SR Engineering College

Innovation . Creativity . Entrepreneurship

IV -B.TECH-CIVIL-II SEMESTER

LESSON PLANS

2018 - 19

DEPARTMENT OF CIVIL ENGINEERING

SR ENGINEERING COLLEGE *(Autonomous)*
(RA15) COURSE STRUCTURE:: B. TECH. CIVIL ENGINEERING
(Applicable from the batch admitted during 2015-16 academic year and onwards)

L: Theory, T: Tutorial, P/D: Practical / Drawing, C: Credits,
CIE: Continuous Internal Evaluation, SEE: Semester End Examination
IV Year II Semester

S. No.	Course Code	Course	Hours / Week			
			L	T	P/D	C
1	OE OE113	***Open Elective – 3*** Pollution and Control Engineering	3	-	-	3
2	 CE142 CE143	**Professional Elective -5** 1. Pavement Construction and Evaluation 2. Solid Waste Management	3	-	-	3
3	 CE146 CE147	***Professional Elective -6*** 1. Retrofitting and Rehabilitation of Structures 2. Environmental Impact Assessment and Management	3	-	-	3
4	CE151	Technical Seminar	-	-	2	1
5	CE152	Major Project / Practice School	-	-	-	14
Total						**24**

(OE113) POLLUTION CONTROL AND ENGINEERING

Year	Semester	Hours / Week			C	Marks		
		L	T	P/D		CIE	SEE	Total
III or IV	I or II	3	-	-	3	30	70	100

COURSE OBJECTIVES:

Students will be able to

1. Attain basic knowledge of the various pollutants, their sources and effects on the environment.
2. Understand the techniques employed on mitigation of the air pollutants.
3. Analyze the various stages of water treatment procedure.
4. Introduce the students to various biological methods to mitigate water pollution.
5. Understand the different ways to curb land / soil pollution.
6. Introduce the students to various noise pollution control methods.

COURSE OUTCOMES:

At the end of the course, the student will develop ability to

1. Identify the sources of air, water, land and noise pollution.
2. Understand air pollution sampling and measurement.
3. Distinguish between the pollution abatement systems for particulate matter and gaseous constituents.
4. Build knowledge on water quality analysis and management.
5. Fundamentals of urban water supply and sanitation infrastructure.
6. Design of waste-water and industrial effluent treatment.
7. Evaluate hazardous solid waste treatment and disposal techniques.
8. Estimate low cost treatment technologies.

UNIT – I

Introduction to atmosphere, chemistry in the atmosphere. Air pollutants, Sources of air pollutants, Effects on human beings and environment. Pollutant concentration and emission measurements. Dispersion of pollutants in the atmosphere.

UNIT - II

Air Pollution Control: Particulate emission control by mechanical separation and electrostatic precipitation, wet gas scrubbing, gaseous emission control by absorption and adsorption, Design of cyclones, ESP, fabric filters and absorbers.

UNIT - III

Water Pollution Control: Physical treatment, pre-treatment, solids removal by setting and sedimentation, filtration centrifugation, coagulation and flocculation, trickling filter, activated sludge and lagoons, septic tanks, aeration systems.

UNIT - IV

Soil and Control: Soil contamination by chemical pollutants: sources and fate. Remediation by plants, bioremediation by microorganisms; contamination by inorganic (including heavy metals) and organic pollutants; factors affecting uptake of contaminants, prevention and

elimination of contamination; Solids waste disposal - composting, landfill, briquetting / gasification and incineration.

UNIT –V

Noise Pollution Control: Basics of Sound, Sound Propagation, Directionality,Reverberation, SEL, LAeq,T, L90, L10, SIL, Noise Control at source, Noise Control along the source-receiver pathway, Noise Control at Receiver, Assessing and Predicting Noise.

TEXT BOOKS:

1. C.S.Rao. “Environmental Pollution Control Engineering”, New Age Publications, 2015.
2. S.K.Garg Sewage, “Disposal and Air Pollution Engineering (Environmental Engineering Vol. II)”, Khanna Publishers, 2010.

REFERENCE BOOKS:

1. Manahan, Stanley E, “Environmental Science, Technology and Chemistry".
2. Boca Raton, “Environmental Chemistry”, CRC Press LLC, 2000
3. Metcalf and Eddy, “Wastewater Engineering: Treatment and Reuse”, McGraw Hill Higher Education Publisher, 2002..

(CE142) PAVEMENT CONSTRUCTION AND EVALUATION
(Professional Elective-5)

Year	Semester	Hours / Week			C	Marks		
		L	T	P/D		CIE	SEE	Total
IV	II	3	-	-	3	30	70	100

COURSE OBJECTIVES:

Students will be able to

1. Explain principles of pavement design and performance.
2. Explain the importance of different overlay design methods for pavement constructions and modeling concepts.
3. Discriminate between overlay design methods and deterioration modeling concepts.
4. Recommend any software required and their importance and utilization in pavement construction and evaluation.
5. Elaborate the need for maintenance and quality control.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to

1. Define and examine the meaning of pavement, its components and various aspects involved in its construction.
2. Analyse the importance of pavement evaluation.
3. Solve various problems involved in pavements by various design methods.
4. Distinguish various modeling concepts to be used in the pavement construction.
5. Recommend various specifications in pavement design and construction.
6. Assess the routine pavement conditions, drainage conditions and maintenance required.
7. Evaluate the importance of ISO 9000 in TQM.
8. Critique the quality control aspects in pavement evaluation.

UNIT – I

Pavement Evaluation: Pavement Inventories and Evaluation - Factors affecting Pavement Deterioration, Functional Condition Evaluation Techniques: Roughness Measurements, serviceability concepts: Visual and Ride Rating Techniques, structural Condition Evaluation Techniques: NDT Procedures, Rebound Deflection, Measurement and Analysis, Destructive Testing, Remaining Life Concept.

UNIT – II

Overlay Design Methods: Overlay Design methods, IRC, Overlay Design methods, AASHTO methods, Evaluation of Pavement Safety: Skid Resistance, Factors, evaluation, Hydroplaning Reduction with Porous Overlays and Popcorn Friction overlay.

UNIT – III

Deterioration Modelling Concepts: Factors Influencing Structural and Functional Condition Deterioration, Examples of Initiation and Progressing Deterioration Models, Use of Deterioration Models by HDM Software.

UNIT – IV

Pavement Construction: Construction of Subgrade layers, Sub-base and Base Courses, Bituminous Surface Courses, Cement Concrete Surface Courses, MORTH specifications, Quality control.

UNIT – V

Pavement Maintenance and Quality Control: Routine, Periodic Maintenance, Special Repairs, Responsive Maintenance Programmes, Rehabilitation and Reconstruction, Components of Pavement Maintenance Management System (PMMS), Stages in Implementing PMMS, Total Quality Management (TQM): Quality Assurance/Quality Control Concepts, Sampling, Tolerances and Controls Related to Profile and Compaction, Role of ISO 9000 in TQM.

TEXT BOOKS:

1. S.K.Khanna and C.E.G. Justo, "Highway Engineering", Nemchand and Bros.,7th Edition (2001)
2. Dr. L.R. Kadiyali and Dr. N.B. Lal, "Principles and Practices of Highway Engineering" Khanna Publishers, 2005.

REFERENCE BOOKS:

1. IRC Code for flexible pavement – IRC – 37 -2001.
2. IRC Code for Rigid pavement – IRC – 58 – 2002.

(CE143) SOLID WASTE MANAGEMENT
(Professional Elective-5)

Year	Semester	Hours / Week			C	Marks		
		L	T	P/D		CIE	SEE	Total
IV	II	3	-	-	3	30	70	100

COURSE OBJECTIVES:

Students will be able to

1. Acquire the knowledge on description of waste; different types of waste, classification of waste, waste flows in society, and composition of waste.
2. Develop the ability to understand the classification and handling of different types of waste
3. Develop understanding on the causes of the waste problem and strategies to minimize these problems; consumption and waste prevention, problem solving with a system analysis approach.
4. Analyze the legal and economic aspects of control for waste management.
5. Manage waste treatment and handling, thermal and biological methods, land filling.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to

1. Define and explain important concepts in the field of solid waste management, such as waste treatment, waste prevention, municipal solid waste etc.
2. For a given case, connected to a solid waste problem, suggest, motivate and describe a way to tackle the problem from a system analysis approach.
3. Analyze and describe the potential treatment, and thereby associated problems and possibilities in a sustainable society.
4. Discuss social aspects connected to handling and recirculation of solid waste from a local as well as global perspective.
5. Suggest and describe suitable technical solutions for biological and thermal treatment. The student should also be able to discuss the drawbacks and prerequisites for a chosen solution.
6. Describe economical and legal means of control that affect waste management on a social and industrial level.
7. Relate independent search for information connected to solid waste management, and make a compilation of this, and analyze it in a written report.
8. Make an oral presentation of an individual work and actively participate in the discussion of other groups work.

UNIT – I

Municipal Solid Waste Management, Generation and Characteristics of Waste, Health and Environmental Effects, Types and Sources of solid and hazardous wastes - Need for solid and hazardous waste management - Handling of municipal solid wastes, hazardous wastes, and biomedical wastes.

UNIT – II

Waste generation rates – Composition - Hazardous Characteristics - waste sampling- Source reduction of wastes – Recycling and reuse. Introduction to biomedical waste and e-waste.

UNIT-III

Handling and segregation of wastes at source – storage and collection of municipal solid wastes – Analysis of Collection systems - Need for transfer and transport – Transfer stations - labeling and handling of hazardous wastes.

UNIT – IV

Waste processing – processing technologies – biological and chemical conversion technologies – Composting - thermal conversion technologies - energy recovery – Incineration – solidification and stabilization of hazardous wastes.

UNIT-V

Disposal in landfills - site selection - design and operation of sanitary landfills- secure Landfills– leachate and landfill gas management – landfill closure and environmental monitoring – landfill remediation.

TEXT BOOKS:

1. Donald R Rowe and Howard S Peavy, “Environmental Engineering”, McGrawHill Science / Engineering / Math.
2. Santhosh Kumar Garg, “Sewage Disposal and Air Pollution Engineering”- Vol-II, Khanna Publishers.

REFERENCE BOOKS:

1. George Tchobanoglous, Hilary Theisen and Samuel A Vigil, “Integrated Solid Waste Management”, McGrawHill, New York, 1993
2. “Manual on Municipal Solid Waste Management”, Central Public Health and Environmental Engineering Organization (CPHEEO), Government of India, New Delhi, 2000.
3. Dewan S, “Solid Waste Management”, HB New Title Edition.

(CE146) RETROFITTING AND REHABILITATION OF STRUCTURES
(Professional Elective-6)

Year	Semester	Hours / Week			C	Marks		
		L	T	P/D		CIE	SEE	Total
IV	II	3	-	-	3	30	70	100

COURSE OBJECTIVES:

Students will be able to

1. Define rehabilitation and retrofitting of structures.
2. Classify rehabilitation and retrofitting of structures.
3. Identify deterioration of structure.
4. Explain mechanism of damages of concrete structure.
5. Calculate, test and monitor existing structures.
6. Discuss common types of repairs in structures

COURSE OUTCOMES:

At the end of the course, the students will develop ability to

1. Understand the causes and prevention of deterioration in structures.
2. Interpret different types of damages in structures.
3. Understand failure mechanisms of different structures.
4. Categorize the causes and prevention mechanisms for various damages occurring in structures.
5. Examine to inspect and assess the structures using various techniques of inspection and NDT.
6. Estimate the structural damage and recommend suitable repair.
7. Apply various methods of retrofitting of structures.
8. Recommend and Make use of the latest health monitoring and building instrumentation methods.

UNIT – I

Introduction: General Consideration – Distresses monitoring – Causes of distresses – Quality assurance – Defects due to climate, chemicals, wear and erosion – Inspection – Structural appraisal – Economic appraisal.

UNIT – II

Distress and Tests: Distress in concrete / steel / Masonry Structures – damage – source – cause – effects – case studies. Damage assessment and Evaluation models – Damage testing methods – NDT – Core samples.

UNIT – III

Rehabilitation: Rehabilitation methods – grouting – Surface Impregnation – Overlays – imbalance of structural stability – case studies.

UNIT – IV

Repairs and Maintenance: Methods of repairs – short creting – guniting – epoxy injection – cement mortar injection – crack ceiling.

UNIT – V

Strengthening of Existing Structures: General principle – relieving loads – Strengthening super structures – plating – Conversation to composite construction – post stressing – Jacketing – bonded overlays – Reinforcement addition – strengthening the substructures – under pinning – Buildings Repair – IS standards – Bridge repairs – Seismic strengthening.

TEXT BOOKS:

1. R.N.Raikar, "Diagnosis and Treatment of Structures in Distress", R and D Centre of Structural Designers and Consultants Pvt. Ltd., Mumbai, 1994.
2. "Handbook on Repair and Rehabilitation of RCC Buildings", CPWD, Delhi, 2002.

REFERENCE BOOKS:

1. Santha Kumar A.R, "Concrete Technology", Oxford University Press, 2007, New Delhi

(CE147) ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT
(Professional Elective-6)

Year	Semester	Hours / Week			C	Marks		
		L	T	P/D		CIE	SEE	Total
IV	II	3	-	-	3	30	70	100

COURSE OBJECTIVES:

Students will be able to

1. Provide an integrated programme of studies to equip students to undertake the planning tasks.
2. Know about management tasks associated with the principal stages of environmental assessment.
3. Provide an opportunity for students to pursue particular aspects of environmental assessment.
4. Know about wider environmental management.
5. Know about the assignments in great depth.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to

1. Understanding of current EIA methods and the techniques and tools used.
2. Understanding of current assessment methods and legislation.
3. Understanding of current environmental monitoring systems.
4. Apply knowledge acquired to the process of environmental impact modelling and prediction as a design tool with application to a number of case studies.
5. Apply knowledge on the various acts its application in various industries.
6. Determine impacts of any new project on the environment.
7. Apply concepts and application of environmental audit.
8. Apply knowledge on various EIA methods in various industries.

UNIT – I

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

E I 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- cost/benefit Analysis. 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.

UNIT-III

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. Assessment of Impact of development Activities on Vegetation and wildlife-environmental Impact of Deforestation – Cause sand effects of deforestation.

UNIT – IV

Environmental Audit and Environmental legislation: Objectives of Environmental Audit-Types of environmental Audit- benefits of environmental audit- stages of Environmental Audit. Post Audit activities- The Environmental pollution Act- The water Act- The Air (Prevention and Control of pollution Act.

UNIT-V

Case Studies: Preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS

1. Y.Anjaneyulu, "Environmental Impact Assessment Methodologies", B.S. Publication, Sultan Bazar, Kakinada, 2010.
2. B.B. Hosetti, "Environmental Assessment and Management", Daya Publishing House, Delhi, 1998.

REFERENCE BOOKS:

1. Rao and Datt, "Waste Water Treatment", Oxibh Edition, 3rd Edition, 2008.
2. V.V.N. Murty, Madan K. Jha, "Land and Water Management Engineering", Kalyani Publishers, 6th Edition, 2013.

Lesson Plan

Department: Civil Engineering	**Date:** 09/10/2018
Academic Year:2018-19	**Year/Semester:** IV/II
Name of the Faculty: Dr.R.Gobinath	
Course Name: Pollution Control and Engineering	**Course Code:**CE 113
Prerequisite: Knowledge about soil, air and water pollution and basic information about noise and its impacts on human health	

Course Outcomes:

At the end of the course, the student will develop an ability to

1. Identify the sources of air, water, land and noise pollution.
2. To understand air pollution sampling and measurement
3. Distinguish between the pollution abatement systems for particulate matter and gaseous constituents.
4. Develop knowledge on water quality analysis and management.
5. Fundamentals of urban water supply and sanitation infrastructure.
6. Design of waste-water and industrial effluent treatment.
7. Evaluate hazardous solid waste treatment and disposal techniques.
8. Develop knowledge on Low Cost Treatment Technologies

Lecture Schedule:

S.No	Topic of the Lecture	Name of the Activity & Instructional Aids	Tentative Date
	UNIT-V		
	Noise Pollution Control		
1	Basics of Sound, Sound Propagation, Directionality, Reverberation	Presentation and discussion	19/11/2018
2	SEL, LAeq, T, L90, L10, SIL and other technical terms	Presentation and discussion	20/11/2018
3	Noise Control at source	Videos and presentation	22/11/2018
4	Noise Control along the source receiver pathway	Presentation and discussion	23/11/2018
5	Noise Control at Receiver	Presentation and discussion	26/11/2018
6	Assessing and Predicting Noise	Presentation and discussion	28/11/2018
7	Revision	Discussion and Quiz	29/11/2018
8	Discussion about Noise Pollution (Regulation and Control) (Amendment) Rules, 2010	Class room activity	30/11/2018
	UNIT-I		
	Introduction to atmosphere		
10	Introduction to atmosphere, chemistry in the atmosphere.	Presentation	03/12/2018
11	Air pollutants	Presentation	04/12/2018
12	Sources of air pollutants	Presentation	05/12/2018
13	Effects on human beings and environment.	Presentation	05/12/2018
14	Journal papers related to impact of air pollution on human health	Online journal search in class room	07/12/2018
15	Pollutant concentration and emission measurements.	Presentation	10/12/2018
16	Dispersion of pollutants in the atmosphere	Presentation	11/12/2018
17	Air quality models and its importance	Presentation and model viewing	12/12/2018
18	Revision	Discussion and Quiz	13/12/2018
	UNIT-II		
	Air Pollution Control		
19	Particulate emission control by mechanical separation and electrostatic precipitation	Chalk and board	17/12/2018
20	Wet gas scrubbing	Chalk and board	18/12/2018
21	Gaseous emission control by absorption and adsorption	Chalk and board	13/12/2018
22	Design of cyclones	Chalk and board	21/12/2018
23	Design of cyclones	Chalk and board	23/12/2018

24	Design of ESP	Chalk and board	24/12/2018
25	Design of ESP	Chalk and board	25/12/2018
26	Design of fabric filters and absorbers	Chalk and board	26/12/2018
27	Design of fabric filters and absorbers	Chalk and board	27/12/2018
30	Extra problems related to air pollution control equipment during any extra hour if available		
	UNIT-III		
	Water Pollution Control		
31	Physical treatment	Presentation	02/01/2019
32	Pre-setting and sedimentation	Presentation	02/01/2019
33	Filtration centrifugation	Presentation	04/01/2019
34	Coagulation and flocculation	Presentation	04/01/2019
35	Trickling filter	Chalk and board	07/01/2019
36	Activated sludge and lagoons	Chalk and board	08/01/2019
37	Septic tanks	Chalk and board	09/01/2019
38	Aeration systems	Chalk and board and presentation	14/01/2019
39	Revision	Presentation	15/01/2019
40	Class activity	Discussion and quiz	16/01/2019
	UNIT-IV		
	Soil and Control		
41	Soil contamination by chemical pollutants: sources and fate.	Presentation/ Videos	18/01/2019
42	Journal papers related to Soil Pollution	Presentation/ Videos	21/01/2019
43	Remediationby plants	Presentation/ Videos	22/01/2019
44	Bioremediation by microorganisms; contamination by inorganic (including heavymetals) and organic pollutants	Presentation/ Videos	24/01/2019
45	Factors affecting uptake of contaminants	Presentation/ Videos	25/01/2019
46	Prevention and elimination of contamination	Presentation/ Videos	28/01/2019
47	Solids waste disposal - composting, landfill	Presentation/ Videos	29/01/2019
48	Briquetting / gasification and incineration.	Presentation/ Videos	30/01/2019
49	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019
50	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019
51	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019

1. Topic Name	**:** Air quality models.
Name of the Activity	**:** Online search activity.
Description of the Activity	**:** Students will be given with names of various air quality models in which they have to search, find and discuss about their features.
2. Topic Name	: Water quality implementation.
Name of the Activity	: Student discussion on water quality implementation in Warangal district.
Description of the Activity	**:**Students will be discussing on various water treatment plants of Warangal district, their capacity, features and implementation process.
3. Topic Name	**:** Journal paper reading and understanding.
Name of the Activity	**:** Group discussion.
Description of the Activity	**:** Students will be formed as groups and will be asked to check internet or books and find data about various patents, international trademarks and other related information. They will be asked to discuss about the same in the class for two hours in total.

TEXT BOOKS:

1. C.S.Rao. "Environmental Pollution Control Engineering", Newage publications, 2015.
2. S.K.GargSewage, "Disposal and Air Pollution Engineering (Environmental Engineering Vol. II)", Khanna publishers, 2010.

REFERENCE BOOKS:

1. Manahan, Stanley E., "Environmental Science, Technology and Chemistry".
2. Boca Raton, "Environmental Chemistry", CRC Press LLC, 2000.
3. Metcalf and Eddy, "Wastewater engineering: treatment and reuse" McGraw Hill Higher Education publisher, 2002

Course Projects:

1) Students should design a water treatment plant for a fixed capacity and submit it as a project report
2) Students should design as a team any two-air pollution control equipment for a fixed capacity and submit it as a report

Prepared By: Dr.R.Gobinath

Note: Dates mentioned are only tentative and will be updated duly

Lesson Plan

Department: Civil Engineering	**Date:**11/10/2018
Academic Year:2018-2019	**Year/Semester:** IV/ II
Name of the Faculty: N.Prabhanjan	
Course Name: Pavement Construction and Evaluation	**Course Code:** CE 142
Prerequisite: Transportation Engineering	

Course Outcomes:

At the end of the course, the students will develop ability to

1. Define and examine the meaning of pavement, its components and various aspects involved in its construction.
2. Analyse the importance of pavement evaluation.
3. Solve various problems involved in pavements by various design methods.
4. Distinguish various modeling concepts to be used in the pavement construction.
5. Recommend various specifications in pavement design and construction.
6. Assess the routine pavement conditions, drainage conditions and maintenance required.
7. Evaluate the importance of ISO 9000 in TQM.
8. Critique the quality control aspects in pavement evaluation

Lecture Schedule:

S.No	Topic of the Lecture	Name of the Activity & Instructional Aids	Tentative Date
	UNIT-I		
	Pavement Evaluation		
1	Pavement Inventories and Evaluation	Chalk and board	19-11-2018
2	Factors affecting Pavement Deterioration	Chalk and board	20-11-2018
3	Functional Condition Evaluation Techniques	Chalk and board	22-11-2018
4	Roughness Measurements, serviceability concepts	Presentation and discussion	23-11-2018
5	Visual and Ride Rating Techniques	Presentation and discussion	26-11-2018
6	Structural Condition Evaluation Techniques	Presentation and discussion	28-11-2018
7	NDT Procedures, Rebound Deflection	Discussion and Quiz	29-11-2018
8	Measurement and Analysis	Class room activity	30-11-2018
9	Destructive Testing, Remaining Life Concept.	Class room activity	30-11-2018
	UNIT-II		
	Overlay Design Methods		
10	Overlay Design methods	Presentation	03-12-2018
11	Overlay Design methods by IRC	Presentation	04-12-2018
12	Overlay Design methods by AASHTO	Presentation	05-12-2018
13	Evaluation of Pavement Safety	Presentation	05-12-2018
14	Skid Resistance, Factors	Online journal search in Classroom	07-12-2018
15	Factors, evaluation	Presentation	10-12-2018
16	Hydroplaning Reduction with Porous Overlays and Popcorn Friction overlay	Presentation	11-12-2018
17	Problems on IRC METHOD	Presentation and model viewing	12-12-2018
18	Problems on AASHTO METHOD	Discussion and Quiz	13-12-2018
	UNIT-III		
	Deterioration Modelling Concepts		
19	Factors Influencing Structural and Functional Condition Deterioration	Chalk and board	17-12-2018
20	Examples of Initiation and Progressing Deterioration Models	Chalk and board	18-12-2018 19-12-2018 20-12-2018
21	Examples of Initiation and Progressing Deterioration Models	Chalk and board	19-12-2018
22	Examples of Initiation and Progressing Deterioration Models	Chalk and board	20-12-2018
23	Use of Deterioration Models by HDM Software	Chalk and board	20-12-2018

24	Use of Deterioration Models by HDM Software	Chalk and board	21-12-2018
25	Use of Deterioration Models by HDM Software	Chalk and board	22-12-2018
26	Use of Deterioration Models by HDM Software	Chalk and board	24-12-2018
27	Use of Deterioration Models by HDM Software	Chalk and board	27-12-2018
	UNIT-IV		
	Pavement Construction		
28	Construction of Subgrade layers	Presentation	02-01-2019
29	Sub-base and Base Courses	Presentation	02-01-2019
30	Bituminous Surface Courses	Presentation	04-01-2019
31	Cement Concrete Surface Courses	Presentation	04-01-2019
32	MORTH specifications	Chalk and board	07-01-2019
33	MORTH specifications	Chalk and board	08-01-2019
34	MORTH specifications	Chalk and board	09-01-2019
35	Quality control	Chalk and board	14-01-2019
36	Quality control	Chalk and board	15-01-2019
37	Quality control	Chalk and board	16-01-2019
	UNIT-V		
	Pavement Maintenance and Quality Control		
38	Routine, Periodic Maintenance	Presentation/ Videos	18-01-2019
39	Special Repairs	Presentation/ Videos	21-01-2019
40	Rehabilitation and Reconstruction	Presentation/ Videos	24-01-2019
41	Components of Pavement Maintenance Management System (PMMS)	Presentation/ Videos	25-01-2019
42	Stages in Implementing PMMS	Presentation/ Videos	28-01-2019
43	Total Quality Management (TQM)	Presentation/ Videos	29-01-2019
44	Quality Assurance/Quality Control Concepts	Discussion and quiz	30-01-2019
45	Sampling	Discussion and quiz	First week of February
46	Tolerances and Controls Related to Profile and Compaction	Discussion and quiz	First week of February
47	Role of ISO 9000 in TQM		First week of February

TEXT BOOKS:

1. S.K.Khanna and C.E.G. Justo, "Highway Engineering", Nemchand and Bros.,7th Edition (2001)
2. Dr. L.R. Kadiyali and Dr. N.B. Lal, "Principles and Practices of Highway Engineering" Khanna Publishers, 2005.

REFERENCE BOOKS:

1. IRC Code for flexible pavement – IRC – 37 -2001.
2. IRC Code for Rigid pavement – IRC – 58 – 2002.

Course Projects:

1) Students should design a flexible pavement and submit it as a project report
2) Students should design as a rigid pavement and submit it as a report

Prepared By: N.Prabhanjan

Note: Dates mentioned are only tentative and will be updated duly

Lesson Plan

Department: Civil Engineering	**Date:** 09/10/2018
Academic Year: 2018-19	**Year/ Semester :** III/II
Name of the Faculty: G. Sangeetha	
Course Name: Solid Waste Management	**Course Code:** CE 143
Prerequisite: An understanding about waste generation from the society and its impact on regional and national level.	

Course Outcomes:

At the end of the course, the student will develop an ability to

1. Define and explain important concepts in the field of solid waste management, such as waste treatment, waste prevention, municipal solid waste etc.
2. From a given case, connected to a solid waste problem, suggest, motivate and describe a way to tackle the problem from a system analysis approach.
3. Analyze and describe the potential treatment, and thereby associated problems and possibilities in a sustainable society.
4. Discuss social aspects connected to handling and recirculation of solid waste from a local as well as global perspective.
5. Suggest and describe suitable technical solutions for biological and thermal treatment. The student should also be able to discuss the drawbacks and prerequisites for a chosen solution.

Lecture Schedule:

S.No	Topic of the Lecture	Name of the Activity & Instructional Aids	Tentative Date
	UNIT - I		
	Solid Waste Generation and characterisation		
1	Municipal Solid Waste Management	Presentation and discussion	19/11/2018
2	Generation and Characteristics of Waste, biomedical wastes	Presentation and discussion	20/11/2018
3	Health and Environmental Effects	Videos and presentation	22/11/2018
4	Types and Sources of solid and hazardous wastes	Presentation and discussion	23/11/2018
5	Need for solid andhazardous waste management	Presentation and discussion	26/11/2018
6	Handling of municipal solid wastes, hazardous wastes	Presentation and discussion	28/11/2018
7	Biological waste handling	Presentation and discussion	29/11/2018
8	Indian Scenario- Class work	Class room activity	30/11/2018
	UNIT - II		
	Waste composition and other parameters		
9	Waste generation rates	Presentation	03/12/2018
10	Composition	Presentation	04/12/2018
11	Hazardous Characteristics	Presentation	05/12/2018
12	Waste sampling	Presentation	05/12/2018
13	Source reduction of wastes	Presentation/ Board discussion	07/12/2018
14	Recycling and reuse	Presentation	10/12/2018
15	Introduction to biomedical waste and e-waste	Presentation	11/12/2018
16	Class activity on waste characterisation	Class activity	12/12/2018
17	Revision	Discussion and Quiz	13/12/2018
	UNIT - III		
	Handling, segregation and storage of waste		
18	Handling and segregation of wastes at source	Chalk and board	17/12/2018
19	Storage and collection of municipal solid wastes	Chalk and board	18/12/2018
20	Analysis of Collection systems	Chalk and board	13/12/2018
21	Need for transfer and transport	Chalk and board	21/12/2018
22	Transfer stations	Chalk and board	23/12/2018
23	Labeling and handling of hazardous wastes.	Presentation	24/12/2018
24	Class room activity related to regional waste generation level, its composition and characterisation methods	Discussion and Quiz, Think-Pair-Share method	25/12/2018
25	Class room activity related to regional waste generation level, its composition and characterisation methods	Discussion and Quiz, Think-Pair-Share method	26/12/2018

	UNIT - IV		
	Waste Processing Technologies		
26	Waste processing	Presentation	02/01/2019
27	Processing technologies	Presentation	02/01/2019
28	Biological and chemical conversion technologies	Presentation	04/01/2019
29	Composting	Presentation	04/01/2019
30	Thermal conversion technologies	Presentation and discussion	07/01/2019
31	energy recovery	Presentation and discussion	08/01/2019
32	Incineration of solid waste and its impact on environment	Presentation and discussion	09/01/2019
33	Solidification and stabilization of hazardous wastes.	Chalk and board and presentation	14/01/2019
	UNIT - V		
	Soil and Control		
34	Disposal in landfills	Presentation/ Videos	18/01/2019
35	Site selection	Presentation/ Videos	21/01/2019
36	Design and operation of sanitary landfills	Presentation/ Videos	22/01/2019
37	SecureLandfills	Presentation/ Videos	24/01/2019
38	Leachate and landfill gas management	Presentation/ Videos	25/01/2019
39	Landfill closure and environmental monitoring	Presentation/ Videos	28/01/2019
40	Landfill remediation	Presentation/ Videos	29/01/2019
41	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019
42	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019
43	Revision/ Class work/ Discussion/ quiz during extra and free hours if any	Discussion and quiz	First week of February 2019

1. Topic Name	**:** Remote Sensing applications in Solid Waste Management.
Name of the Activity	**:** Class room discussion.
Description of the Activity	**:** Students will be given with task of preparing a Remote Sensing and GIS map for preparing Solid waste route marking for Warangal City.
2. Topic Name	**:** Solid Waste Source identification and mapping.
Name of the Activity	**:** Student discussion on SWM implementation in Warangal district.
Description of the Activity	**:** Students will be discussing on various methods of source collection of solid waste in Warangal district using multiple tools and techniques.

3. Topic Name	**:** Journal paper reading and understanding
Name of the Activity	**:** Group discussion.
Description of the Activity	**:** Lot of research works are done by researchers across the globe related to Solid Waste Management, students should read, discuss and obtain information related to them.
3. Topic Name	**:** Revision and class assignments
Name of the Activity	**:** Class assignment and open book test
Description of the Activity	**:** Students will be formed as groups and will be asked to check internet or books and find data about various patents, international trademarks and other related information. They will be asked to discuss about the same in the class for two hours in total.

TEXT BOOKS:

1. George Tchobanoglous, Hilary Theisen and Samuel A, Vigil, Integrated Solid Waste Management, McGraw- Hill, New York, 1993
2. Sewage Disposal and Air Pollution Engineering, Environmental Engineering- Volume II, S.K.Garg, Standard Publication.

REFERENCE BOOKS:

1. CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.
2. Solid Waste Management HB New title Edition by Dewan S.
3. SOLID AND LIQUID WASTE MANAGEMENT by Siddiqui Faisal Zia Agrawal Sanjeev
4. Municipal Solid Waste Management by N.N. Bandela , D.G. Tare.

Course Projects:

1) Students should design SWM plan for at least one city
2) Students should design as a team any two cities source collection pattern and segregation pattern.

Prepared By: G. Sangeetha

Note: Dates mentioned are only tentative and will be updated duly

Lesson Plan

Department: Civil Engineering	**Date:** 31/10/2018
Academic Year:2018-2019	**Year/ Semester : IV/II**
Name of the Faculty: S. Goverdhan Reddy	
Course Name: Retrofitting And Rehabilitation of Structures	**Course Code: CE146**
Prerequisite:	

Course Outcomes:

At the end of the course, the students will develop ability to

1. Understand the causes and prevention of deterioration in structures.
2. Interpret different types of damages in structures.
3. Understand failure mechanisms of different structures.
4. Categorize the causes and prevention mechanisms for various damages occurring in structures.
5. Examine to inspect and assess the structures using various techniques of inspection and NDT.
6. Estimate the structural damage and recommend suitable repair.
7. Apply various methods of retrofitting of structures.
8. Recommend and Make use of the latest health monitoring and building instrumentation methods.

Lecture Schedule:

S.No	Topic of the Lecture	Name of the Activity & Instructional Aids	Tentative Date
	UNIT – I		
1	**Introduction:** General Consideration – Distresses monitoring	PPT/BB	23/11/2018
2	Causes of distresses– Quality assurance	PPT/BB	23/11/2018
3	Defects due to climate, chemicals, wear and erosion	PPT/BB	24/11/2018
4	Inspection – Structural appraisal – Economic appraisal.	PPT/BB	30/11/2018
	UNIT – II		
5	**Distress and Tests:** Distress in concrete / steel / Masonry Structures	PPT	30/11/2018
6	Damage – source – cause – effects	PPT	01/12/2018
7	Damage – source – cause – effects — case studies	PPT	07/12/2018
8	Damage assessment and Evaluation models	PPT/BB	07/12/2018
9	Damage testing methods – NDT – Core samples.	PPT/Lab	08/12/2018
	UNIT – III		
10	**Rehabilitation:** Rehabilitation methods	PPT/BB	14/12/2018
11	Grouting – Surface Impregnation – Overlays	PPT	14/12/2018
12	Imbalance of structural stability – case studies	PPT	15/12/2018
13	Imbalance of structural stability – case studies	PPT	21/12/2018
	UNIT – IV		
14	**Repairs and Maintenance**	PPT	21/12/2018
15	Methods of repairs	PPT	22/12/2018
16	Short creating	PPT	28/12/2018
17	Guniting – epoxy injection	PPT	28/12/2018
18	Cement mortar injection	PPT	29/12/2018
19	Crack ceiling	PPT	04/01/2019
	UNIT – V		
20	**Strengthening of Existing Structures**	PPT/BB	04/01/2019
21	General principle	PPT	05/01/2019
22	General principle – relieving loads	PPT	11/01/2019
23	Strengthening super structures – plating – Conversation to composite construction	PPT	11/01/2019
24	Strengthening super structures – plating – Conversation to composite construction	PPT	12/01/2019
25	Post stressing	PPT	19/01/2019
26	Jacketing	PPT	25/01/2019
27	Bonded overlays – Reinforcement addition	PPT/BB	25/01/2019
28	Strengthening the substructures	PPT	26/01/2019
29	Strengthening the substructures	PPT	01/02/2019
30	Strengthening the substructures	PPT	01/022019
31	Under pinning	PPT	02/02/2019
32	Buildings Repair	PPT	08/02/2019
33	Buildings Repair	PPT	08/02/2019

34	Buildings Repair	PPT	09/02/2019
35	IS standards	PPT	15/02/2019
36	IS standards	PPT	15/02/2019
37	Bridge repairs	PPT	16/02/2019
38	Bridge repairs	PPT	22/02/2019
39	Seismic strengthening	PPT/BB	22/022019
40	Seismic strengthening	PPT/BB	23/02/2019
41	Case studies	Inspection and field study	01/0/2019
42	Case studies	Inspection and field study	01/03/2019
43	Case studies	Inspection and field study	02//03/2019
44	Bonded overlays – Reinforcement addition	PPT/BB	08/03/2019
45	Bonded overlays – Reinforcement addition	PPT/BB	08/03/2019

1. Topic Name **:** Strengthening of Existing Structures

Name of the Activity **:** Field visit

Description of the Activity **:** Building repairs

2. Topic Name **:** Strengthening super structures – plating – Conversation to composite construction

Name of the Activity **:** Field Visit

Description of the Activity **:** Jacketing

Course Prepared by: S. Goverdhan Reddy

Lesson Plan

Department: Civil Engineering	**Date:**15/11/2018
Academic Year:2018-19	**Year / Semester:** IV/II
Name of the Faculty: S. Haripriya Varma	
Course Name : Environmental Impact Assessment and Management	Course Code: CE147
Prerequisite: Environmental Studies	

Course Outcomes:

At the end of the course, the students will develop ability to

1. Understanding of current EIA methods and the techniques and tools used.
2. Understanding of current assessment methods and legislation.
3. Understanding of current environmental monitoring systems.
4. Apply knowledge acquired to the process of environmental impact modelling and prediction as a design tool with application to a number of case studies.
5. Apply knowledge on the various acts its application in various industries.
6. Determine impacts of any new project on the environment.
7. Apply concepts and application of environmental audit.
8. Apply knowledge on various EIA methods in various industries.

Lecture Schedule:

S.No	Topic of the Lecture	Name of the Activity & Instructional Aids	Tentative Date
	UNIT - I		
	Basic Concept Of Eia		
1	Introduction	Black Board/class room delivery	19/11/2018
2	Initial environmental Examination	Black Board/class room delivery	20/11/2018
3	Elements of EIA	Black Board/class room delivery	21/11/2018
4	factors affecting E-I-A	Black Board/class room delivery	23/11/2018
5	Impact evaluation and analysis	Black Board/class room delivery	26/11/2018
6	preparation of Environmental Base map	Black Board/class room delivery	27/11/2018
7	Classification of environmental parameters	Black Board/class room delivery	28/11/2018
8	Revision		30/11/2018
9	Activity	Think-pair aloud share	03/12/2018
	UNIT - II		
	E I Methodologies		
10	Introduction	Black Board/class room delivery	04/12/2018
11	Criteria for the selection of EIA Methodology.	Black Board/class room delivery	05/12/2018
12	E I A methods- Ad-hoc methods- matrix methods.	Black Board/class room delivery	07/12/2018
13	Network method Environmental Media Quality Index method	Black Board/class room delivery	10/12/2018
14	overlay methods- cost/benefit Analysis	Black Board/class room delivery	11/12/2018
15	Impact of Developmental Activities and Land use	Black Board/class room delivery	14/12/2018
16	Introduction and Methodology for the assessment of soil and ground water	Black Board/class room delivery	17/12/2018
17	Delineation of study area	Black Board/class room delivery	18/12/2018
18	Identification of actives	Black Board/class room delivery	19/12/2018
19	Revision		21/12/2018
20	Activity	Collaborative learning, technique-JIGSAW STRATEGY	25/12/2018
	UNIT - III		
	Procurement Of Relevant Soil Quality		
21	Impact prediction	Black Board/class room delivery	28/12/2018

22	Assessment of Impact significance	Black Board/class room delivery	02/01/2019
23	Identification and Incorporation of mitigation measures	Black Board/class room delivery	03/01/2019
24	E I A in surface water- Air and Biological environment.	Black Board/class room delivery	04/01/2019
25	Methodology for the assessment of Impacts on surface water environment.	Black Board/class room delivery	07/01/2019
26	Air pollution sources- generalized approach for assessment of Air pollution Impact.	Black Board/class room delivery	10/01/2019
27	Assessment of Impact of development Activities on Vegetation and wildlife-environmental Impact of Deforestation	Black Board/class room delivery	11/01/2019
28	Cause sand effects of deforestation	Black Board/class room delivery	21/01/2019
29	Revision		22/01/2019
30	Activity	Think-pair aloud share	25/01/2019
	UNIT - IV		
	Environmental Audit And Environmental Legislation		
31	Objectives of Environmental Audit	Black Board/class room delivery	26/01/2019
32	Types of environmental Audit	Black Board/class room delivery	27/01/2019
33	benefits of environmental audit	Black Board/class room delivery	28/01/2019
34	stages of Environmental Audit	Black Board/class room delivery	29/01/2019
35	Post Audit activities	Black Board/class room delivery	30/01/2019
36	The Environmental pollution Act	Black Board/class room delivery	01/02/2019
37	The water Act	Black Board/class room delivery	04/02/2019
38	The Air Prevention and Control of pollution Act.	Black Board/class room delivery	05/02/2019
39	Revision		13/02/2019
40	Activity	Collaborative learning, technique-JIGSAW STRATEGY	15/02/2019
	UNIT - V		
	Case Studies		
41	Preparation of Environmental Impact assessment statement for various Industries.	Black Board/class room delivery	21/02/2019
42	Preparation of Environmental Impact assessment statement for various Industries	Black Board/class room delivery	22/02/2019
43	Preparation of Environmental Impact assessment statement for various Industries	Black Board/class room delivery	26/02/2019

44	Preparation of Environmental Impact assessment statement for various Industries	Black Board/class room delivery	27/02/2019
45	Preparation of Environmental Impact assessment statement for various Industries	Black Board/class room delivery	28/02/2019
46	Revision		02/03/2019
47	Activity	Think-pair aloud share	04/03/2019

1. Topic Name UNIT-1, UNIT-III, UNIT-V

Name of the Activity : Think-pair aloud share

Description of the Activity : Think-Pair-aloud Share is a collaborative learning strategy in which students work together to solve a problem or answer a question about an assigned reading. This technique requires students to (1) think individually about a topic or answer to a question; and (2) share ideas with classmates. Discussing an answer with a partner serves to maximize participation, focus attention and engage students in comprehending the reading material.

2. Topic Name : UNIT-II, UNIT-IV

Name of the Activity : JIGSAW STRATEGY

Description of the Activity : The jigsaw technique is a method of organizing classroom activity that makes students dependent on each other to succeed. It breaks classes into groups and breaks assignments into pieces that the group assembles to complete the jigsaw (assigned task).

Course Projects: Students can do the projects on the Environmental Impacts.

Prepared by: S.Haripriya Varma