3170628 INFRASTRUCTURE FOR SMART CITIES

SEMESTER: 7

CIVIL ENGINEERING DEPARTMENT

GOVERNMENT ENGINEERING COLLEGE - DAHOD

Academic Year: 2025-26

:: VISION STATEMENT OF THE INSTITUTE ::

To be a value-based engineering institute to disseminate globally acceptable educationand nurturing research, innovation and entrepreneurship.

:: MISSION STATEMENTS OF THE INSTITUTE ::

1. To provide quality education in the engineering disciplines through creative balance ofacademics and extracurricular programs.

2. To provide learning environment for innovation and entrepreneurship.

3. To disseminate ethical values, social values and sensitivity towardsenvironmental issues.

:: VISION STATEMENT OF THE CIVIL ENGINEERING DEPARTMENT ::

To be a recognized department in the field of civil engineering education to produce professional civil engineers, innovators and entrepreneurs for the development of the society.

:: MISSION STATEMENTS OF THE CIVIL ENGINEERING DEPARTMENT ::

1. To provide quality education to civil engineering undergraduates through creative balance of academic, professional and extra-curricular activities.

2. To impart knowledge in the field of civil engineering for the development of infrastructure facilities with environmental concern for betterment of the society.

3. To contribute in the nation's development through innovative ideas in the field of civil engineering.

Annexure I: Knowledge and Attitude Profile (WK)

1. WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
2. WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
3. WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
4. WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
5. WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
6. WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
7. WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
8. WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
9. WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

:: PROGRAM OUTCOMES (POs) ::

1. PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4

respectively to develop to the solution of complex engineering problems.

2. PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
3. PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
4. PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
5. PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
6. PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
7. PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
8. PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9. PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
10. PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
11. PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

:: PROGRAM SPECIFIC OUTCOMES (PSOs) ::

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

Civil Engineering Graduates shall have

PSO 1: Ability to analyze, design and rehabilitate the infrastructural projects of civil engineering.

PSO 2: Ability to use advanced civil equipment, software, techniques and work seamlessly in teams.

PSO 3: Ability to apply gained knowledge to choose from the innovative career paths, to be an entrepreneur, and a zest for higher studies.

:: PROGRAMME EDUCATION OBJECTIVES (PEOs) ::

Program Educational Objectives (PEOs) describe the career and professional accomplishments that programs are preparing graduates to attain within a few years (3-5 years) of graduation.

Following are the PEOs of B.E Civil Engineering Program:

10. Establish themselves as civil engineering professionals in government, public and private sectors
11. Manage infrastructural and sanitary facilities
12. Solve real world problems environmental concerns to serve society
13. Adapt to changing trends in analysis and design of civil engineering structures.
14. To do testing, survey and planning of civil engineering structures using modern tools

:: COURSE OUTCOMES (COS) ::

Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course. These relate to the skills, knowledge, and behaviour that students acquire in their matriculation through the course.

PROGRAM NAME: B.E. CIVIL ENGINEERING		
COURSE NAME: 3170628 INFRASTRUCTURE FOR SMART CITIES		
SEMESTER: 7	**A.Y 2022-23**	**Weightage %**
3170628.1	Understand the necessity of infrastructural development for smart cities.	20%
3170628.2	Identify components of infrastructure and Prepare infrastructure plan for smart city.	25%

3170628.3	Understand smart transport system for smart cities and its application	20%
3170628.4	Study of water resources systems for smart city and its application.	20%
3170628.5	Understand National and Global policies to implement for smart city development.	15%

DISTRIBUTION OF THEORY MARKS					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10%	45%	30%	5%	5%	5%

Legends: **R**: Remembrance; **U**: Understanding; **A**: Application;**N**: Analyze; **E**: Evaluate **C**: Create and above Levels (As per revised Bloom's Taxonomy)

:: TEACHING AND EXAMINATION SCHEME ::

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	00	00	100

ESE - END SEMESTER EXAMINATION, **PA** - PROGRESS ASSESSMENT,

List of Open Source Software/learning website:

1. Smart city government of India. http://smartcities.gov.in

2. Reconceptualising Smart Cities: A Reference Framework for India https://www.niti.gov.in/writereaddata/files/document_publication/CSTEP%20Report%20Smart%20Cities%20Framework.pdf

3. Draft Concept Note on Smart City Scheme". Government of India - Ministry of Urban Development -martcitiesoftomorrow.com/wp-content/uploads/2014/09/CONCEPT_NOTE_ 3.12.2014_REVISED_AND_LATEST_.pdf

:: INDEX ::

Sr. No.	Date	Title	Page No.	CO attained	Marks	Sign of Faculty with Date
1		Understand the necessity of infrastructural development for smart cities.		CO1		
2		Identify components of infrastructure and Prepare infrastructure plan for smart city.		CO2		
3		Understand smart transport system for smart cities and its application		CO3		
4		Study of water resources systems for smart city and its application		CO4		
5		Understand National and Global policies to implement for smart city development.		CO5		

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CIVIL ENGINEERING DEPARTMENT

BE- 7th SEMESTER

3170628 _INFRASTRUCTURE FOR SMART CITIES

Tutorial 01 **CO- 1**

All Batches

Understand the necessity of infrastructural development for smart cities._Tutorial 1

Ques. 1	What is smart city? Write different the objectives of smart cities?
Ques. 2	Explain: (i) Smart Governance, (ii) Smart Mobility, (iii) Smart Living, (iv) Smart People, (v) Smart Environment.
Ques. 3	Write the difference between a city and smart city. What are the factors required to become a smart city?
Ques. 4	Explain different dimensions of smart city development.
Ques. 5	Describe different types of infrastructure pillars for smart city.
Ques. 6	What are the advantages of smart city?
Ques. 7	Explain core infrastructure elements of smart city.
Ques. 8	Write history of smart city in the world.
Ques. 9	Give a brief history of smart city in India.
Ques. 10	What are the smart city challenges and measures? Explain in brief.
Ques. 11	Write in brief the progress of smart city projects in India.
Ques. 12	Write short note in context to smart city/ infrastructure on: (i) GIFT City project, (ii) DMIC project, (iii) LAVASA First Fully Planned hill city, (iv) Chandigarh smart city, (iii) Gandhinagar smart city.
Ques. 13	Write down and explain the framework for infrastructure need assessment.
Ques. 14	What is the need to develop a smart city?
Ques. 15	How smart city helps in sustainable development?

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Tutorial 02 **CO- 2**

All Batches

Identify components of infrastructure and Prepare infrastructure plan for smart city. _Tutorial 2

Ques. 1	Explain energy and ecology with reference to smart city.
Ques. 2	Explain smart grid and its requirement in India?
Ques. 3	What is solar smart city? Write the objectives of solar smart city?
Ques. 4	What are the issues and challenges for solar power plants in India? How to overcome the challenges?
Ques. 5	What is affordable housing? Describe the criteria for housing in smart city.
Ques. 6	What is green building? What are the objectives of green building?
Ques. 7	List down and explain the features of green building. Write about the different benefits of green building.
Ques. 8	Explain different technology advancement required for the safety and security in smart city.
Ques. 9	What are the challenges for safety in smart city?
Ques. 10	What is cyber security? Explain different types of cyber threats.
Ques. 11	Write a note on disaster management in smart city. What are the different phases of disaster management cycle?
Ques. 12	Explain early warning system (EWS). List out different agencies with their areas for monitoring and early warning in India.
Ques. 13	What are the different economy indicators for smart economy?
Ques. 14	Describe various phases of smart city project management.
Ques. 15	Draw and explain a programme breakdown structure for smart city.

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Tutorial 03 **CO- 3**

All Batches

Understand smart transport system for smart cities and its application_Tutorial 3

Ques. 1	What is Intelligent Transportation System (ITS)? Write the advantages of ITS.
Ques. 2	Explain working of ITS.
Ques. 3	What are the different types of ITS? Explain in brief.
Ques. 4	Define the concept of smart vehicles. What are the features of smart cars?
Ques. 5	Write in brief about fuels for future.
Ques. 6	Write about the application of GIS in transportation.
Ques. 7	Write about the application of GPS in transportation.
Ques. 8	Explain navigation systems in India.
Ques. 9	Discuss importance of traffic safety management.
Ques. 10	Explain the approach for road safety management.
Ques. 11	Give your views on road safety policies. Explain National road safety policy 2010 in brief.
Ques. 12	Explain the concept of E-ticketing. Write its advantages and disadvantages.
Ques. 13	What is smart mobility and how it can be improved?
Ques. 14	Give recommendations for infrastructure improvement and vehicle technology for traffic safety.
Ques. 15	List out various smart transport system for smart cities.

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Tutorial 04 **CO- 4**

All Batches

Study of water resources systems for smart city and its application._Tutorial 4

Ques. 1 What do you mean by smart water management (SWM)?

Ques. 2 What are the drawbacks of existing water system? Give some suggestions to improve existing water conveyance system.

Ques. 3 Write about the IOT based smart wastewater management system.

Ques. 4 What are the issues and challenges with existing urban sanitation system?

Ques. 5 Write a note on water-meters.

Ques. 6 Explain water smart city (WSC) concept.

Ques. 7 Describe the water smart city approach and solutions.

Ques. 8 Write short note on rain water harvesting. Write its need and advantages.

Ques. 9 Explain the free flow and pressurized water conveyance system.

Ques. 10 Explain the principles of sustainable urban water management.

Ques. 11 Describe innovative sanitation solutions for smart cities.

Ques. 12 Explain integrated flood management system.

Ques. 13 Describe flood forecasting and warning systems in India.

Ques. 14 Write a note on water resources conservation.

Ques. 15 Describe various flood mitigation measures.

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Tutorial 05 **CO- 5**

All Batches

Understand National and Global policies to implement for smart city development

Ques. 1 What is integrated infrastructure management? What is the need for IIMS for smart city?

Ques. 2 Write worldwide policies for smart cities.

Ques. 3 Explain the mission statement for smart city-India.

Ques. 4 What is smart city challenge?

Ques. 5 What is the procedure for selection of smart city in India?

Ques. 6 Write targets laid down by government of India for development of smart cities in India.

Ques. 7 Write a case study of smart city with SWOT analysis for Dehradun.

Ques. 8 Write a case study of smart city with SWOT analysis for Nagpur.

Ques. 9 Write a case study of smart city with SWOT analysis for Ahmedabad.

Ques. 10 What is pan city project?

Ques. 11 Explain the use of GIS in site selection for major infrastructure in smart city projects.

Ques. 12 Prepare report on “Application of GIS technology for major facility identification and representation for Ahmedabad city or any smart city”. Use freely available data on various websites like Bhuvan, USGS, Diva GIS, etc.