

(SOET)(BTech-CivilEngineering)

Title of the Course	Major Project
Course Code	CED0804[P]

			Part A					
Year	4th	Samaatar	8th	Credits	L	Т	Р	-
rear	401	Semester	OUI	Credits	0	0	8	(
Course Type	Project				•			
Course Category	Projects and	Internship						
Pre-Requisite/s	Knowledge of	f Civil engineering and interdisc	ciplinary subjects.	Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- To incre CO3- To incul							
Coures Elements	Skill Developr Entrepreneurs Employability Professional I Gender X Human Value Environment	ship ✓ ✓ Ethics X	SDG (Goals)					

Part B

Modules	Contents	Pedagogy	Hours	
1	Project/Problem Identification	Project Work	8	
2	Project Analysis, Requirement Gathering	Project Work	8	
3	Implementation of Project/Solution	Project Work	8	
4	Testing and Verification	Project Work	8	
5	Presentation and Report Writing	Project Work	8	

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-I	Identification of a problem and formulation of a topic of project/thesis	PBL	BL3-Apply	15 hrs
Module-III	Dissertation and Viva-voci	PBL	BL5-Evaluate	20 hrs

Part D(Marks Distribution)

	Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
	50												
			Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	50	40	20	60									

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	3
CO1	2	0	0	0	2	1	3	3	3	2	0	2	1	1	2	<u>"</u> "
CO2	2	0	1	0	1	0	2	2	3	2	0	2	2	2	1	- 🕞
CO3	1	0	1	0	1	2	3	3	3	2	0	1	1	1	1	-6
CO4	2	1	1	0	1	2	3	2	2	2	0	2	1	1	2	4
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



(SOET)(BTech-CivilEngineering)

Title of the Course	Plastic design of steel structure
Course Code	CEE0807

Part A

Year	4th	Semester	8th	Credits	L	Т	Р	С	"L"
leai	401	Semester	Olli	Credits	3	1	0	4	
Course Type	Theory or	nly							
Course Category	Discipline	Electives							4
Pre-Requisite/s				Co-Requisite/s				,	
Course Outcomes & Bloom's Level	CO2- Lea grids(BL4 CO3- Lea CO4- Cal		lysis, applicable to bea es, and method of con Plastic beams and fram				frames, ga	ble fra	mes,
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics × Gender × Human Values × Environment × SDG (Goals) SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies)								

Part B

Modules	Contents	Pedagogy	Hours
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Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Prepare at least one drawing in any CAD software (like AutoCAD) for design of structures conducted in the syllabus	PBL	BL4-Analyze	15
2	Preparation of EXCLE Worksheets for the design of various structural components of Plate Girder/ Gantry Girder/ Foot Over bridge	PBL	BL4-Analyze	15

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	Internal Evaluation	Min. Internal Evaluation									
100	40	40	12	60	0							
			Practical									
Total Marks Minimum Passing Marks		External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

Part E

Books	1. B G Neal, Plastic Methods of Structural analysis-, 3rd edition, Chapman and hall publications, 1977 2. B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, -Comprehensive Design of Steel Structures, Laxmi Publications (P) Ltd
Articles	https://www.researchgate.net/publication/359352619_BASICS_AND_CONCEPTS_OF_PLASTIC_DESIGN_OF_STEEL_FRAMES
References Books	1. S K Duggal, -Limit state Design of Steel Structuresl,, McGraw Hill education, 2010 2. MR Shiyekar-Limit State Design of Steel Structuresl, PHI Publication, 3rd Edition
MOOC Courses	https://archive.nptel.ac.in/courses/114/106/114106047/
Videos	https://www.youtube.com/watch?v=qJV5zdx7NJs

	Course Articulation Matrix															
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	: <u>"/</u> :
CO1	3	3	2	2	-	-	-	-	-	-	2	2	3	2	2	
CO2	3	3	2	3	-	-	-	-	-	-	2	1	3	1	1	(3)
CO3	3	3	2	2	-	-	-	-	-	-	2	2	2	2	2	4
CO4	3	2	2	2	-	-	-	-	-	-	2	2	3	2	2	
CO5	3	2	2	2	-	-	-	-	-	-	1	1	2	2	1	
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



(SOET)(BTech-CivilEngineering)

Title of the Course	Building Environment & Services
Course Code	CEE0808[T]

Part A

	4.0				L	Т	Р	С	
Year	4th	Semester	ł 8th	Credits	3	1	0	4	— " <u>"</u> "
Course Type	Theory o	nly			•	•	•	•	3
Course Category	Discipline	e Electives							7
Pre-Requisite/s				Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- Stu Apply) CO3- Stu CO4- Stu	CO1- Students will learn the importance of durability of civil engineering structures (BL2-Understand) CO2- Students will be able to detect the defects in foundation, masonry, plastering, Painting, flooring, doors and windows(BL3-Apply) CO3- Students will be able to provide preventive and remedial measures for Defects(BL4-Analyze) CO4- Students will be able to locate and place different components like Lifts, electrical panels etc.(BL4-Analyze) CO5- Students will learn the importance of Need for retrofitting and restoration (BL2-Understand)							
Coures Elements	Entreprei Employal	onal Ethics X < ′alues X	SDG (Goals)	SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies)					

Part B

Modules	Contents	Pedagogy	Hours
1	Durability of civil engineering structures: – Importance of durability – Factors affecting durability of buildings – life expectancy of different classes of buildings. Environmental factors that affect the durability of structures – Effect of natural agents (Air, sun, rain, frost and biological agents such as vegetation & insects) – Environmental pollution – Effect of pollution of air, water and soil – Location effect (Marine, Industrial area etc.) – Usage aspects (Structures subjected to dynamical loading & abrasive condition) - Preventive and remedial measures. Role of maintenance in durability and serviceability of buildings: – Necessity of maintenance – Economic aspects of maintenance. Different types of maintenance – Preventive maintenance – Remedial maintenance – Routine maintenance – Pre-monsoon maintenance – Special maintenance – Planning aspects of maintenance	Lectures with Presentation, Video Lectures	8
2	Cracks in buildings – Defects in foundation, masonry, plastering, Painting, flooring, doors and windows, concrete (RCC and PCC) and wooden roof - Corrosion of reinforcement and steel structures – structural damage due to fire - Causes – Preventive and remedial measures Cracks in buildings – Causes - Preventive and remedial measures	Lectures with Presentation, Practical visits to detect cracks and defects in a building	8
3	Causes - Preventive and remedial measures for Defects in foundation, masonry wooden roof concrete (RCC and PCC) Corrosion of reinforcement and steel structures flooring doors and Painting Defects due to fire, Stair case, water supply system, sewage and sullage system, in drainage system and electrical system Building Services Introduction to other building services	Lectures with Presentation, Practical visits to detect cracks and defects in a building	8
4	Lift – Location – RTT – Number of lifts – lift well and shaft – Machine room. Air conditioning system: Types of A/C – Capacity determination – Requirements for an A/C room. Electrical installations: Panel board & Buss bar, rising mains – distribution boards – MCB – ELCB – DP - TP and change over switch switches - Telephone and TV connectivity – Requirements of domestic gas pipeline	Lectures with Presentation, Case Study on different lift locations	8
5	Retrofitting and restoration of building – Need for retrofitting and restoration – Common retrofitting works carried out – Shoring and underpinning – Different methods of retrofitting and restoration – Challenges in retrofitting and restoration works. Deterioration of monumental and historical buildings – Common causes – Preventive measures – Restoration works – Conservation of world heritages	Lectures with Presentation, Practical visits to provide solutions for cracks and defects in a building	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Plan and draw in detail ventilation and air-conditioning for a given building	PBL	BL3-Apply	15
2	Plan movement facilities: Lifts, escalators, ramps etc. for a given public building	PBL	BL3-Apply	15

Part D(Marks Distribution)

			Theory						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40 40		12	60	0				
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Part E

Books	S. Champion :Failures and repair of concrete structures ; John Wiley & Sons		
Articles	Philip.H.Perkins: Concrete Structures-repair water proofing and protection; Elsevier Science Ltd		
References Books B.S.Nayak : A book on Maintenance Engineering ; Khanna Publishers			
MOOC Courses	https://nptel.ac.in/courses/105107156		
Videos	https://www.youtube.com/watch?v=9hfKdUGWQjQ&t=2s		

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	3
CO1	3	2	2	2	1	1	2	-	-	-	2	2	2	3	3	" <u>"</u> "
CO2	3	2	3	2	1	1	2	-	-	-	2	2	2	2	2	- 🕞
СОЗ	3	2	3	2	-	-	1	-	-	-	2	2	2	3	3	<u>-8</u>
CO4	3	3	3	1	1	=	2	-	-	-	1	2	2	2	2	4
CO5	3	3	2	2	1	1	2	-	-	-	2	2	2	2	2	
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



(SOET)(BTech-CivilEngineering)

Title of the Course Design of Pre stressed Concrete Structure				
Course Code	CEE0809[T]			

Part A

Year	4th Semester 8th Credits		L	Т	Р	С	- <u>"</u> ["		
1 eai	401	Semester	Out	Credits	4	1	0	5	- <u>&</u> : - [] 3
Course Type	Theory onl	neory only							
Course Category	Discipline	Electives							4
Pre-Requisite/s	basic prop	basic properties of materials, and steel and Rcc design Co-Requisite/s						tures	,
Course Outcomes & Bloom's Level	CO2- To un CO3- Stud CO4- To an CO5- To ev	CO1- Students will remember the WSM Method for RCC and Pre-stressed Structures.(BL1-Remember) CO2- To understand different types and Methods of Pre-stressing.(BL2-Understand) CO3- Students will be able to apply the knowledge of Pre-stressing on different RCC Structures.(BL3-Apply) CO4- To analyze Beam for different Profiles of Tendons.(BL4-Analyze) CO5- To evaluate the stress distribution for different zones of beams(BL5-Evaluate) CO6- To Create and design a Pre-stressed beam and understand its advantages over RCC(BL6-Create)							
Coures Elements	Skill Devel Entreprene Employabi Profession Gender X Human Va Environme	urship √ lity √ al Ethics X lues X	SDG (Goals)						

Part B

Modules	Contents	Pedagogy	Hours
unit 1	Introduction, Principles of prestressing, Different methods of prestressing – post tensioning and pre-tensioning. Prestressed concrete materials. Need for high strength concrete and High concrete tensile steel. Creep and shrinkage of concrete, relaxation of steel. Losses of prestress friction and anchorage of steel	Lectures with problem based learning, experimental learning, case study, field trips	10
unit II	Introduction, assumption in plastic analysis Safe moment, yield moment, plastic moment, shape factor, load factor, moment curvature relationship, collapse load for standard cases, plastic hing length	Lectures with problem based learning, experimental learning, case study, field trips	9
unit III	Stress-pattern in anchorage zones. Transmission length. End zone reinforcement. Stress distribution in end block	Lectures with problem based learning, experimental learning, case study, field trips	8
unit IV	Plastic design of columns for different condition	Lectures with problem based learning, experimental learning, case study, field trips	10
unit V	Design of R.C.C structures concepts (W.S.M)	Lectures with problem based learning, experimental learning, case study, field trips	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
ı	making model of prestressed beam	PBL	BL4-Analyze	3
II	making a model of prestressed slabs	PBL	BL5-Evaluate	2
III	making of model of prestressed coloums	PBL	BL4-Analyze	2

Part D(Marks Distribution)

			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
. J.a. Marko					

Part E

	T GIVE	
Books	Prestress concrete by S S Ramamrutham	
Articles	https://railtec.illinois.edu/wp/wp-content/uploads/Nawy-2009-Prestressed-Concrete.pdf	<u>"</u> "
References Books	Prestress concrete by Krishna Raju	- □
MOOC Courses	https://archive.nptel.ac.in/courses/105/106/105106118/	10
Videos	https://easyengineering.net/design-of-reinforced-concrete-structures-by-ramamrutham/	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	2	3	1	1	2	-	-	-	-	1	1	-
CO2	1	2	1	1	1	-	2	1	-	1	-	-	1	2	-
CO3	2	1	3	1	-	1	-	1	-	-	-	1	-	=	-
CO4	1	1	1	-	1	-	1	-	-	1	=	2	-	1	-
CO5	1	2	1	-	1	-	1	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Traffic Engineering
Course Code	CEE0810[T]

Part A

Year	4th	Semester	8th	Credits	L	Т	Р		
Teal	401	Genicates our Greates		Credits	4	2	0	(
Course Type	Theory only						3		
Course Category	Discipline Ele	ectives						4	
Pre-Requisite/s	basic knowle	dge of traffic and highway engin	eering	Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- To und CO3- To imp CO4- To prov will best suit CO5- To eva	CO1- To remember the various concepts in traffic engineering.(BL1-Remember) CO2- To understand & analyze the traffic engineering problems(BL2-Understand) CO3- To implement car-following models, queuing theories, and design of traffic signals in traffic engineering.(BL3-Apply) CO4- To provide experimental basis, and to enable the students to suggest the car-following theory and traffic control measures tha will best suit the Indian traffic condition.(BL4-Analyze) CO5- To evaluate the vehicle, highway and traffic factors that influences the movement of vehicles and design of traffic control measures(BL5-Evaluate)							
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓ Professional Ethics × Gender × Human Values × Environment ×								

Part B

Modules	Contents	Pedagogy	Hours
unit 1	Introduction: Role of traffic Engineer, Vehicle, highway and traffic factors. Traffic characteristics, Vehicular Road users, Introduction to Traffic Noise and Air Pollution and remedial measures.	Lectures with problem based learning, experimental learning, case study, field trips	10
unit II	Traffic flow: Interrupted and Uninterrupted Traffic Flow, Highway capacity: Urban, rural and intersection, Capacity of transit system, Traffic flow theory: Car Following and Queuing Theory.	Lectures with problem based learning, experimental learning, case study, field trips	9
unit III	Traffic Studies: Traffic volume studies, speeds studies, Speed and Delay Studies, Origin and Destination studies, Accident studies, capacity studies, parking studies.	Lectures with problem based learning, experimental learning, case study, field trips	8
unit IV	Traffic Control: regulations and other operational controls, Traffic Signal and marking, street lighting, Traffic Safety: Barricades, delineators.	Lectures with problem based learning, experimental learning, case study, field trips	10
unit V	Design of Intersections: Channelizing islands, Design of Rotaries, Intersection and terminal Design, Parking facilities.	Lectures with problem based learning, experimental learning, case study, field trips	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
	model of traffic light	PBL	BL2-Understand	3
II	drawing of pavment marking	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100		40	12	60	18			
			Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
	0							

Part E

Books	Principles of Transportation engineering by CEG Justo & S K Khanna	n/n
Articles	https://archive.nptel.ac.in/courses/105/101/105101008/	_ <u>~</u>
References Books	Highway Engineering By L R Kadiyali Khanna publication House	- (₹\$
MOOC Courses	https://archive.nptel.ac.in/courses/105/105/105105215/	7
Videos		

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	2	2	1	-	2	1	-	-	-	1	1	-
CO2	1	2	1	2	1	-	1	1	1	-	-	-	-	-	-
соз	2	1	2	1	-	-	1	2	3	-	-	-	2	1	-
CO4	1	1	1	2	1	-	1	1	-	-	-	-	-	-	-
CO5	2	2	1	-	1	1	1	1	-	-	-	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Energy Efficient and Green Building
Course Code	CEE0811

Part A

Year	4th Semester 8	8th	Credits	L	Т	Р	С		
Tear	4(1)	Semester	, oth	Credits	3	1	0	4	- 1/2
Course Type	Theory o	nly			•			•	3
Course Category	Discipline	e Electives							7
Pre-Requisite/s		Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- An: CO3- Un CO4- De	O1- Understand the concept of Green Buildings(BL2-Understand) O2- Analyze & compute the energy flow in buildings(BL4-Analyze) O3- Understand the energy efficient buildings(BL2-Understand) O4- Design the building as per LEED India Rating System(BL4-Analyze) O5- Design an Eco-friendly captive power generation(BL5-Evaluate)							
Coures Elements	Entrepre Employa	onal Ethics X ≺ ⁄alues X	SDG (Goals)	SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies)					

Part B

Modules	Contents	Pedagogy	Hours
1	What is Green Building, Why to go for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, What are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building	Lectures with Presentation and Seminar	8
2	Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency	Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures	8
3	Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximise System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement	Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures	8
4	Introduction, CII Godrej Green business centre, Design philosophy, Design interventions, Energy modeling, HVAC System design, Chiller selection, pump selection, Selection of cooling towers, Selection of air handing units, Precooling of fresh air, Interior lighting system, Key feature of the building. Ecofriendly captive power generation for factory, Building requirement	Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures	8
5	Handling of non process waste, waste reduction during construction,materials with recycled content,local materials,material reuse,certified wood ,Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indore air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels	Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Eco-friendly captive power generation for ITM University any block	PBL	BL4-Analyze	20
2	Preparing Models of Green Buildings	PBL	BL3-Apply	15

Part D(Marks Distribution)

			Theory			
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation	on
100	40	40	12	60	0	<u>"</u> "
			Practical			€\$
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation	•

Part E

Books	Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009
Articles	https://www.researchgate.net/publication/322273339_Energy_Consumption_and_Efficiency_in_Green_Buildings#:~:text=The%20study%20consummates
References Books	Green Building Hand Book by Tomwoolley and Samkimings, 2009
MOOC Courses	https://archive.nptel.ac.in/courses/105/102/105102195/
Videos	https://www.youtube.com/watch?v=LdHMjhaBWxw

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	-	1	2	-	-	-	1	2	2	2	3
CO2	3	2	3	1	1	1	2	-	-	-	1	2	2	3	2
CO3	3	2	3	1	1	1	3	-	-	-	2	2	2	2	3
CO4	3	3	3	2	-	1	2	-	-	-	1	2	3	3	3
CO5	3	2	3	1	-	1	3	-	-	-	1	2	3	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Airport Engineering
Course Code	CEE0812

Part A

Year	4th Semester	8th	Credits	L	Т	Р	С	"n	
Tear	4111	Semester	OUI	Credits	3	1	0	4	- 1/2
Course Type	Theory or	nly			•				3
Course Category	Discipline	Electives						-	4
Pre-Requisite/s				Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- Ana CO3- Exp CO4- Des	CO1- Describe the different components of airport and aircrafts(BL2-Understand) CO2- Analyse the requirements of an airport layout with respect to international regulations(BL4-Analyze) CO3- Explain the airport runway design(BL4-Analyze) CO4- Design Taxiways & Aprons.(BL3-Apply) CO5- Summarise the concepts of the terminal service facilities(BL3-Apply)							
Coures Elements	Entreprer Employat	nal Ethics X (alues X	SDG (Goals)	SDG11(Sustainable cities and economies)					

Part B

Modules	Contents	Pedagogy	Hours
1	AIR TRANSPORTATION Airport terminology, component parts of Aeroplane, Classification and size of airports; Aircraft characteristics. Air traffic control need for ATC, Air traffic control network, Air traffic control aids —enroute aids, landing aids. Airport site location and necessary surveys for site section, airport obstructions.	Lectures with Presentation, Site Visit to Airport	8
2	PLANNING: Airport master plan –FAA recommendations, Regional Planning, ICAO recommendations, Estimation of future airport traffic needs-layout of Air Port	Lectures with Presentation, Site Visit to Airport	8
3	RUNWAYS: Runway orientation – windrose diagram, basic runway length, corrections for elevation, temperature and gradient, runway geometric design, runway pavement design introduction	Lectures with Presentation, Site Visit to Airport	8
4	TAXIWAYS AND APRONS: Loading aprons –holding aprons – Geometric design standards, exit taxiways –optimal location, design, and fillet and separation clearance	Lectures with Presentation, Site Visit to Airport	8
5	OTHER FACILITIES: Lighting, visual airport marking, airport lighting aids. OPERATIONS AND SCHEDULING: Ground transportation facilities; Airport capacity, runway capacity and delays.	Lectures with Presentation, Site Visit to Airport	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Project On Airport Planning and Design	PBL	BL3-Apply	15

Part D(Marks Distribution)

Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	40	40 12		0			
	Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			

Part E

Books	Khanna S.K., Arora M.G., Jain S.S., "Airport Planning & Design",1st Edition, Nemch and Bros. Roorkee, 2009	
Articles	https://www.researchgate.net/publication/228007533_Airport_Engineering_Planning_Design_and_Development_of_21st_Century_Airports_Fourth_	i
References Books	Robert Horonjeff, Francis Mc Kelvey, William Sproule and Seth Young, "Planning and Design of Airports" 5th Edition, 2010	(E)
MOOC Courses	https://archive.nptel.ac.in/courses/105/107/105107123/	7
Videos	https://www.youtube.com/watch?v=WUq3uN4MDms	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	-	-	-	-	-	-	2	2	3	3	2
CO2	3	2	3	1	-	-	-	-	-	-	3	2	2	2	3
CO3	3	2	2	1	-	-	-	-	-	-	2	2	3	2	2
CO4	2	2	1	1	-	-	-	-	-	-	2	2	2	2	3
CO5	2	2	3	-	-	-	-	-	-	-	2	3	2	3	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Solid Waste Management
Course Code	CEE0813

Part A

Year	4th	Semester	8th	Credits	L T P		Р	С	
1001		Jun	o, ounc	3	1	0	4	- <u>"</u> - (3)	
Course Type	Theory or	neory only							
Course Category	Discipline	scipline Electives							
Pre-Requisite/s		Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- Stu CO3- Stu CO4- Stu	CO1- Students will Understand the concept of solid waste management(BL2-Understand) CO2- Students will be able to explain handling and processing of solid waste(BL2-Understand) CO3- Students will be able to apply the concept of landfilling for disposal of solid waste(BL3-Apply) CO4- Students will be able to design composting and other solid waste conversion units(BL4-Analyze) CO5- Students will understand the various hazardous waste, risk assessment and legislation (BL2-Understand)							
Coures Elements	Entreprer Employal	nal Ethics X (alues X	SDG (Goals)	SDG6(Clean water and sanitation) SDG11(Sustainable cities and economies)					

Part B

Modules	Contents	Pedagogy	Hours
1	Solid waste: Public health and ecological impacts, Sources and types of solid wastes, material flow and waste generation, Functional elements: Waste generation, storage, collection, Transfer and transport, processing and recovery, disposal. Physical and chemical composition of municipal solid waste, integrated solid waste management, hierarchy of waste management options, different methods for generation rates. Storage: movable bins, fixed bins, Collection: home to home collection, community bin system. Theory and design of hauled container system, stationary container system	Lectures with problem based learning, experimental learning, case study, field trips	8
2	Transportation: handcart, tri-cycle, animal cart, tripper truck, dumper placer, bulk refuse carrier, railroad transport, water transport, conveyors, layout of routes. Engineering system for on-site handling and processing of solid waste: separators, size reduction equipments, screening equipments, densification, baling, cubing, pelleting equipments	Lectures with problem based learning, experimental learning, case study, field trips	8
3	Land filling: Site selection criteria, landfill layout, landfill sections, Occurrence of gases and leachate in landfills: composition and characteristics, generation factors, initial adjustment phase, transition phase, acid formation phase, methane formation phase, maturation phase of gases and leachate, Introduction to engineered landfills	Lectures with problem based learning, experimental learning, case study, field trips	8
4	Composting, types of composting, process description, design and operational consideration of aerobic composting, process description, design and operational consideration of anaerobic composting. Thermal conversion technologies: incineration and pyrolysis system, energy recovery, system. Overview of solid waste management practices in India	Lectures with problem based learning, experimental learning, case study, field trips	8
5	Introduction to Hazardous wastes, Definition of Hazardous waste, The magnitude of the problem; Hazardous waste: Risk assessment, Environmental legislation, Characterization and site assessment, Waste minimization and resource recovery, Transportation of hazardous waste, Disposal of hazardous waste. Introduction to Electronic waste and Biomedical waste and their disposal	Lectures with problem based learning, experimental learning, case study, field trips	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-I	Comparative study of different filters for water purification	PBL	BL3-Apply	15
Module-II	Project on collection and composting of waste	PBL	BL3-Apply	15

Part D(Marks Distribution)

Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation	on				
100	40	40	12	60	0	"/"				
			Practical			- 🕏				
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
						4				

Part E

Books	Tchobanoglous, G., Theisen, H., & Vigil, S.A; Integrated Solid Waste Management: McGraw Hill, New York
Articles	https://investmeghalaya.gov.in/resources/homePage/17/megeodb/rules/Solid_Waste_Management_Rules.pdf
References Books	Solid Waste Engineering, Principle & Management issues by Ven Te Chow
MOOC Courses	https://archive.nptel.ac.in/courses/105/103/105103205/
Videos	https://www.youtube.com/watch?v=cjlacnNRLHE

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	-	1	2	-	-	-	1	1	2	2	3
CO2	2	1	1	1	-	1	2	-	-	-	1	1	2	3	2
CO3	2	2	2	1	-	2	2	-	-	-	1	2	2	2	2
CO4	3	3	1	1	-	1	1	-	-	-	1	1	2	2	1
CO5	2	2	1	2	-	2	2	-	-	-	1	2	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Urban Transportation Planning
Course Code	CEE0814

Part A

Year	4th	Semester	8th	Credits	L	Т	Р	С	- <u>"</u> "	
			3	1	0	4	- 🗟			
Course Type	Theory or	Theory only								
Course Category	Discipline	iscipline Electives								
Pre-Requisite/s		Co-Requisite/s								
Course Outcomes & Bloom's Level	CO2- Stu Analyze) CO3- Stu CO4- Stu	CO1- Students will be able to Understand the basic concepts of planning at urban and regional levels(BL2-Understand) CO2- Students will be able to Distinguish between the Conventional and current approaches for travel demand estimation(BL4-Analyze) CO3- Students will be able to Implement various types of models and trip generation(BL3-Apply) CO4- Students will be able to Analyze the urban travel markets(BL4-Analyze) CO5- Students will be able to Evaluate the transport planning proposals(BL5-Evaluate)								
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓ Professional Ethics × Gender × Human Values × Environment ✓ SDG (Goals) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)									

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to transportation planning, planning concept, Goals, objectives, and Importance of transportation planning. Nature of traffic problems in cities. Present Scenario of road transport and rail transport assets. Role of transportation: Social, Political, Environmental. Transport and Socioeconomic Activities, Historical Development of Transport, Transportation in the Cities, Freight Transportation, Future Developments.	Lectures with problem based learning, experimental learning, case study, field trips	8
2	Urban form and Transport patterns, land use – transport cycle, concept of accessibility. Types of transport systems, evolution of transport modes, transport problems and mobility issues. Public Transport: Intermediate Public Transport (IPT) Rapid and mass transport system like MRTS & bus rapid transit. Transport Planning Process, Problem Definition, Solution Generation	Lectures with problem based learning, experimental learning, case study, field trips	8
3	Travel demand: Estimation and fore casting, trip classification, trip generation: factor and methods, multiple regression analysis. Trip distribution methods, modal split, trip assignment	Lectures with problem based learning, experimental learning, case study, field trips	8
4	Studying travel behavior. Analyzing urban travel markets. Traffic and transportation surveys and studies, traffic and travel characteristics, urban transport planning process – stages, study area, zoning, database	Lectures with problem based learning, experimental learning, case study, field trips	8
5	Evaluation of transport planning proposals: Land Use Transport Planning, Economic Evaluation methods like Net present Value methods, and Benefit Cost method. Transport system management: Long-term and short-term planning	Lectures with problem based learning, experimental learning, case study, field trips	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Traffic Survey of National Highways	PBL	BL4-Analyze	15
2	Parking Planning for given vehicles	PBL	BL4-Analyze	15

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40 40		12	60	0				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Part E

	1 41(2	
Books	Metropolitan Transportation planning-J.W. Dickey	
Articles	https://www.tandfonline.com/journals/rupt20	ıllı
References Books	Hutchinson, B.G.(1974).Principles of Urban Transport Systems Planning. Mc Graw Hill Book Company, New York	€\$
MOOC Courses	https://archive.nptel.ac.in/courses/105/105/105105208/	10
Videos	https://www.youtube.com/watch?v=pW-Qymxabsc	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1	-	-	-	-	2	2	2	2	3
CO2	2	2	2	3	2	1	-	-	-	-	2	1	2	1	2
CO3	3	2	2	2	2	1	-	-	-	-	2	2	2	1	1
CO4	3	2	2	3	1	1	-	-	-	-	1	1	2	2	2
CO5	2	3	2	2	1	1	-	-	-	-	2	2	1	1	2
CO6	-	-	-	-	-	-	ı	-	-	-	-	-	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Environment Engineering-II
Course Code	CEL0826[T]

Part A

Year	4th	Semester	8th	Credits	L	Т	Р	- "[]"	
Teal	401	Semester	Otti	Credits		1	2		
Course Type	Embedded the	eory and field work						3	
Course Category	Discipline Cor	e						4	
Pre-Requisite/s	Environmenta	l Engineering and Basics of Waste	water and hydraulics	Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- To unde CO3- Student CO4- To analy CO5- To evalu	CO1- Students will be remember the different Pollutants responsible for Pollution(BL1-Remember) CO2- To understand different parameters like BOD and COD(BL2-Understand) CO3- Students will be able to apply the knowledge of treatment of waste water(BL3-Apply) CO4- To analyze different pollutants responsible for water pollution(BL4-Analyze) CO5- To evaluate the type of treatment required for sludge and solid waste(BL5-Evaluate) CO6- To Create Water Treatment system and solve Rural Sanitization Problems(BL6-Create)							
Coures Elements	Skill Developr Entrepreneurs Employability Professional E Gender X Human Values Environment	ship X √ Ethics X s X	SDG (Goals)						

Part B

Modules	Contents	Pedagogy	Hours
1	Sewerage schemes and their importance, collection & conveyance of sewage, storm water quantity, fluctuation in sewage flow, flow through sewer, design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.	Lectures with problem based learning, experimental learning, case study, field trips	10
2	Characteristics and analysis of waste wate, rcycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. BOD & COD, TOC, TOD, Th OD, Relative Stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. by land treatment & by dilution, self purification capacity of stream, Oxygen sag analysis.	Lectures with problem based learning, experimental learning, case study, field trips	8
3	Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, Sewage filtration- theory & design.	Lectures with problem based learning, experimental learning, case study, field trips	8
4	Methods of Biological Treatment (Theory & Design) - Activated Sludge process, Oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal.	Lectures with problem based learning, experimental learning, case study, field trips	8
5	Advanced Waste Water treatment - Diatomaceorus earth filters, ultrafiltration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico chemical waste water treatment, Solid waste disposal - classification, composition, collection, & disposal methods. Rural sanitation - collection & disposal of refuse, sullage & night soil.	Lectures with problem based learning, experimental learning, case study, field trips	10

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	BOD Test on Sewage water	Experiments	BL3-Apply	2
2	COD Test on Sewage water	Experiments	BL3-Apply	2
3	DO Test on Sewage water	Experiments	BL3-Apply	2
4	Incubation for E-coli	Experiments	BL2-Understand	2
5	Incubation for B-coli	Experiments	BL2-Understand	2

	Part D(Marks Distribution)								
	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluatio				
100	40	40	12	60	Ų				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	0	40	20	60					

Part E

Books	S.K.Garg, Environmental engineering volume 1 and 2, Khanna publisher		
Articles	https://easyengineering.net/sewage-waste-disposal-and-air-pollution-engineering-by-santosh-kumar-garg/		
References Books B.C.Punamia, Environmental engineering volume 1 and 2, Laxmi Publication			
MOOC Courses	https://archive.nptel.ac.in/courses/127/105/127105018/		
Videos	https://ia902309.us.archive.org/6/items/eco-8/ECO8.pdf		

	Ocaroo / Wacalation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	3	3	-	-	3	-	2
CO2	2	-	2	2	1	2	-	-	3	3	-	-	3	2	2
CO3	-	-	2	1	1	-	-	-	2	1	-	-	3	2	2
CO4	-	1	2	3	1	-	-	-	-	-	-	-	3	-	2
CO5	-	1	1	2	1	-	-	-	-	-	-	-	3	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



(SOET)(BTech-CivilEngineering)

Title of the Course	Design of Hydraulic Structures
Course Code	CEL0827[T]

Part A

Year	4th	Semester	8th	Credits	L	Т	Р	"/"		
i eai	401	Semester	Ott	Credits	3	1	2	(E		
Course Type	Embedded tl	mbedded theory and lab								
Course Category	Discipline Co	oline Core								
Pre-Requisite/s	Basics of Str	lasics of Structural Design and Analysis Co-Requisite/s								
Course Outcomes & Bloom's Level	CO2- To und CO3- To imp CO4- To pro CO5- To eva	CO1- To remember the various concepts in theory of Dams(BL1-Remember) CO2- To understand & analyze the different Hydraulic strutures(BL2-Understand) CO3- To implement the different designing concepts of Spillways(BL3-Apply) CO4- To provide experimental basis, and to enable the students to analyze the design of gravity dams(BL4-Analyze) CO5- To evaluate the applications of different Energy dissipators in various fields such as research & industries CO6- To apply the understanding of Hydel power plant in solving problem of electricity								
Coures Elements	Skill Develop Entrepreneu Employability Professional Gender X Human Value Environment	rship X y √ Ethics X es X	SDG (Goals)							

Part B

Modules	Contents	Pedagogy	Hours
1	Gravity dams: Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practical profile, foundation treatment, construction joints, galleries in gravity dams.	Lectures with problem based learning, experimental learning, case study, field trips	8
2	Earth and Rock fill dams: Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition. Rock fill dams: Types, merits and demerits, conditions favourable for their adoption.	Lectures with problem based learning, experimental learning, case study, field trips	10
3	Spillways: Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways, emergency spillways.	Lectures with problem based learning, experimental learning, case study, field trips	8
4	Energy dissipatiors and gates: Principles of energy dissipation Energy dissipators based on tail water rating curve and jump height curves Spillway crest gates - vertical lift and radial gates, their design principles and details. Design of canal regulating structures, Detaild design of Sarda Falls, design of cross drainage works, sphypon aquaduct	Lectures with problem based learning, experimental learning, case study, field trips	10
5	Hydropower Plants: Introduction of Hydropower development, assessment of power potential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details.	Lectures with problem based learning, experimental learning, case study, field trips	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To find the coefficient of ogee weir	Experiments	BL3-Apply	2
2	To study flow characteristics and pressure distribution over ogee weir	Experiments	BL3-Apply	2
3	To study the effect of hydraulic jump for dissipation of energy of a spillway	Experiments	BL4-Analyze	2
4	Study of different energy dissipators and their efficiencies	Experiments	BL5-Evaluate	2
5	To study the flow characteristics through a siphon spillway	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

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			Ineory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation	. 7				
100	40	40	12	60						
Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation	on				
100	0	40	20	60						

Part E

Books	SK Garg, Irrigation engg and Hydraulic structures, Khanna publications
Articles	https://www.freebookcentre.net/civil-books-download/Design-Of-Hydraulic-Structures.html
References Books	SK Sharma, Irrigation engg and Hydraulic structures, Schand
MOOC Courses	https://archive.nptel.ac.in/courses/105/105/105105203/ https://www.youtube.com/watch?v=z9wsUWaN-oY
Videos	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	1	-	2	2	2	1
CO2	3	3	2	2	1	-	-	-	-	1	-	2	2	-	2
соз	3	-	-	-	-	-	-	-	-	1	-	2	2	2	-
CO4	3	3	2	2	1	-	-	-	-	1	-	2	2	1	1
CO5	2	1	=	1	-	-	1	-	-	1	-	2	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





