Lesson Plan/ Course Break – up

CE402E BRIDGE ENGINEERING

Name of the Faculty	**:**	Mr. Manik Goyal
Discipline	**:**	B.Tech in Civil Engineering
Semester	**:**	VIII (4th Year)
Subject	**:**	CE402E BRIDGE ENGINEERING
Lesson Plan Duration	**:**	15 Weeks (from January, 2019 to April, 2019)
Work Load (Lecture / Tutorial) per week (in hrs.)	**:**	Lectures – 03, Tutorial-01

Week	Theory	
	Lecture Day	Topic (Including assignment / Test)
1st	1	Definition, components of bridge, classification of bridges.
	2	Selection of site, economical span.
	3	Aesthetics consideration, necessary investigations. Essential design data.
2nd	4	**Standard Specifications for Roads and Railways Bridges:** General, Indian Road Congress Bridge Code, width of carriage way, clearance,
	5	Various loads to be considered for the design of roads bridges, detailed explanation of IRC standard live loads.
	6	Various loads to be considered for the design of railway bridges, detailed explanation of IRC standard live loads.
3rd	7	**Design Consideration for R. C. C. Bridges:** Various types of R.C.C. bridges(brief description of each type)
	8	Design of R.C.C. culvert bridges.
	9	Design of R.C.C. culvert bridges.
4th	10	Design of R.C.C. culvert bridges.
	11	Design of R.C.C. T-beam bridges.
	12	Design of R.C.C. T-beam bridges.
5th	13	**Design Consideration for Steel Bridges:** Various types of steel bridges (brief description of each)
	14	Various types of steel bridges (brief description of each)
	15	Design of truss bridges.
6th	16	Design of truss bridges.
	17	Design of truss bridges.
	18	Design of truss bridges.
7th	**1st Minor Test**	
8th	19	Design of plate girder bridges.
	20	Design of plate girder bridges.
	21	Design of plate girder bridges.
9th	22	Design of plate girder bridges.
	23	Design of plate girder bridges.
	24	Design of plate girder bridges.
10th	25	Design of plate girder bridges.
	26	Design of plate girder bridges.
	27	**Hydraulic & Structural Design:** Piers
11th	28	**Hydraulic & Structural Design:** Piers
	29	**Hydraulic & Structural Design:** Piers
	30	**Hydraulic & Structural Design:** Abutments

12th	31	**Hydraulic & Structural Design:** Abutments	
	32	**Hydraulic & Structural Design:** Abutments	
	33	**Hydraulic & Structural Design:** wing-wall and approaches	
13th	34	**Hydraulic & Structural Design:** wing-wall and approaches	
	35	**Hydraulic & Structural Design:** wing-wall and approaches	
	36	**Brief Description:** Bearings, joints, articulation and other details.	
14th	**2nd Minor test**		
15th	37	**Bridge Foundation:** Various types, Necessary investigations	
	38	Design criteria of well foundation	
	39	Design criteria of well foundation	

Lesson Plan

CE – 404E Railway and Airport Engineering

Name of the Faculty	**:**	Mr. Kamaldeep Singh
Discipline	**:**	B.Tech in Civil Engineering
Semester	**:**	VIII (4th Year)
Subject	**:**	CE – 404E Railway and Airport Engineering
Lesson Plan Duration	**:**	15 Weeks (from January, 2019 to April, 2019)
Work Load (Lecture / Tutorial) per week (in hrs.)	**:**	Lectures – 02, Tutorial-01

Week	Theory	
	Lecture day	**Topic (Including Assignment Test)**
1st	1	Introduction, Permanent Way and Rails, Rail transportation and its importance in India.
	2	Permanent way: requirements and components, Gauges in India and abroad. Selection of gauge. Coning of wheels. Adzing of sleepers
2nd	3	Rails: functions, composition of rail steel, types of rail sections, requirements of an ideal rail section, length of rails.
	4	Defects in rails. Creep of rails. Long welded rails and continuously welded rails. Sleepers: functions, requirements of an ideal sleeper. Types of sleepers: wooden, cast iron, steel and concrete sleepers, advantages, disadvantages and suitability of each type.
3rd	5	Sleeper density. Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars.
	6	Elastic fastenings. Ballast: functions, requirements, types of ballast and their suitability
4th	7	**Points and Crossings:** Necessity. Turnout: various components, working principle.
	8	Switch: components, types. Crossing: components and types. Design elements of a turnout, design of a simple turnout.
5th	9	Layout plan of track junctions: crossovers, diamond crossing, single-double slips, throw switch, turn table, triangle.
	10	**Signaling, Interlocking and Train Control:** Signals: objects, types and classification. Semaphore signal: components, working principle. Requirements / principles of a good interlocking system.
6th	11	Brief introduction to devices used in interlocking. Methods of control of train movements: absolute block system, automatic block system,
	12	Centralized train control and automatic train control systems. **Geometric Design of the Track:** Gradients, grade compensation. Super elevation, cant deficiency, negative super elevation.
7th	13	**MINOR TEST I**
	14	
8th	15	Maximum permissible speed on curves. Tractive resistances, types. Hauling capacity of a locomotive.
	16	**Stations, Yards and Track Maintenance:** Stations: functions and classification. Junction, non-junction and terminal stations.

9th	17	Yards: functions, types. Marshalling yard: functions, types.
	18	Maintenance of railway track: necessity, types of maintenance. Brief introduction to mechanized maintenance, M.S.P and D.T.M.
10th	19	**Introduction and Airport Planning:** Air transportation, its importance and characteristics, status in India
	20	Layout plan of an airport and its basic elements: terminal area, apron, taxiway, runway, hanger, Aircraft characteristics, their effect on elements of an airport.
11th	21	Site selection of an airport
	22	Classification of airports, **Runway Layout and Pavement Design:** Runway orientation
12th	23	Wind Rose diagram
	24	Basic runway length. Corrections to basic runway length, Numerical Problem
13th	25	Runway patterns
	26	Difference between highway and runway pavement, Types of runway pavements
14th	27	**MINOR TEST II**
	28	
15th	29	Design factors for runway pavement.
	30	Brief introduction to design of thickness of a runway pavement, Illustrative example for runway pavement thickness

Lesson Plan/ Course Break – up

CE 406-E INDUSTRIAL WASTE WATER TREATMENT

Name of the Faculty : Mr. Kuldeep Singh

Discipline : B.Tech in Civil Engineering

Semester : VIII (4th Year)

Subject : CE 406-E, IWWT

Lesson Plan Duration : 15 Weeks (from January, 2019 to April, 2019)

Work Load (Lecture / Tutorial) per week (in hrs.) : Lectures – 03, Tutorial-01

Week	Theory	
	Lecture day	**Topic (Including Assignment Test)**
1st	1	Industrial Waste Water - introduction
	2	Current Issues in Water and Wastewater Treatment Operations
	3	Wastewater Regulations, Parameters, and Characteristics, Wastewater Sources and Types
2nd	4	Wastewater Treatment: Basic Overview
	5	Collection Systems
	6	Preliminary Treatment, Primary Sedimentation
3rd	7	Biological Treatment
	8	Secondary Sedimentation
	9	Advanced Treatment, Wastewater Disinfection
4th	10	Discharge Effluent
	11	Methods for IWWT - Introduction
	12	Effects of industrial wastes on stream, Sewerage systems - Introduction
5th	13	Types of Sewerage systems, Design of economical diameter of sewerage pipe
	14	Wastewater treatment plant - introduction
	15	Minimizing the effects of industrial effluents on waste water treatment plants and receiving streams-conservation of water
6th	16	Pretreatment of Industrial Wastes - Introduction
	17	Pretreatment of Industrial Wastes – Unit Operations, Unit Processes
	18	Reuse of waste water, volume reduction

7th	19	**MINOR TEST I**
	20	
	21	
8th	22	Strength reduction, neutralization**,** equalization and proportioning, Population equivalent
	23	Industrial effluent standards for disposal into inland surface water sources and on land for irrigation
	24	Study of the following Industries from waste generation, quality and its treatment including brief overview of manufacturing process: Textile – manufacturing process brief introduction
9th	25	Textile wastes: Cotton textile wastes
	26	Raw Material, Manufacturing Process, Spinning, weaving and sizing
	27	Desizing, Caustic Kiering, Bleaching, Souring, Synthetic Fiber Wastes, Silk and Jute Manufacturing wastes
10th	28	Tannery - manufacturing process brief introduction
	29	Tannery - waster generation, Characteristics of waste water and its treatment
	30	Sugar Mill - manufacturing process brief introduction, waster generation and its treatment
11th	31	Distillery - manufacturing process brief introduction
	32	Distillery - waster generation and its treatment
	33	Dairy, pulp & paper - manufacturing process brief introduction, waster generation and its treatment
12th	34	Metal plating, oil refinery - manufacturing process brief introduction
	35	Metal plating, oil refinery - waster generation and its treatment
	36	Nitrogenous fertilizers - brief introduction, Ammonia Synthesis, Urea Synthesis
13th	37	Phosphoric Acid, Ammonium Sulphate, DAP
	38	Methods of treatment
	39	Thermal power plants - manufacturing process brief introduction,waster generation and its treatment
14th	40	**MINOR TEST II**
	41	
	42	
15th	43	Radio-active wastes - brief introduction
	44	Handling Radioactive Material
	45	Waster generation, Case Studies, Treatment and Management

Lesson Plan

CE-408E Estimation and Accounts

Name of the Faculty : Mr. Harish Kumar

Discipline : B.Tech in Civil Engineering

Semester : VIII (4th Year)

Subject : CE-408E Estimation and Accounts

Lesson Plan Duration : 15 Weeks (from January, 2019 to April, 2019)

Work Load (Lecture / Practical) per week (in hrs.) : Practical – 02

Week	Practical	
	Lecture day	**Topic (Including Assignment Test)**
1st	1	Estimate: Principles of estimation, units, items of work, different kinds of estimates,
	2	different methods of estimation, estimation of materials in single room building,
2nd	3	Illustrative example
	4	two roomed building with different sections of walls, foundation, floors and roofs,
3rd	5	Illustrative example
	6	R.B. and R.VC.C. works, Plastering, White-washing, Distempering and painting, doors and windows, lump sum items,
4th	7	Estimates of canals, roads etc.
	8	Illustrative example
5th	9	Specification of Works: Necessity of specifications, types of specifications, general specifications,
	10	Specification for bricks, cement, sand, water, lime, reinforcement;
6th	11	Detailed specifications for Earthwork, Cement, concrete, brick work, floorings, D.P.C., R.C.C.,
	12	Cement plastering, white and color washing, distempering, painting.
7th	13	**MINOR TEST I**
	14	
8th	15	**VIVA – VOCE Group - 1**
	16	**VIVA – VOCE Group - 2**
9th	17	Rate Analysis: Purpose, importance and requirements of rate analysis, units of measurement,
	18	Preparation of rate analysis, procedure of rate analysis for items:- Earthwork, concrete works,
10th	19	Procedure of rate analysis for items: -R.C.C. works, reinforced brick work, plastering, painting, finishing (white-washing, distempering).

	20	Public Works Account: Introduction, function of P.W. department, contract,
11th	21	Guidelines, types of contracts, their advantages and disadvantages,
	22	Tender and acceptance of tender, Earnest money, security money, retention money,
12th	23	Illustrative example of contract and tender
	24	Measurement book, cash book, preparation, examination and payment of bills,
13th	25	First and final bills, administrative sanction, technical sanction
	26	Illustrative example of Measurement book and bill preparation
14th	27	**MINOR TEST II**
	28	
15th	29	**VIVA – VOCE Group - 1**
	30	**VIVA – VOCE Group - 2**

Lesson Plan/ Course Break – up

CE – 414E Geosynthetics Engineering

(Department Elective – III)

Name of the Faculty	**:**	Mr. Pardeep Kumar
Discipline	**:**	B.Tech in Civil Engineering
Semester	**:**	VIII (4th Year)
Subject	**:**	CE-414E, Geosynthetics Engineering
Lesson Plan Duration	**:**	15 Weeks (from January, 2019 to April, 2019)
Work Load (Lecture / Tutorial) per week (in hrs.)	**:**	Lectures – 03, Tutorial-01

Week	**Theory**	
	Lecture day	**Topic (Including Assignment Test)**
1st	1	• Introduction to Geosynthetics • Background of reinforced earth • Basic description, mechanism and concept • Historical Development of Geosynthetics
	2	• Nomenclature related to geosynthetics • Function of geosynthetics
	3	• Use around the World • Applications of geosynthetics • Development in India
2nd	4	• Geosynthetics classification, functions
	5	• Raw material used, different types of geosynthetics
	6	• Raw Materials: Polyester, Polypropylene, • Polyethylene, HDPE, CPE, CSPE, PA, Nylon, PVC etc.
3rd	7	• Their Durability and Ageing
	8	• Different types of geosynthetics: Geotextiles,
	9	• Geogrids, Geonets and Geo membranes • Physical properties of geosynthetics
4th	10	• Mechanical properties
	11	• Hydraulic – Permeability properties
	12	• Endurance Properties and Nano Material
5th	13	• Degrading Agencies, Biological Resistance

	14	• Chemical Resistance and Weathering Resistance
	15	• Abrasion resistance, • Durability properties
6th	16	• Melt flow index and asphalt retention
	17	**Manufacturing Methods of:** • Fibers, Yarn, Nonwoven Geotextiles,
	18	• D.S.F. Fabrics • **Geogrids –** Introduction, Applications
7th	19	**MINOR TEST 1**
	20	
	21	
8th	22	• Tests on Geogrids: Aperture opening & Percent open area
	23	• Thickness of rib and junctions, Number of ribs per meter length test
	24	• Mass per unit area test, Tensile strength test
9th	25	• Interface frictional strength: Shear and pullout
	26	• Connection strength between facing blocks and Geogrids
	27	• Sampling, Factors influencing Testing
10th	28	• Physical Properties
	29	• Physical Properties
	30	• Mechanical Properties under Uniaxial loading • Creep Testing
11th	31	• Test on Geonets - I
	32	• Test on Geo membranes: thickness, density
	33	• Tensile strength / Elongation test, • Permeability test
12th	34	• **Erosion Control with Geogrids:** Wind Erosion, Rain Water Erosion
	35	• Erosion Control Measures, Placement of Geogrids
	36	**Bearing Capacity Improvement with Geogrids:** • Reinforced soil system, • Geocells
13th	37	• Geofoam systems

	38	• Advantages, Mechanism, Modes of Failure
	39	• Friction Coefficient, • Experimental Studies
14th	40	**MINOR TEST – II**
	41	
	42	
15th	43	**Application of Geosynthetics in Water Resource Projects: Case Study** • Dharoidam, Hiran II Dam
	44	• Dharoidam, Hiran II Dam
	45	• Meda Creek Irrigation Scheme • Lining of Kakarpar Canal

Lesson Plan/ Course Break – up

CE – 418E Ground Water Hydrology

(Department Elective – III)

Name of the Faculty : Mr. Manju Godara

Discipline : B.Tech in Civil Engineering

Semester : VIII (4th Year)

Subject : CE-418E, Ground Water Hydrology

Lesson Plan Duration : 15 Weeks (from January, 2019 to April, 2019)

Work Load (Lecture / Tutorial) per week (in hrs.) : Lectures – 03, Tutorial-01

Week	Theory		
	Lecture Day	Topic (Including assignment / Test)	
Unit-I			
1st	1	Properties of Aquifers	
	2	Formation constants, compressibility of aquifers	
	3	Equation of motion for steady and unsteady ground water flow in isotropic homogeneous aquifers	
2nd	4	Equation of motion for steady and unsteady ground water flow in isotropic homogeneous aquifers	
	5	Equation of motion for steady and unsteady ground water flow in isotropic homogeneous aquifers, Dupit's assumptions	
	6	Unconfined flow with a recharge	
3rd	7	Tile drain problem	
	8	Ground water exploration and methods of investigations	
	9	Ground water exploration and methods of investigations	
Unit-II			
4th	10	Effect of boundaries	
	11	Interference of water	
	12	leaky aquifers	
5th	13	Thiem's equilibrium formula for unconfined and confined aquifers and determination of hydraulic properties of aquifers	
	14	Thiem's equilibrium formula for unconfined and confined aquifers and determination of hydraulic properties of aquifers	
	15	Thiem's equilibrium formula for unconfined and confined aquifers and determination of hydraulic properties of aquifers	
6th	16	Partial penetration of an aquifer by a well	
	17	Spherical flow in a well	
	18	Non equilibrium formula for aquifer (unsteady radial flows)	
7th	**1st Minor Test**		
Unit-III			
8th	19	Tube wells, design of tube wells in different aquifers	
	20	Optimum capacity, silting of tube well	
	21	tube well types and its parts	
9th	22	Bore hole, strains, its types, well pipe, casing pipe, blind pipe	
	23	Construction and working of tube wells, site selection	
	24	drilling operation, cable tool method, hydraulic method, rivers Rotary Method and drilling fluids, well screen assembly installation, verticality and alignment of tube wells, gravel	

		packing,	
10th	25	development of tube wells, sickness	
	26	In construction and corrosion and failure of tube wells	
	27	Pumping equipment and hydraulic testing of pumps	
Unit-IV			
11th	28	Artificial recharge of ground water	
	29	Considerations and methods	
	30	Considerations and methods, Recharge techniques induced infiltration	
12th	31	Water spreading	
	32	Flooding	
	33	Basins	
13th	34	Ditching	
	35	Modification of natural channels	
	36	Modification of natural channels	
14th	**2nd Minor test**		
15th	37	Irrigation, recharge pits	
	38	Irrigation, recharge pits	
	39	Shafts and recharge wells	

Lesson Plan

CE - 426E TRANSPORTATION ENGINEERING – II (P)

Name of the Faculty : Mr. Manik Goyal

Discipline : B.Tech in Civil Engineering

Semester : VIII(4th Year)

Subject : CE - 426E Transportation Engineering – II (P)

Lesson Plan Duration : 15 Weeks (from January, 2019 to April, 2019)

Work Load (Lecture / Practical) per week (in hrs.) : Practical – 02

Week	Practical	
	Lecture day	Topic (Including Assignment Test)
1st	1	Experiment 1 –Flakiness and Elongation Index of aggregates (Group 1)
	2	Experiment 1 –Flakiness and Elongation Index of aggregates (Group 2)
2nd	3	Experiment 2 –Specific gravity and water absorption test on aggregates (Group 1)
	4	Experiment 2 - Specific gravity and water absorption test on aggregates (Group 2)
3rd	5	Experiment 3 - Specific gravity of bitumen(Group 1)
	6	Experiment 3 - Specific gravity of bitumen (Group 2)
4th	7	Experiment 4 - Proportioning of aggregates (Group 1)
	8	Experiment 4 - Proportioning of aggregates (Group 2)
5th	9	Experiment 5 - Marshall's stability test (Group 1)
	10	Experiment 5 - Marshall's stability test (Group 2)
6th	11	Experiment 6 - Stripping test on aggregates (Group 1)
	12	Experiment 6 - Stripping test on aggregates (Group 2)
7th	13	**MINOR TEST I**
	14	
8th	15	**VIVA – VOCE Group - 1**
	16	**VIVA – VOCE Group - 2**
9th	17	Experiment 7– Determination of bitumen content (Group 1)
	18	Experiment 7 - Determination of bitumen content (Group 2)
10th	19	Experiment 8 -CBR lab test on soil (Group 1)

	20	Experiment 8 - CBR lab test on soil (Group 2)
11th	21	IRC 37 – 2012 specification, CBR calculations and error corrections (Group 1)
	22	IRC 37 – 2012 specification, CBR calculations and error corrections (Group 2)
12th	23	Experiment 9–Traffic volume study using videography technique(Group 1)
	24	Experiment 9 - Traffic volume study using videography technique(Group 2)
13th	25	Experiment 10 - Traffic speed study using videography technique(G1)
	26	Experiment 10 - Traffic speed study using videography technique(G2)
14th	27	**MINOR TEST II**
	28	
15th	29	**VIVA – VOCE Group - 1**
	30	**VIVA – VOCE Group - 2**

Lesson Plan

CE-428E ENVIRONMENTAL ENGINEERING-II (P)

Name of the Faculty : Ms.Manju Godara

Discipline : B.Tech in Civil Engineering

Semester : VIII (4th Year)

Subject : CE-428E Environmental Engineering-II (P)

Lesson Plan Duration : 15 Weeks (from January, 2019 to April, 2019)

Work Load (Lecture / Practical) per week (in hrs.) : Practical – 02

Week	Practical	
	Lecture day	**Topic (Including Assignment Test)**
1st	1	Exp. 1 - Determine the acidity and alkalinity of a sewage sample (Group 1)
	2	Exp. 1 - Determine the acidity and alkalinity of a sewage sample (Group 2)
2nd	3	Exp. 2 - Determine total, suspended, dissolved and settable solids in a sewage sample (Group 1)
	4	Exp. 2 - Determine total, suspended, dissolved and settable solids in a sewage sample (Group 2)
3rd	5	Exp. 3 - Determine volatile and fixed solids in a sewage sample (Group 1)
	6	Exp. 3 - Determine volatile and fixed solids in a sewage sample.(Group 2)
4th	7	Exp. 4 - To determine oil and grease in a sewage sample.(Group 1)
	8	Exp. 4 - To determine oil and grease in a sewage sample.(Group 2)
5th	9	Exp. 5 - To determine the chloride concentration in a sewage sample. (Group 1)
	10	Exp. 5 - To determine the chloride concentration in a sewage sample.(Group 2)
6th	11	Exp. 6 - To determine the Sulphate concentration in a sewage sample.(Group 1)
	12	Exp. 6 - To determine the Sulphate concentration in a sewage sample.(Group 2)
7th	13	**MINOR TEST I**
	14	
8th	15	**VIVA – VOCE Group - 1**
	16	**VIVA – VOCE Group - 2**
9th	17	Exp. 7 - To determine the B.O.D. of a given sewage sample. (Group 1)
	18	Exp. 7 - To determine the B.O.D. of a given sewage sample.(Group 2)

10th	19	Exp. 8 - To determine the C.O.D. of a given sewage sample.(Group 1)
	20	Exp. 8 - To determine the C.O.D. of a given sewage sample.(Group 2)
11th	21	Exp. 9 - To determine the T.O.C. of a given sewage sample.(Group 1)
	22	Exp. 9 - To determine the T.O.C. of a given sewage sample.(Group 2)
12th	23	Exp. 10 - To determine the fecal count of a given sewage sample.(Group 1)
	24	Exp. 10 - To determine the fecal count of a given sewage sample.(Group 2)
13th	25	Exp. 11 - Microscopic studies of a sewage. (Group 1)
	26	Exp. 11 - Microscopic studies of a sewage. (Group 2)
14th	27	**MINOR TEST II**
	28	
15th	29	**VIVA – VOCE Group - 1**
	30	**VIVA – VOCE Group - 2**