
CO3	Students will be able to create innovative solutions for smart infrastructure challenges	2	Create





# Course Contents

## Unit- I

06 Hrs.

Fundamental of smart city & Infrastructure: Introduction of Smart City, Concept of smart city, Objective and, History of Smart city world and India. Need to develop smart city, Challenges of managing infrastructure in India and world, various types of Infrastructure systems, Infrastructures need assessment

## Unit- II

06 Hrs.

Planning and development of Smart city Infrastructure: Energy and ecology, solar energy for smart city, Housing, sustainable green building, safety, security, disaster management, economy, cyber Security etc.

## Unit- III

08 Hrs.

Transportation System Management in Smart Cities: Smart Vehicles and Fuels, Intelligent Transportation System: Weigh –In motion, Variable Message Signs, GIS, GPS, Navigation System, Traffic Safety Management, Mobility Services, E-Ticketing etc.

## Unit- IV

08 Hrs.

Infrastructure Management system & Policy for Smart city Integrated infrastructure management systems for smart city, Infrastructure management system applications for existing smart city. Worldwide policies for smart city Government of India - policy for smart city, Mission statement & guidelines, Smart cities in India, Case studies of smart city

### Reference Books:

Books Recommended: - (minimum 3 books)

1. Smart City on Future Life - Scientific Planning and Construction by Xianyi Li
2. The Age of Intelligent Cities: Smart Environments and Innovation-for-all Strategies (Regions and Cities) by Nicos Komninos
3. Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia by Anthony Townsend
4. Grig N.S., Infrastructure engineering and management, Wiley-Interscience, 1988
5. Hudson W.R., Haas R., Uddin W., Infrastructure Management, McGraw-Hill, 1997
6. Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities – Ranking of European medium-sized cities". Smart Cities. Vienna: Centre of Regional Science

### Evaluation Scheme:

#### Continuous Assessment (A):

Subject teacher will declare Teacher Assessment criteria at the start of Semester.

#### Continuous Assessment (B):





1. Two term tests of 30 marks each will be conducted during the semester.
2. Total duration allotted for writing each of the paper is 1.15 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

**End Semester Examination (C):**

1. Question Paper will be based on entire syllabus summing up to 65 marks
2. Total duration allotted for writing the paper is 2 hr.



