SYLLABUS

OF

B. TECH

OF

IV YEAR

B. TECH. (CBCS)

DEPARTMENT OF CIVIL ENGINEERING

INTEGRAL UNIVERSITY LUCKNOW

SYLLABUS AND EVALUATION SCHEME

Branch: Civil Engineering (w.e.f. 2022-23)

Year – IV, Semester – VII

S. No.	Course Category	Code No	Name of Subject	Periods			Credits	Evaluation Scheme				Subject Total
								Sessional Exam			Exam ESE	
				L	T	P	C	CT	TA	Total		
1	DC	CE401	Environmental Engineering-II	3	1	0	4	40	20	60	40	100
2	DC	CE402	Construction Technology and Management	3	1	0	4	40	20	60	40	100
3	DC	CE403	Steel Structure	3	1	0	4	40	20	60	40	100
4	DE	CE404-CE407	Department Elective-III	3	1	0	4	40	20	60	40	100
5	DE	CE410-CE413	Department Elective-IV	3	1	0	4	40	20	60	40	100
PRACTICAL / DRAWING / DESIGN												
6	DC	CE418	Environmental Engineering Lab-II	0	0	2	1	40	20	60	40	100
7	DC	CE419	Structural Detailing Lab	0	0	2	1	40	20	60	40	100
8	DC	CE420	Minor Project	-	-	2	1	-	-	60	40	100
9	DC	CE300*	IndustrialTraining	-	-	-	0	-	-	-	50	50
Total				**15**	**5**	**6**	**23**					**800**

*Note: Industrial Training (CE300) is a zero credit course. Student must clear this paper with 50% marks and marks will not be included in result

L – Lecture; **T –** Tutorial; **P –**Practical; **C** – Credits; **CT** – Class Test; **TA** – Teacher Assessment
Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

DC – Departmental Core
DE – Departmental Elective
OE – Open Elective

SYLLABUS AND EVALUATION SCHEME

Branch: Civil Engineering(w.e.f. 2022-23)

Year – IV, Semester – VIII

S. No.	Course Category	Code No	Name of Subject	PERIODS			Credits	EVALUATION SCHEME				Subject Total
								SESSIONAL EXAM			EXAM	
				L	T	P	C	CT	TA	Total	ESE	
THEORY SUBJECT												
1	OE	-	Open Elective - II	3	1	0	4	40	20	60	40	100
PRACTICAL / DRAWING / DESIGN												
2	DC	CE499	B.Tech Project	-	-	-	4	-	-	60	40	100
3	DC	CE499	B.Tech Project	-	-	-	4	-	-	60	40	100
4	DC	CE499	B.Tech Project	-	-	-	4	-	-	60	40	100
5	DC	CE451	Seminar	-	-	-	3	-	-	60	40	100
6	DC	CE452	Comprehensive Assessment	-	-	-	2	-	-	100	-	100
Total				**3**	**1**	**0**	**21**					**600**

L – Lecture; **T –** Tutorial; **P –** Practical; **C** – Credits; **CT** – Class Test; **TA** – Teacher Assessment
Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

DC – Departmental Core
DE – Departmental Elective
OE – Open Elective

List of Departmental Electives (III & IV)

Departmental Elective - III

CE404	Transportation System &Planning
CE405	Advanced Concrete Design
CE406	Environmental Pollution Control
CE407	Design of Waste Water System

Departmental Elective - IV

CE410	Earthquake Resistant Design
CE411	Advanced Foundation Design
CE412	Impact of Climate Change for CivilEngineering Projects
CE413	Plastic Design of Steel Structures

Integral University, Lucknow

Effective from Session:2018-19							
Course Code	CE401	**Title of the Course**	Environmental Engineering-II	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	3	1	0	4
Pre-Requisite	CE310	**Co-requisite**	NIL				
Course Objectives	Students will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and societal responsibilities. Students will have the necessary qualifications for employment in environmental engineering and related professions, for entry into advanced studies.						

CourseOutcomes	
CO1	The learner will learn basic management skill in given environmental condition about various characteristics of sewage.
CO2	Learner will understand the basic water management and design criteria of sewer.
CO3	To understand various treatment process and engineering knowledge for filter design.
CO4	The learner will learn about sewage stabilization and environmental condition of sewage.
CO5	To learn the waste management in given environmental condition in given location.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Wastewater Quality and Quantity Estimation	Introduction to wastewater engineering, wastewater management, Wastewater Quantity Estimation, Fluctuations in Dry Weather Flow, Population Equivalent, Wastewater Characterization.	**8**	**CO1**
2	Wastewater Collection and Conveyance	Conservancy system, Waste water carriage system, wastewater flow rates, storm water flow, Hydraulic design of Sewers, construction of sewers, Sewer Appurtenances.	**8**	**CO2**
3	Wastewater Treatment	Unit operations and unit processes for wastewater treatment, Preliminary and Primary treatment: Screening, grit chamber, Sedimentation and chemical clarification. Secondary treatment: Types of biological treatment systems, theory and design of trickling filter; theory and design of Activated sludge process.	**8**	**CO3**
4	Miscellaneous Method	Oxidation ditch, aerated lagoons, waste stabilization pond, Rotating biological contactors, Up flow anaerobic sludge blanket reactor, Introduction to Duckweed pond, Vermiculture and Root zone technology.	**8**	**CO4**
5	Waste Management	Sludge characteristics, Sludge Treatment process, disposal of sludge, septic tank, solid waste disposal, composting, incineration, Introduction to sanitary landfill.	**8**	**CO5**

Reference Books:

Birdie G.S and Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons, 2010.
Duggal K N, Elements of Environmental Engineering, S Chand & Co Ltd.
Garg S K, Environmental Engineering Vol II, Khanna Publishers, 2010
Fair, Gayer and Okun, Water and Waste water Engineering Vol. II, John Wiley. 3rd Edition 2011.
Metcalf and Eddy, Waste Water Engineering, Treatment, Disposal & Reuse, Tata McGraw Hill. 2002.

e-Learning Source:

https://nptel.ac.in/courses/105105178

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	0	0	0	3	0	0	0	0	0	2	1
CO2	3	2	3	0	0	0	3	0	0	0	0	0	1	2
CO3	3	2	3	0	0	0	3	0	0	0	0	0	1	1
CO4	3	0	0	0	0	0	3	0	0	0	0	0	3	2
CO5	3	0	0	0	0	0	3	0	0	0	0	0	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE402	**Title of the Course**	Construction Technology and Management	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	3	1	0	4
Pre-Requisite	NIL	**Co-requisite**	NIL				
Course Objectives	• To make the students aware regarding general construction practices used in past and in upcoming future. • To impart the practical knowledge of Construction Management tools and methods used in Project monitoring and Control. • To make them aware about the construction safety and its guidelines to ensure safe construction environment. • To develop problem solving skills to overcome practical/situation based site execution problems in construction industry. • To enhance the skills by using operation, maintenance and productivity ethics for Equipment end use.						

CourseOutcomes	
CO1	To make students familiar with the past and recent trends of construction industry using project management tools.
CO2	Understand the information based on construction activity monitoring and to analyses the problems using Network diagram techniques.
CO3	To make the students aware about the globally recognized guidelines, theories for safety and other economic benefits.
CO4	Learner will be able to understand the problems associated with contract administration & bidding due to poor management of construction projects.
CO5	To facilitate the need to understand the productivity of construction equipment based on various construction works.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Fundamentalsof Construction Management	Introduction, Problems in Construction Industry, History of Construction Management. Construction Projects & its Classifications .Project Cycle, Project Parameters, Organizations in Construction Industry, Planning, Scheduling, Monitoring and Management Information System.	08	CO1
2	Network Techniques & Analysis	Basic Concepts , Application of PERT, CPM, GERT, AOA & AON Networks and its applications , Critical Path, Bar Charts, Milestone Chart, Time Estimates, Preparation of Network Diagrams, Crashing, Cost Planning, Resource Allocation, Resource Planning, Line of Balance Techniques.	08	CO2
3	Construction Safety & Engineering Economics	Introduction, Hazards in Construction Projects, Cause of Accidents, Classifications of Construction Accidents, General Safety Programme, and Accident Report, Safety Precautions at Construction Site. Engineering Economics- Time Value of Money, Cash Flow Diagrams, Payback Period, Replacement Analysis, Concept of Depreciation and its methods, Break even chart Analysis.	08	CO3
4	Contract Management	Introduction, Indian Contract Act, Labour Laws, Prequalification of Contracts, Selection of Contractor, Classification of Contracts, Conditions of Contract, Prerequisites of Tendering, Tender Document, Tender Notice, Security Deposit , Earnest Money Deposit, Evaluation of Tenders, Contract Negotiation, Award of Contract, Termination of Contract, Settlements of Disputes, Arbitration and Conciliation Act, Commissioning and Closure of Project.	08	CO4
5	Construction Equipment Management	Introduction, Procurement of Equipment, Selection of Equipment, Productivity, Operational Cost, Owning and Hiring Cost, Work motion Study, Equipment Maintenance, Time Concepts for use, Depreciation, earth moving Equipments, Hauling and Hoisting Equipments, Concrete Production Equipments, Operational Use of equipments.	08	CO5

Reference Books:

Dr. U.K.Shrivastava "Construction Planning and Management",Galgotia Publications.; 3rd Edition 2005.

Kumar Neeraj Jha, " Conmstruction Project Management ", Pearson New Delhi; 1st Edition 2005.

K.G.Krishnamurthy and S.V.Ravindra "Construction and Project Management" CBS Publishers and Distributers Pvt.ltd.; 2ndEdition 2017.

IS 456-2000 Indian Standard "Construction Planning, Equipment and Methods", Mc Graw Hill; 7th Edition 2006.

e-Learning Source:

http://nptel.ac.in/courses/105103093/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	0	0	0	0	0	0	0	0	0	3	3	1	3
CO2	3	3	0	0	0	0	0	0	0	0	3	0	2	3
CO3	3	0	0	0	0	3	0	0	0	0	3	0	1	3
CO4	3	0	0	0	0	0	0	0	0	0	3	3	1	3
CO5	2	0	0	0	0	0	0	2	0	0	3	2	1	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE403	**Title of the Course**	Steel Structures	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	**3**	**1**	**0**	**4**
Pre-Requisite	CE204	**Co-requisite**	Nil				
Course Objectives	◆ Learner will understand the types and requirement of connections in steel members, then they should be able to design connection given conditions by following guide line of code IS: 800 of code IS: 800 ◆ Learner will understand the behavior & significance of different parameter of compression member, and should be able to design of compression member by following guide line of Indian codes. ◆ Learner will understand the behavior & mode of failures of tension member, then they be should able to design of tension member by following guide line of Indian codes. ◆ Learner will understand the behavior flexural member, then they be should able to design members by following guide line of Indian codes. ◆ Learner will understand the behavior and requirement Industrial building, then they be should able to design of elements of industrial building by following guide line of Indian codes.						

Course Outcomes	
CO1	Learner should be able to design the various steel structural connections as per conditions and requirements.
CO2	Learner should be able to apply the principles, procedures and codal requirements to the analysis and design compression members by knowing its loading conditions.
CO3	Learner should be able to apply the principles, procedures and codal requirements to the analysis and design tension members for given loading conditions
CO4	Learner should be able to Apply the principles, procedures and codal requirements to the analysis and design flexure members for given loading conditions.
CO5	Learner should be able to define the requirement of industrial structure and also able design its components for given requirements

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Attributes of Steel Structural Design	Basis for design, design philosophies, Introduction to Limit State Design, Limit state for steel design, limit state of strength, limit state of serviceability, probabilistic basis for design, design criteria, material, structural steel. Stress - Strain Curve for Mild Steel. Introduction to rolled steel sections, Loads. Riveted, Bolted, Pinned and Welded connections, Strength, Efficiency and Design of joints.	8	CO1
2	Design of Steel Compression Members	Compression members- Effective length, Slenderness ratio, Strength of Compression members, Design of Struts, Columns, Built-up Columns, Design of eccentrically loaded columns.	8	CO2
3	Design of Steel Tension Members	Tension members – Net and Gross sectional areas, Strength of members and their design. Design of slab and Gusset bases, Design of Grillage footing.	8	CO3
4	Design of Steel Beams	Beams – web crippling and web buckling, design of laterally supported beam, design of laterally unsupported beam.	8	CO4
5	Design of Industrial Building	Design of Industrial Buildings –Elements of an industrial building, Design of elements of roof trusses, i.e purlin and plate girder.	8	CO5

Reference Books:

Subramanian, “Steel Structures- “Design and Practice”, Oxford, University Press.

M.R. Shriyekar, “Limit State Design in Structural Steel”, PHI, New Delhi.

Duggal S.K. “Limit State Design of Steel Structures”, McGraw-Hill Education (India) Private Limited, New Delhi.

Kazmi, S.M.A and Jindal R.S “Design of Steel Structures” PHI, New Delhi, India.

I.S: 800-2007- Code of Practice for General Construction in Steel, BIS, New Delhi, I

e-Learning Source:

http://nptel.ac.in/courses/105106112/

https://youtu.be/CNE4hk_SGTo

https://youtu.be/ruuKvu5QtkI

https://youtu.be/utgnv9NIFQc

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	0	0	0	0	3	0	1	0	2	3	3
CO2	3	3	3	0	0	0	0	3	0	1	0	3	3	3
CO3	3	3	3	0	0	0	0	3	0	1	0	3	3	3
CO4	3	3	3	0	0	0	0	3	0	1	0	3	3	3
CO5	3	3	3	0	0	0	0	3	0	1	0	3	3	3

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Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE404	**Title of the Course**	Transportation Systems and Planning	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	3	1	0	4
Pre-Requisite	CE303	**Co-requisite**	NIL				
Course Objectives	• To introduce the student to fundamentals of Transport System and it's planning. • To gain knowledge about transportation system planning and its economic analysis.						

CourseOutcomes	
CO1	Learner will acquire knowledge about fundamentals of transportation system, role of transportation for various aspects & hierarchy of roads in India.
CO2	Learner will be able to evaluate the concepts of public transport selection & will be able to prelimary design few transport infrastructure.
CO3	Learner will be able to understand the fundamentals of transportation costs, demand & supply and all effects of transportation on environmental.
CO4	Learner will understand basis of transport planning process & will be able to do economic evaluation of transport projects.
CO5	Learner will understand fundamentals about system operations & intelligent transportation systems.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Transport System and Its Development	Transport System and its Development: Transportation system, classification of transport system, urbanization and transport demand, motorization trends, urban transport problems, role of transportation: social, economic, political, and environmental; transportation today, organizations involved in transportation development in India. Hierarchy of Roads and Capacity: Hierarchy of Roads, Concept of PCU, capacity and level of service, factors affecting capacity and level of service; capacity of rural and urban roads-	08	CO1
2	Transport Facility Design	Public Transportation and Transport Facility Design: Technology in transportation, public transport systems, design of parking facilities, design of pedestrian facilities, design of cycle tracks, design of bus facilities, terminal and its functions, transit planning, transit demand, transit route network.	08	CO2
3	Transportation Cost, Demand and Supply	Transportation Cost, Demand and Supply: Transport costs: capital cost, operation and maintenance cost, vehicle operating cost (VOC), value of time (VOT), accident cost; transportation demand, supply in transportation, transportation networks and environmental impact.	08	CO3
4	Transport Planning	Transport Planning: Transportation planning surveys, transport planning process: trip generation, trip distribution, modal split and trip assignment; economic evaluation of transport plans.	08	CO4
5	Modern Transportation Techniques	System Operations and ITS: System operation and management, Intelligent Transport System (ITS), Benefits of ITS, ITS services: advanced traffic management system (ATMS), advanced traveler information system (ATIS), advanced vehicle control system (AVCS), commercial vehicle operation (CVO), advanced public transport system (APTS), emergency management system (EMS), electronic payment (EP), safety, working of ITS, application of ITS.	08	CO5

Reference Books:

Traffic Engineering & Transport Planning by LR Kadyali, Khanna Publisher, Delhi, 2010.

Theory and Applications of Economics in Highway and Transport Planning, Vinay Maitri, P.K.Sarkar, Standard Publishers Distributors, Delhi, 2008.

Transportation Planning, Principles, Practice and Policies, P.K.Sarkar, Vinay Maitri, G.J. Joshi, Prentice-Hall India, Delhi, 2002.

Transportation Engineering and Planning, C.S.Papacostas, P.D.Prevedouros,Prentice –Hall India, Delhi, 2005.

5. Highway Engineering-S.K.Khanna& C.EG. Justo, Nem Chand & Bros, Roorkee, 2014.

e-Learning Source:

https://nptel.ac.in/courses/105106058/

http://www.civil.iitb.ac.in/~dhingra/ce751.htm

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	1	3	0	1	0	1	0	2	1	0	0
CO2	1	1	3	1	2	3	1	1	0	0	0	0	0	0
CO3	2	1	3	3	1	0	3	0	0	0	1	0	0	0
CO4	1	3	2	3	0	0	0	2	1	1	3	0	0	0
CO5	0	0	0	0	3	1	2	0	1	0	1	0	0	0

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE405	**Title of the Course**	Advanced Concrete Design	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	**3**	**1**	**0**	**4**
Pre-Requisite	CE311	**Co-requisite**	Nil				
Course Objectives	Students are expected to realize the importance of design of heavy RCC structure and their application in civil engineering						

CourseOutcomes	
CO1	Natures of stresses in spherical domes, Analysis of spherical domes, Design of reinforced concrete domes under uniformly distributed load and point load at crown, using IS:456-2000 guide lines. Nature of stresses in Curved beams, Design philosophy, Design of reinforced concrete curved beam using IS:456-2000 guide lines
CO2	Nature of stresses in reinforced concrete overhead tank, Design philosophy, IS Code guide lines, Design of rectangular and cylindrical water tank using IS-3370 design charts
CO3	Elements of Intze tank, Effect of continuity, Design of top dome, Top ring beam, Cylindrical wall, Bottom ring beam, Conical dome, Bottom dome , Bottom circular beam at junction of tank and supporting columns, Design of supporting columns with bracings and raft foundation, Reinforcement detailing of different elements of Intze tank.
CO4	Dead load, Live load, Wind load and Earthquake loads, Analysis of building frames by substitute frames,portal and cantilever methods, Design of building frames.
CO5	guileslines as per IS-800, Design of encased columns. Types of bridges, Economic span, Load, forces and permissible stresses, General design requirements, Design of deck slab using effective width concept, Introduction to Pigeaud's and Courban's theory, Design concept of encased columns, Guide

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	RC Domes and Curved Beams	Natures of stresses in spherical domes, Analysis of spherical domes, Design of reinforced concrete domes under uniformly distributed load and point load at crown, using IS:456-2000 guide lines. Nature of stresses in Curved beams, Design philosophy, Design of reinforced concrete curved beam using IS:456-2000 guide lines.	8	CO1
2	RC Overhead Tank	Nature of stresses in reinforced concrete overhead tank, Design philosophy, IS Code guide lines, Design of rectangular and cylindrical water tank using IS-3370 design charts	8	CO2
3	Intze Tank	Elements of Intze tank, Effect of continuity, Design of top dome, Top ring beam, Cylindrical wall, Bottom ring beam, Conical dome, Bottom dome , Bottom circular beam at junction of tank and supporting columns, Design of supporting columns with bracings and raft foundation, Reinforcement detailing of different elements of Intze tank.	8	CO3
4	Building Frames	Dead load, Live load, Wind load and Earthquake loads, Analysis of building frames by substitute frames ,portal and cantilever methods, Design of building frames.	8	CO4
5	RC Bridges and Composite members	lines as per IS-800, Design of encased columns. Types of bridges, Economic span, Load, forces and permissible stresses, General design requirements, Design of deck slab using effective width concept, Introduction to Pigeaud's and Courban's theory, Design concept of encased columns, Guide	8	CO5

Reference Books:

N .Krishna Raju "Advance concrete design", CBS Publishers, 3rd edition,2015

D.J. Victor "Essential of Bridge Engineering" , Oxford & IBH Publishing company, 6th edition 2017

B.C. Punmia and A.K.Jain "Limit State Design of Reinforced Concrete", Laxmi Publications, 1st Reprint2017.

IS:3370(Part-1,2,3,4) -1965-Code of practice for concrete structures for the storage of liquids.

IS 456-2000 Indian Standard "Plain & Reinforced Concrete-code of practice", BIS, New Delhi.

IS:11682-1985-Criteria for design of RCC staging for overhead water tank.

e-Learning Source:

http://nptel.ac.in/courses/105105105/

http://nptel.ac.in/downloads/105105104

http://onlinecourses.nptel.ac.in

http://m.youtube.com/channel

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	0	0	0	0	0	0	0	0	2	2	2
CO2	3	2	3	0	0	0	0	0	0	0	0	2	3	2
CO3	3	2	3	0	0	0	0	0	0	0	0	2	3	2
CO4	3	3	3	0	0	0	0	0	0	0	0	2	3	2
CO5	3	2	3	0	0	0	0	0	0	0	0	2	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE406	**Title of the Course**	Environmental Pollution Control	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	3	1	0	4
Pre-Requisite	CE310, CE401	**Co-requisite**	NIL				
Course Objectives	• Impart knowledge on fundamental aspects of air pollution & control, solid waste management and noise pollution. • To introduce some basics of sanitation methods essential for protection of community health.						

CourseOutcomes	
CO1	• Realize the importance of ecosystem, its elements and biodiversity for maintaining ecological balance.
CO2	• Identifying air pollution sources, effects, its measurement and control devices.
CO3	• Identifying the sources of water pollution and classify the pollutants and analyze the waste water sample.
CO4	• Identify the type of land pollution and understand solid waste management.
CO5	• Identifying noise pollution sources, effects, its measurement, prevention and control.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Impact of man on environment**	Environment and its Components, Biosphere, Hydrologic Cycle, Nutrient Cycles, Anthropogenic Activities, Consequences of Population Growth, Energy Problem, Pollution of Air, Water and Land. Environmental Protection Act.	**8**	**CO1**
2	**Air Pollution**	Sources and Effects, Meteorological Aspects, Air Pollution Sampling and Measurement, Control Methods and Equipment, Control of Specific Air Pollutants, Air (Prevention and Control of Pollution) Act. National Ambient Air Quality Standards.	**8**	**CO2**
3	**Water Pollution**	Sources and Classification of Water Pollutants, Wastewater Sampling and Analysis. Water (Prevention and Control of Pollution) Act, Water Quality Criteria, WHO Drinking Water Specifications, BIS Drinking Water Specification (IS 10500: 2012)	**8**	**CO3**
4	**Land Pollution**	Definition, Major Types of Land Pollution, Solutions for Land Pollution, Solid Waste Management, Generation, Storage, Collection, Transport, Processing and Disposal. Land Filling with Solid Waste, Solid Waste Management Rules, 2016.	**8**	**CO4**
5	**Noise Pollution**	Definition, Human Diseases Caused by Noise Pollution, Effects of Noise Pollution on Wildlife and Marine Life, Preventive Measures, The Noise Pollution (Regulation And Control) Rules 2000, Noise Level Calculations.	**8**	**CO5**

Reference Books:

Birdie G.S and Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons, 2010.
Duggal K N, Elements of Environmental Engineering, S Chand & Co Ltd.
Fair, Gayer and Okun, Water and Waste water Engineering Vol. II, John Wiley. 3rd Edition 2011.
Metcalf and Eddy, Waste Water Engineering, Treatment, Disposal & Reuse, Tata McGraw Hill. 2002.

e-Learning Source:

https://onlinecourses.nptel.ac.in/noc22_ch45/preview

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	0	0	0	3	3	1	0	0	0	1	2	1
CO2	3	2	0	0	0	3	3	1	0	0	0	1	1	2
CO3	3	2	0	0	0	3	3	1	0	0	0	1	1	1
CO4	3	2	0	0	0	3	3	1	0	0	0	1	3	2
CO5	3	2	3	0	0	3	3	1	0	0	0	1	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE407	**Title of the Course**	DESIGN OF WASTEWATER SYSTEM	**L**	**T**	**P**	**C**
Year	**4th**	**Semester**	7th	**3**	**1**	**0**	
Pre-Requisite	CE310	**Co-requisite**	NIL				
Course Objectives	To understand the basic concept and procedure of designing of various wastewater treatment processes.						

CourseOutcomes	
CO1	'To give the basic knowledge about the characteristics of wastewater and oxygen requirement of organic material for the decomposition.
CO2	To give the basic idea about the primary treatment of the wastewater.
CO3	To give the knowledge of secondary treatment of wastewater and design process of activated sludge units.
CO4	To give the idea of design of trickling filter and calculation of efficiency of the trickling filters.
CO5	To learn about the waste stabilization pond, Oxidation ditches and Rotating Biological Contactors.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Wastewater Characteristics	Wastewater Characteristics: Physical, Chemical and Biological characteristics, Composition and Microbiology of Wastewater, BOD kinetics and COD.	8	1
2	Wastewater Treatment	Primary Treatment: Theory and design of Screens, Grit chamber, Sedimentation Tank, Unit operation and processes, Process flow sheets of wastewater treatment plant.	8	2
3	Activated Sludge Process	Secondary Treatment: Theory, Design and Construction of Biological Treatment Processes, Activated Sludge Process, Design of different Units and Modifications, Extended Aeration Systems.	8	3
4	Trickling Filter	Secondary Treatment: Theory, Design and Construction of Trickling Filter, Types of Trickling Filter, Efficiency Calculation of Trickling Filter, Recirculation of Treated Sewage. SBR Technology: Methodology and Operation.	8	4
5	Miscellaneous Method	Waste Stabilization Ponds, Aerated Lagoon, Oxidation Ditches, and Rotating Biological Contactors (RBC).	8	5

Reference Books:

Birdie G.S. and Birdie J.S, "Water Supply and Sanitary Engineering", Dhanpat Rai & Sons, 2010.

Duggal K. N, "Elements of Environmental Engineering", S Chand & Co Ltd..

Garg S. K, "Environmental Engineering Vol II", Khanna Publishers, 2010

Fair, Gayer and Okun, "Water and Waste water Engineering Vol. II", John Wiley. 3rd Edition 2011.

e-Learning Source:

http://nptel.ac.in/courses/105105048/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	1	2	3	1	2	2	2	2	0	0
CO2	1	1	3	1	1	2	3	1	1	1	3	1	0	0
CO3	1	3	3	2	2	1	3	1	3	2	2	2	0	0
CO4	2	2	3	2	1	2	2	1	2	2	3	2	0	0
CO5	3	2	2	1	1	2	2	1	1	2	1	2	0	0

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE411	**Title of the Course**	Advanced Foundation Design	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	**3**	**1**	**0**	**4**
Pre-Requisite	CE312	**Co-requisite**	NIL				
Course Objectives	To apply the principles of soil mechanics to design shallow and deep foundations including bearing capacity and analysis						

CourseOutcomes	
CO1	Student will be able to determine bearing capacity of different types of soils.
CO2	Student will be able to design the different types of footing.
CO3	Student will be able to design piles for deep foundations.
CO4	Student will be well versed with hydraulic designing of well foundations.
CO5	Student will be able to design foundation of machinery structures.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Introduction	Introduction, Basic definitions, Gross & Net footing pressure, Rankine's analysis, Terzaghi's analysis, Prandtl's analysis, Terzaghi's bearing capacity theory	08	1
2	Shallow Foundations	Bearing capacity of foundation, types of shears Failure, Terzaghi's, Meyerhof's, Hansen, Skemptons& IS methods, Effect of water Table, Plate Load Test.	08	2
3	Pile Foundations	Load capacity of pile foundations Various factors affecting load carrying capacity of piles, Static and Kinematics analysis of pile groups in sand & clays, Settlement of pile groups, Efficiency, Pile load tests Laterally loaded and battered piles.	08	3
4	Well Foundation	Elements of well foundation, shapes, depth of scour, well sinking, tilts, shift and their prevention, Coffer dams and its types.	08	4
5	Machine Foundation and its Design	Machine foundation and its types, basic terms and definitions, general design criteria of machine foundation, natural frequency of natural soil system, vibration isolation and control.	08	5

Reference Books:

Dr. K K Arora -"Soil Mechanics & Foundation Engineering", Standard Publisher Distributors.7th Edition Reprint 2015.

Dr Alam Singh -"Soil engineering in Theory 7 Practices", Volume-2, CBS Publishers & Distributors 2nd Edition Reprint 2009.

Gopal Ranjan & A S Rao -"Basics & Applied Mechanics 2nd Edition, New Age International (P) Ltd Publishers,2nd edition Reprint 2012.

e-Learning Source:

https://nptel.ac.in/courses/105108069/
https://nptel.ac.in/content/syllabus_pdf/105108069.pdf
https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/105105039/lec5.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	0	2	0	0	0	0	0	1	0	1
CO2	3	1	2	0	1	2	0	1	0	1	0	1	0	2
CO3	3	1	2	0	1	2	0	1	0	1	0	1	0	2
CO4	3	1	2	0	1	2	0	1	0	1	0	1	0	1
CO5	3	1	2	0	1	2	0	1	0	1	0	1	0	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE412	**Title of the Course**	Impact of Climate Change for Civil Engineering Projects	**L**	**T**	**P**	**C**
Year	**4th**	**Semester**	7th	**3**	**1**	**0**	**4**
Pre-Requisite	CE201/CE306	**Co-requisite**	NIL				
Course Objectives	To identify the factors influencing the global and regional climate systems and develop strategies for adaptation and mitigation measures for sustainable development						

CourseOutcomes	
CO1	Students are able to understand Basic meteorology, Earth's Climate System, Green House Gases and Global Warming.
CO2	Students are able to understand the Impact of climate change on hydrological cycle and impact on water quality and quantity.
CO3	Students are able to understand the Climate change dilemma for engineering, and statistical methods for risk assessment and management.
CO4	Students are able to understand The Montreal Protocol, effect of climate change on a Global Scale and in India, and impacts on urban water systems
CO5	Students are able to understand the Climate Change Adaptation and Mitigation Measures in various sectors like Water, Transport, and Energy.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Introduction to Weather and Climate	Basic meteorology, measurement of meteorological parameters, Earth's Climate System, Climate Classification , The general circulation ,Trade Winds and the Hadley Cell , The Westerlies , Cloud Formation and Monsoon Rains(focus on Indian Monsoon) , Storms and Hurricanes , The Hydro-logical Cycle , El Nino and its Effect , Solar Radiation ,The Earth's Natural Green House Effect , Green House Gases and Global Warming ,Carbon Cycle.	**08**	CO1
2	Climate Change Impacts on Water Resources	Impact on hydrological cycle ,floods, droughts, coupling of hydroclimate variability with human systems, impact on water quality and quantity ,Climate change projections, Water management approaches to climate change adaptation and mitigation	**08**	CO2
3	Incorporating Climate Science in Engineering Practice	Climate change dilemma for engineering, Uncertainty and statistical methods for risk assessment, Risk management, Engineering standards and regulations, Guiding principles	**08**	CO3
4	Climate Change Impacts in Civil Engineering	The Montreal Protocol – UNFCCC – IPCC –Evidences of Changes in Climate and Environment – on a Global Scale and in India, Impacts on buildings and other structures, impacts on transportation, impacts on urban water systems, coastal management, air quality and energy supply ,adaptation and mitigation strategies for sustainable development of infrastructure.	**08**	CO4
5	Climate Change Mitigation Strategies	Climate Change Adaptation And Mitigation Measures in various sectors - Water – Transport – Energy – Key Mitigation Technologies and Practices – Energy Supply – Transport – Buildings – Industry – Carbon sequestration – Carbon capture and storage (CCS)- –Carbon Trading examples of future Clean Technology – Biodiesel – Natural Compost – Eco- Friendly Plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind –Hydroelectric Power ,green concrete	**08**	CO5

Reference Books:

John M Wallace,Peter V Hobbs "Atmospheric science-, An introductory survey ", Academic press.; 2nd Edition 2006

J.Rolf Olsen, "Adopting infrastructure and civil engineering practice to a changing climate ", American Society of Civil Engineers(ASCE) , 2015

Dash Sushil Kumar, "Climate Change – An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007

e-Learning Source:

https://ascelibrary.org/doi/pdf/10.1061/9780784479193

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	0	2	0	0	0	0	0	1	0	1
CO2	3	1	2	0	1	2	0	1	0	1	0	1	0	2
CO3	3	1	2	0	1	2	0	1	0	1	0	1	0	2
CO4	3	1	2	0	1	2	0	1	0	1	0	1	0	1
CO5	3	1	2	0	1	2	0	1	0	1	0	1	0	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE418	**Title of the Course**	Environmental Engineering Lab-II	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	0	0	2	1
Pre-Requisite	CE310	**Co-requisite**	CE401				
Course Objectives	To impart the experimental knowledge of wastewater quality assessment to be applied in environmental engineering						

CourseOutcomes	
CO1	Learners will be able to determine, explain, analyze and compare various characteristics of domestic and industrial wastewater according to the guidelines prescribed by IS code
CO2	Learners will be able to explore the real wastewater treatment plant for site visit

Experiment No.	**Content of Experiment**	**Contact Hrs.**	**Mapped CO**
1.	Determination of total suspended and dissolved solids.	2	CO1
2.	Determination of BOD of sample.	2	CO1
3.	Determination of COD of sample.	2	CO1
4.	Determination of Kjeldahl nitrogen.	2	CO1
5.	Determination of fluorides.	2	CO2
6.	Determination of rate kinetics constant of aerobic reactions.	2	CO2
7.	Field visit of water / wastewater treatment plant.	2	CO2

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	0	0	3	3	0	3	3	3	3	0	3	2	2
CO2	0	0	0	3	3	0	3	3	3	3	0	3	2	2
CO3	0	0	0	3	3	0	3	3	3	3	0	3	2	2
CO4	0	0	0	3	3	0	3	3	3	3	0	3	2	2
CO5	0	0	0	3	3	0	3	3	3	3	0	3	2	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE419	**Title of the Course**	Structural Detailing Lab	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	3	1	0	4
Pre-Requisite	NIL	**Co-requisite**	NIL				
Course Objectives	• To have a knowledge to understand the basics of drawing. • To impart the knowledge of various sections used in steel design. • To enable the student to draw the various elements of the steel sections.						

CourseOutcomes	
CO1	To learn preparation of working drawings of Rolled sections and connections (welded and bolted).
CO2	To learn preparation of working drawing of Built-up columns and beams.
CO3	To learn preparation of working drawing of Gusset bases.
CO4	To learn preparation of working drawing of Grillage footing.
CO5	To learn preparation of working drawing of Roof trusses.
CO6	To learn preparation of working drawing of RC retaining walls.
CO7	To learn preparation of working drawing of RC water tanks.

Unit No.	**Experiment No.**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Experiment 1	Rolled sections and connections (welded and bolted).	2	CO 1
2	Experiment 2	Built-up columns and beams.	2	CO 2
3	Experiment 3	Gusset bases.	2	CO 3
4	Experiment 4	Grillage footing	2	CO 4
5	Experiment 5	Roof trusses	2	CO 5
6	Experiment 6	RC retaining walls	2	CO 6
7	Experiment 7	RC water tanks	2	CO 7

Reference Books:

Subramanian, “Steel Structures- “Design and Practice”, Oxford, University Press

M.R. Shriyekar, “Limit State Design in Structural Steel”, PHI, New Delhi

Kazmi, S.M.A and Jindal R.S “Design of Steel Structures” PHI, New Delhi, India

I.S: 800-2007- Code of Practice for General Construction in Steel, BIS, New Delhi, India

I.S: 808-1989- Dimensions for Hot Rolled Steel Beam, Column, Channel and Angle Sections, BIS, New Delhi, India

A.K..Jain “Reinforced concrete design, limit state Method”, Nem Chand & Bros.; 7th Edition 2012

e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO2	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO3	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO4	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO5	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO6	1	0	0	0	0	0	0	0	1	1	1	0	0	0
CO7	1	0	0	0	0	0	0	0	1	1	1	0	0	0

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE420	**Title of the Course**	Minor Project	**L**	**T**	**P**	**C**
Year	**4th**	**Semester**	7th	**-**	**-**	**2**	**1**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	• To enable students to work as a team and to select B.Tech project topic.						

Course Outcomes	
CO1	Skill to work in a team and to select the best topic as per the ability and strength of a team to carry out the literature review work.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
-	-	-	-	CO1
-	-	-	-	
-	-	-	-	
-	-	-	-	
-	-	-	-	
Reference Books:				
-				
e-Learning Source:				
-				

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	3	0	3	3	0	0	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE300	**Title of the Course**	Industrial Training	**L**	**T**	**P**	**C**
Year	4th	**Semester**	7th	-	-	-	**0**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	The aim of this course is exposed the learner to the real world situation and provide an opportunity to apply classroom knowledge						

Course Outcomes	
CO1	Learner will able be to apply engineering knowledge learned in classroom to the real situations.
CO2	Learner will able be to show the knowledge of advanced tools and techniques and exposure to professional engineering practices.
CO3	Learner will able beto follow the role and responsibilities as well as code of ethics that engineers should uphold.
CO4	Learner will able be to show awareness about general workplace behaviour and build interpersonal and team skills.
CO5	Learner will able be to prepare professional work, reports and presentations.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
-	-	Industrial training under for at least 1 month to acquire field knowledge or develop any emplobility skills.	Minimum 1 months industrial training	CO1, CO2, CO3, CO4 and CO5
-	-			
-	-			
-	-			
-	-			
Reference Books:				
-				
e-Learning Source:				
-				

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	0	0	0	3	0	0	0	3	3	1	2	3	3
CO2	0	0	0	0	3	0	0	0	3	3	1	2	3	3
CO3	0	0	0	0	0	0	0	3	3	3	1	2	3	3
CO4	0	0	0	0	0	0	0	3	3	3	1	2	3	3
CO5	0	0	0	0	3	0	0	3	3	3	1	2	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE499	**Title of the Course**	B.TECH PROJECT	**L**	**T**	**P**	**C**
Year	4th	**Semester**	8th	-	-	-	**1**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	• To enable students to work as a team to develop the methodology for the project. • To develop the capability to apply the engineering principles to carry out the project work. • To define the conclusion of the project undertaken with in depth understanding of the topic.						

Course Outcomes	
CO1	Ability to work as a team to plan the execution of the undertaken project.
CO2	Capability to use the engineering knowledge and principles on an undertaken project as required.
CO3	Capacity to complete the undertaken project on time with effective communication to deliver the project successfully.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
-	-	----------	-----	CO1, CO2, and CO3
-	-			
-	-			
-	-			
-	-			
Reference Books:				
-				
e-Learning Source:				
-				

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	0	1	2	2	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	2	2	3	3	3	3	3	3	3
CO3	0	0	0	0	2	1	1	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:2015-16							
Course Code	CE451	**Title of the Course**	Seminar	**L**	**T**	**P**	**C**
Year	4th	**Semester**	8th	-	-	-	3
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	• To understand organization of topic for presentation and research. • To learn the skill set required to perform research.						

Course Outcomes	
CO1	Skill to search on any topic to extract the information.
CO2	Ability to organize – deliver presentation and report on any topic.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	-	Select any topic related to civil engineering, investigate the topic and accumulate the knowledge. Organize the information collected and deliver the presentation along with report.	-	CO1 and CO2
2	-		-	
3	-		-	
4	-		-	
5	-		-	

Reference Books:
-
e-Learning Source:
-

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	0	0	3	3	1	2	1	3	3	0	3	3	3
CO2	0	0	0	0	3	1	2	1	3	3	0	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	CE452	**Title of the Course**	Comprehensive Assessment	**L**	**T**	**P**	**C**
Year	4th	**Semester**	8th	-	-	-	**2**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	• To test the learner's knowledge, skills and understanding of civil engineering at undergraduate level.						

Course Outcomes	
CO1	Learner should be able to demonstrate their knowledge in the field of civil engineering.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	-	Complete syllabus of 4th year B.Tech Civil Engineering	-	CO1
2	-		-	
3	-		-	
4	-		-	
5	-		-	

Reference Books:
-
e-Learning Source:
-

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)													
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	0	3	0	3	0	0	0	3	3	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**