

## CEM209N GEOLOGY

**Teaching Scheme: 2L**

**Evaluation Scheme: 30MSE + 10ISA + 60ESE**

**Duration of ESE: 03Hrs**

**Total Credit: 2**

**Total Marks: 100**

### COURSE DESCRIPTION

The course is to focus on the core activities of engineering geologists – site characterization and geologic hazard identification and mitigation. The student will learn the properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects. Geology also includes the assessment and mitigation of geologic hazards such earthquakes, landslides and groundwater remediation and resource evaluation

### COURSE OUTCOMES

After successful completion of this course; student shall be able to

1. understand earth process and geological formations
2. identify the geological structures and properties of rock.
3. understand physical properties, mechanical properties of the minerals and their application

### Relevance of Program Outcomes (Pos)and strength of co-relation

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1			1										2		
2			1										2		
3	1					2	1						3	2	

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

### General Geology: [ 03 Hrs.]

Earth as a planet: Size, shape, rotation, and internal structure, Earth's major internal and external processes, Geological time scale, Minerals and rocks: Classification, formation, and identification.

### Geomorphology: [ 03 Hrs.]

Landforms and their evolution, Plate tectonics and its impact on landforms. Weathering, erosion, and deposition, Fluvial, aeolian, glacial, and coastal processes,

### Structural Geology: [ 03 Hrs.]

Stress and strain, Fold and fault structures, Unconformities, Geological maps and cross-sections.

### Paleontology: [ 02 Hrs.]

Fossils and their significance, Principles of paleontology, Evolution of life on Earth.

### Stratigraphy: [ 03 Hrs.]

Principles of stratigraphy, Classification and correlation of rock strata, Stratigraphic nomenclature.

### Mineralogy: [ 02 Hrs.]

Crystallography, Physical and optical properties of minerals, Classification of minerals.

### Igneous and Metamorphic Petrology: [ 03 Hrs.]

Origin and classification of igneous rocks, Types of volcanoes, Metamorphism and metamorphic rocks.

**Sedimentary Petrology: [ 03 Hrs.]**

Sedimentary processes and environments, Types of sedimentary rocks, Diagenesis and sedimentary structures.

**Economic Geology: [ 03 Hrs.]**

Mineral resources of India and the world, Ore genesis and exploration techniques, Environmental issues related to mining.

**Engineering Geology: [ 03 Hrs.]**

Geological factors in construction and engineering projects, Landslides and their prevention, Geological hazards.

**Environmental Geology: [ 03 Hrs.]**

Natural hazards and disasters, Environmental impact assessment, Geology and sustainable development.

**Geophysical Exploration Methods: [ 03 Hrs.]**

Principles and applications of geophysical methods in geology, Seismic surveys, gravity, and magnetic methods.

**Reference Books**

Krynin, D.P. and Judd W.R. 1957. Principles of Engineering Geology and Geotechnique, McGraw Hill (CBS Publ).

Johnson, R.B. and De Graf, J.V. 1988. Principles of Engineering Geology,

John Wiley. Goodman, R.E., 1993. Engineering Geology: Rock in Engineering constructions.

John Wiley & Sons, N.Y. Waltham, T., 2009. Foundations of Engineering Geology (3rd Edn.)

Taylor & Francis. Bell: F.G-, 2006. Basic Environmental and Engineering Geology Whittles Publishing.

Bell, .F.G, 2007. Engineering Geology, Butterworth-Heineman

Stanley, S.M., 2008 Earth System History

Jonathan I. Lumine W.H.Freeman Earth-Evolution of a Habitable World, Cambridge University Press

# CEM259N SMART CITIES PLANNING AND MANAGEMENT

Teaching Scheme: 2L

Evaluation Scheme: 30MSE + 10ISA + 60ESE

Duration of ESE: 03Hrs

Total Credit: 2

Total Marks: 100

## COURSE DESCRIPTION

The objectives of the course are to understand the basic concept of various types of Infrastructure and Smart cities and its associated challenges. Students will learn the process of planning system and to apply the basic need to solve various Infrastructure problems

## COURSE OUTCOMES

After successful completion of this course; student shall be able to

1. understand the concept of smart cities and understand national and global policies to implement for smart city development.

2. analyse the necessity of infrastructural development for smart cities. Identify components of infrastructure and Prepare infrastructure plan for smart city.

3. apply planning and design techniques to different smart housing system.

4. evaluate smart transport system and water resources systems for smart cities and its application.

Relevance of Program Outcomes (Pos) and strength of co-relation

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	2	3									2		
2		3		2								1		2	
3	2		2									1		2	
4		2		2									2		
5	2		3									1	2	2	

1-Weakly correlated      – 2 Moderately correlated      – 3 Strongly correlated

### Introduction to Smart Cities: [ 06 Hrs.]

Definition, Concept, Need and importance, Benefits of smart cities, History of Smart city in India, Features & components of a smart city, Characteristics and factors of smart cities, Smart structures, Classification of smart structures, Challenges faced in developing smart cities, Scope of smart cities, Worldwide Policies for Smart City. Government of India: India “100 Smart Cities” Policy and Mission, Smart Cities in India, Case Studies of Smart City.

### Infrastructure Management System: [ 08 Hrs.]

Infrastructure Management in India, Challenges, Objectives, Various types of Infrastructure Services, Applications for Existing Smart City.

Planning and Management of Smart Cities: Dimension of Smart Cities, Smart Construction, Planning & Design, Theory and principles, Sustainable Building- Housing, Introduction to Green Buildings, Features of green building rating systems in India: LEED, GRIHA, Energy Saving System, Solar Energy for Smart City, Project Management.

### **Smart Technologies: [ 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.

### **Water Resource Management and Infrastructures in Smart Cities: [ 08 Hrs.]**

Storage and Conveyance System of Water, Sustainable Water And Sanitation, Sewerage System, Flood Management, Conservation System Methods etc.

### **Reference Book**

1 Jo Beall (1997); “A city for all: valuing differences and working with diversity”; Zed books limited, London (ISBN: 1-85649-477-2).

2 UN-Habitat; “Inclusive and sustainable urban planning: a guide for municipalities”; Volume 3: Urban Development Planning (2007); United Nations Human Settlements Programme (ISBN: 978- 92-1-132024-4).

3 Arup Mitra; “Insights into inclusive growth, employment and wellbeing in India”; Springer (2013), New Delhi (ISBN: 978-81-322-0655-2).

4 William J. V. Neill (2004); “Urban Planning and cultural identity”; Routledge, London (ISBN:0- 415-19747-3).

5 Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities – Ranking of European medium-sized cities".

6 "Draft Concept Note on Smart City Scheme". Government of India - Ministry of Urban Development  
([http://indiansmartcities.in/downloads/CONCEPT\\_NOTE\\_3.12.2014\\_REVISIED\\_AND\\_LATEST\\_.pdf](http://indiansmartcities.in/downloads/CONCEPT_NOTE_3.12.2014_REVISIED_AND_LATEST_.pdf)).

Supplementary learning Material:

1 <https://smartcities.gov.in/>.

2 Re-conceptualizing Smart Cities: A Reference Framework for India  
[https://www.niti.gov.in/writereaddata/files/document\\_publication/CSTEP%20Report%20Smart%20Cities%20Framework.pdf](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  
[smartcitiesoftomorrow.com/wpcontent/uploads/2014/09/CONCEPT\\_NOTE\\_3.12.2014\\_\\_REVISED\\_AND\\_LATEST\\_.pdf](http://smartcitiesoftomorrow.com/wpcontent/uploads/2014/09/CONCEPT_NOTE_3.12.2014__REVISED_AND_LATEST_.pdf) /.