

**Course Structure for CIVIL ENGINEERING
B. Tech Course (2013-14)**

IV B. Tech – II Sem

S.No.	Course Code	Subject	Theory	Tu	Lab	Credits
1	13A01801 13A01802	MOOC – I* 1. Urban Transportation Planning 2. Environmental Impact Assessment and Management	3	1	-	3
2	13A01803 13A01804	MOOC – II* 1. Remote Sensing & GIS 2. Advanced Structural Engineering	3	1	-	3
3	13A01805 13A01806	MOOC – III* 1. Pre Stressed Concrete 2. Cost Effective Housing Techniques	3	-	-	3
4	13A01807	Technical Seminar		-	4	2
5	13A01808	Project Work	-	-	20	10
6	13A01809	Survey Camp**	-	-	4	2
		Total	9	02	28	23

3 Theory + 1 Survey Camp + 1 Technical Seminar + 1 Project work

*Either by MOOCS manner or Self study or Conventional manner

** The survey camp conducted after II year – II semester, shall be evaluated in IV – II semester

B.Tech. IV -II sem (C.E.)

T	Tu	C
3	1	3

**(13A01801) URBAN TRANSPORTATION PLANNING
(MOOC – I)**

OBJECTIVES: *This course aims to introduce the student to the basic concepts of urban transportation planning and various stages of planning such as trip generation, trip distribution, mode split and traffic assignment are dealt here. Concepts of economic evaluation of transportation plans are also introduced.*

UNIT - I

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Concept of Travel Demand; Travel Characteristics - Origin, Destination, Route, Mode, Purpose; Travel Demand as a function of independent variables; Assumptions in Demand Estimation Relation between land use and Travel.

UNIT - II

Transportation Planning process; General concept of Trip; Four step process of Transportation planning-Aggregate and disaggregate Models. Delineation of study area; Zoning Principles; Formation of TAZs; Types and sources of Data, Home Interview surveys; Road side interview surveys; Goods. Taxi, IPT surveys; sampling techniques; Expansion factors and accuracy check; Desire line diagram and use.

UNIT - III

Trip Generation: Factors governing Trip Generation and Attraction; Multiple Linear Regression Models, Category Analysis.

Trip Distribution: Methods of Trip Distribution; Growth Factor Models Uniform Growth Factor Method; Average Growth Factor Method; Fratar Method; Advantages and limitations of Growth Factor Models; concept of Gravity Model (Elementary Concept Only).

UNIT -IV

Mode Split: Factors affecting mode split; Logit Model.

Traffic assignment: Purpose of Assignment and General Principles; Minimum path trees; Assignment Techniques - All - or- nothing Assignment; Capacity restraint Assignment; diversion curves.

UNIT - V

Economic Evaluation of Transportation plans; Costs and benefits of transportation projects; vehicle operating cost; Time savings; Accident costs. Methods of Economic Evaluation - Benefit cost Ratio Method; Net present value method; Internal Rate of Return method.

TEXT BOOKS:

1. L.R.Kadiyali; Traffic Engineering and Transportation Planning, Khanna Publishers, Delhi.
2. Papa Costas C.S.; Fundamentals of Transportation Engineering, Prentice Hall, India.
3. Khisty C.J., Transportation Engineering -An Introduction, Prentice Hall.

OUTCOMES:

On completion of this course the student will be able to

1. *Understand the concept of Travel Demand and the factors affecting it*
2. *Understand the different stages of Urban Transportation Planning and the mathematical models associated with each stage*
3. *Assess the economic impact of new Transportation plans*

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T	Tu	C
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**(13A01802) ENVIRONMENTAL IMPACT ASSESTMENT & MANAGEMENT
(MOOC – I)**

OBJECTIVE

This subject deals with the various impacts of infrastructure projects on the components of environment and method of assessing the impact and mitigating the same. The student is able to know about the various impacts of development projects on environment and the mitigating measures.

UNIT – I**INTRODUCTION:-**

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II**EIA METHODOLOGIES:-**

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis.

UNIT – III**IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:-**

Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – IV**ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE :**

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

ENVIRONEMNTAL AUDIT :

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-V**ENVIRONEMENTAL ACTS (PROTECTION AND PREVENTION)**

Post Audit activities, The Environmental protection Act, The water prevention Act, The Air (Prevention & Control of pollution Act.), Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katari & Sons Publication., New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
3. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
4. John G. Rau and David C. Wooten (Ed), Environmental Impact Analysis Handbook, McGraw Hill Book Company.

OUTCOMES:

On completion of this course the student will be able to

1. *Perform a critical quality review of an EIA and EIS;*
2. *Structure the EIA working process considering the need for interdisciplinarity;*
3. *Perform the screening and scoping of an EIA, based on existing requirements, evaluate the impacts and draw meaningful conclusions from the results of the EIA;*
4. *Clarify the concept of EIA and its application in an international context to those involved in or affected by the EIA process;*
5. *Interpretate an EIA, present its conclusions and translate its conclusions into actions.*

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**(13A01803) REMOTE SENSING AND GIS
(MOOC – II)**

OBJECTIVES:

1. To understand the Photogrammetric techniques, concepts, components of Photogrammetry
2. To introduce the students to the basic concepts and principles of various components of remote sensing.
3. To provide an exposure to GIS and its practical applications in civil engineering
4. Analyze the energy interactions in the atmosphere and earth surface features

UNIT – I**INTRODUCTION TO PHOTOGRAMMETRY:**

Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducially line.

UNIT – II**REMOTE SENSING :**

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III**GEOGRAPHIC INFORMATION SYSTEM:**

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

TYPES OF DATA REPRESENTATION:

Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV**GIS SPATIAL ANALYSIS:**

Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V**WATER RESOURCES APPLICATIONS:**

Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage

Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

- 1 Remote Sensing and GIS by B.Bhatta, Oxford University Press, New Delhi.
- 2 Fundamentals of remote sensing by Gorge Joseph, Universities press, Hyderabad

REFERENCES:

1. Advanced surveying : Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.
2. Remote Sensing and its applications by LRA Narayana University Press 1999.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
4. Remote sensing and GIS by M.Anji Reddy, B.S. Publications, New Delhi.
5. GIS by Kang – tsung chang, TMH Publications & Co.,

OUTCOMES:

On completion of the course the students will have knowledge on

1. *Principles of Remote Sensing and GIS*
2. *Analysis of RS and GIS data and interpreting the data for modeling applications*

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**(13A01804) ADVANCED STRUCTURAL ENGINEERING
(MOOC – II)**

OBJECTIVE: *To make the student more conversant with the design principals of multistoried buildings, roof system, foundation and other important structures.*

1. Design of a flat slab (Interior panel only)
2. Design of concrete bunkers of circular shape – (excluding staging) – Introduction to silos
3. Design of concrete chimney
4. Design of circular and rectangular water tank resting on the ground
5. Design of cantilever and counter forte retaining wall with horizontal back fill

FINAL EXAMINATION PATTERN:

The question paper shall contain 2 questions of either or type covering all the syllabus where each question carries 35 marks out of 35 marks, 20 marks shall be for the design and 15 marks are for the drawing.

TEXT BOOKS :-

1. Structural Design and drawing (RCC and steel) by Krishnam Raju, Universites .Press , New Delhi
2. R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi

Reference books :-

1. Design of RCC structures by M.L.Gambhir P.H.I. Publications, New Delhi.
2. Advanced RCC by Varghese , PHI Publications, New Delhi.
3. R.C.C Designs by Sushil kumar , standard publishing house.
4. Fundamentals of RCC by N.C.Sinha and S.K.Roy, S.Chand Publications, New Delhi.

OUTCOMES:

On completion of this course the student will be able to

1. *Design of roof systems with reference to Indian standards*
2. *Design of water retaining and storage structures*
3. *Design of silos and chimneys*

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**(13A01805) PRESTRESSED CONCRETE
(MOOC – III)**

OBJECTIVES:

To introduce the need for prestressing as well as the methods, types and advantages of prestressing to the students. Students will be introduced to the design of prestressed concrete structures subjected to flexure and shear.

UNIT – I**INTRODUCTION:**

Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

METHODS OF PRESTRESSING:-

Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – II**LOSSES OF PRESTRESS:-**

Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of stress in steel, slip in anchorage ,bending of member and wobble frictional losses.

UNIT – III**ANALYSIS & DESIGN OF SECTIONS FOR FLEXURE:-**

Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure – Kern – lines, cable profile.

UNIT – IV**DESIGN OF SECTION FOR SHEAR :**

Shear and Principal Stresses – Design for Shear in beams.

COMPOSITE SECTION:

Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

UNIT – V**DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS:**

Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

- 1 Prestressed Concrete by N. Krishna Raju; - Tata Mc.Graw Hill Publications.
- 2 Prestressed Concrete by Ramamrutham,Dhanpatrai Publications
- 3 Prestressed Concrete by K.U.Muthu, PHI Publications.

REFERENCE:

1. Prestressed Concrete design by Praveen Nagrajan, Pearson publications, 2013 editions.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.
3. Prestressed Concrete by Pandit.G.S. and Gupta.S.P., CBS Publishers and Distributers Pvt. Ltd, 2012.
4. Prestressed Concrete by Rajagopalan.N, Narosa Publishing House, 2002.
5. Prestressed Concrete Structures by Dayaratnam.P., Oxford and IBH, 2013

Codes/Tables:

Codes: BIS code on prestressed concrete, IS 1343 to be permitted into the examination Hall.

OUTCOMES:

Student shall have knowledge on methods of prestressing and able to design various prestressed concrete structural elements.

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(13A01806) COST EFFECTIVE HOUSING TECHNIQUES**(MOOC – III)****OBJECTIVES:**

The objective of the course is to train the students to have a comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects. The course focuses on cost effective construction materials and methods. Emphasis is given on the principles of sustainable housing policies and programmes.

UNIT – I:-**INTRODUCTION TO HOUSING**

Definition of Basic Terms – House, Home, Household, Apartments, Multi storied Buildings, Special Buildings, Objectives and Strategies of National Housing Policies including Slum Housing Policy, Principle of Sustainable Housing – Integrated approach on arriving holding capacity and density norms - All basic infrastructure consideration - Institutions for Housing at National, State and Local levels.

UNIT – II:-**HOUSING PROGRAMMES**

Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighborhoods- Plotted land development programs, Open Development Plots, Apartments, Gated communities, Townships, Rental Housing, Co-operative Housing, Slum Housing Programmes – Slum improvement – Slum redevelopment and Relocation – Use of GIS and MIS in Slum Housing Projects,, Role of Public housing agencies, and Private sector in supply , quality, infrastructure and pricing – Role of Non-Government Organizations in slum housing.

UNIT – III:-**DEVELOPMENT AND ADOPTION OF LOW COST HOUSING TECHNOLOGY:**

Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements - Adopting of total prefabrication of mass housing in India- General remarks on pre cast roofing/flooring systems -Economical wall system - Single Brick thick loading bearing wall - 19cm thick load bearing masonry walls - Half brick thick load bearing wall - Fly ash gypsum thick for masonry - Stone Block masonry - Adoption of precast R.C. plank and join system for roof/floor in the building

UNIT – IV:-**ALTERNATIVE BUILDING MATERIALS FOR LOW COST HOUSING AND INFRASTRUCTURE SERVICES IN RURAL HOUSES:-**

Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes - Low cost Infrastructure services: Introduce - Present status - Technological options - Low cost sanitation - Domestic wall - Water supply, energy.Rural Housing:Introduction traditional practice of rural housing continuous - Mud Housing technology-Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs

UNIT – V:-

HOUSING IN DISASTER PRONE AREAS:

Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and Railways of non-engineered buildings - Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions. Requirement's of structural safety of thin pre-cost roofing units against Earthquake forces -Status of R& D in earthquake strengthening measures - Floods, cyclone, future safety

TEXT BOOKS

1. Hand book of Low Cost Housing by A.K.Lal – New Age International Publishers.
2. Low cost Housing – G.C. Mathur, IBH publishers.
3. Housing in India by Francis Cherunilam and Odeyar D Heggade, Himalaya Publishing House, Bombay, 1997.

REFERENCES:-

1. Disaster Science and Management by Tushar Bhattacharya, TMH Publications.
2. Building materials for low –income houses – International council for building research studies and documentation.
3. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.
4. Properties of concrete – Neville A.m. Pitman Publishing Limited, London.
5. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.

OUTCOMES:

The students will have a comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects with cost effective housing techniques. The student can be in a position to adopt the suitable techniques in rural and disaster prone areas by using locally available materials.