

# EXCEL ENGINEERING COLLEGE (Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai Accredited by NBA and NAAC with "A+"and Recognized by UGC (2f&12B) KOMARAPALAYAM - 637303

### B.E. CIVIL ENGINEERING REGULATION – 2020 CHOICE BASED CREDIT SYSTEM I TO VIII SEMESTERS CURRICULUM AND SYLLABI

	SE	MESTER I							
Sub Codo	Courses	Cotogony	Per	iods/	Week	6	Maxi	mum	Marks
Sub Code	Course	Calegory	L	Т	Ρ	U	СА	FE	Total
Theory Cou	rse (s)								
20MA102	Mathematics - I for Building Sciences	BS	3	2	0	4	40	60	100
20CE101	Basics of Civil Engineering	ES	3	0	0	3	40	60	100
Theory with	Practical Course (s)								
20ENEXX	Language Elective - I*	HSS	2	0	2	3	50	50	100
20CH102	Chemistry for Building Sciences	BS	3	0	2	4	50	50	100
20ME101	Engineering Graphics	ES	1	0	4	3	50	50	100
Practical Co	ourse (s)								
20CE102	Civil Engineering Practices Laboratory	ES	0	0	2	1	50	50	100
Mandatory	Course (s)								
20MC101	Induction Programme	MC	2 W	'eeks		0	100	0	100
		Total	12	2	10	18	380	320	700
*Language	Electives – I								
20ENE01	Communicative English	HSS	2	0	2	3	50	50	100
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100

SEMESTER II									
Sub Code	Course	Catagory	Per	iods/	Week	C	Мах	imum	Marks
Sub Code	Course	Category	L	Т	Ρ	U	CA	FE	Total
Theory Cou	rse (s)								

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20MA202	Mathematics - II for Building Sciences	BS	3	2	0	4	40	60	100
20ME201	Engineering Mechanics	ES	3	2	0	4	40	60	100
Theory with	Practical Course (s)								
20ENEXX	Language Elective - II*	HSS	2	0	2	3	50	50	100
20PH202	Physics for Building Sciences	BS	3	0	2	4	50	50	100
20CS201	Problem Solving using Python	ES	3	0	2	4	50	50	100
Practical Co	ourse (s)								
20CE201	Computer Aided Building Drawing Laboratory	PC	0	0	4	2	50	50	100
Mandatory (	Course (s)								
20MC201	Environmental Sciences	MC	2	0	0	0	100	0	100
		Total	16	4	10	21	380	320	700
<sup>*</sup> Language E	Electives - II								
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100
20ENE03	Hindi	HSS	2	0	2	3	50	50	100
20ENE04	French	HSS	2	0	2	3	50	50	100
20ENE05	German	HSS	2	0	2	3	50	50	100

	SEMESTER III									
	•		Peri	ods/	Week		Мах	imum	Marks	
Sub Code	Course	Category	L	т	Ρ	С	СА	FE	Total	
Theory Co	urse (s)									
20MA301	Transforms and Boundary Value Problems	BS	3	2	0	4	40	60	100	
20CE301	Mechanics of Solids I	ES	3	2	0	4	40	60	100	
20CE302	Fluid Mechanics	ES	3	0	0	3	40	60	100	
20CE303	Engineering Geology	PC	3	0	0	3	40	60	100	
Theory wit	h Practical Course (s)									
20CE304	Surveying I	PC	3	0	2	4	50	50	100	
20CE305	Construction Materials	PC	3	0	2	4	50	50	100	
Mandatory	v Course (s)									

20MC301	Interpersonnal Skills	MC	0	0	2	0	100	0	100
		Total	18	4	6	22	360	340	700

	SEMESTER IV											
Sub Codo	Course	Catagory	Periods/Week			Ϋ́ς	Maximum Marks					
	Course	Calegory	L	т	Ρ		СА	FE	Total			
Theory Co	urse (s)											
20MA401	Numerical Analysis and Statistics	BS	3	2	0	4	40	60	100			
20CE401	Concrete Technology	PC	3	0	0	3	40	60	100			
20CE402	Geotechnical Engineering I	PC	3	0	0	3	40	60	100			
20CE403	Mechanics of Solids II	PC	3	2	0	4	40	60	100			
Theory wit	h Practical Course (s)											
20CE404	Surveying II	PC	3	0	2	4	50	50	100			
20CE405	Applied Hydraulic Engineering	ES	3	0	2	4	50	50	100			
Practical (	Course (s)											

20CE406	Strength of Materials Laboratory	PC	0	0	2	1	50	50	100
Mandatory Course (s)									
20MC401	Soft Skills	MC	2	0	0	0	100	0	100
		Total	20	4	6	23	410	390	800

SEMESTER V											
Sub Codo	Course	Cotogory	Peri	iods	/Wee	k	Maximum Marks				
	Course	Category	L	т	Ρ		СА	FE	Total		
Theory Cou	ırse (s)										
20CE501	Design of Reinforced Cement Concrete Elements	PC	3	2	0	4	40	60	100		
20CE502	Structural Analysis I	PC	3	0	0	3	40	60	100		
20CEEXX	Professional Elective-I	PE	3	0	0	3	40	60	100		

20YYOXX	Open Elective-I	OE	3	0	0	3	40	60	100
Theory with	n Practical Course (s)								
20CE503	Environmental Engineering I	PC	3	0	2	4	50	50	100
20CE504	Geotechnical Engineering II	PC	3	0	2	4	50	50	100
Practical C	ourse (s)								
20CE505	Survey Camp	PC	1 V	Vee	k	1	100	0	100
		Total	18	2	4	22	360	340	700

	SEMES	STER VI							
Sub Code	Course	Cotomorry	Peri	iods	/Week		Мах	imum	Marks
	Course	Category	L	т	Ρ		СА	FE	Total
Theory Cou	irse (s)								
20CE601	Design of Steel Structural Elements	PC	3	2	0	4	40	60	100
20CE602	Structural Analysis II	PC	3	0	0	3	40	60	100
2 <mark>0CE603</mark>	Environmental Engineering II	PC	3	0	0	3	40	60	<mark>100</mark>
20CEEXX	Professional Elective-II	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-II	OE	3	0	0	3	40	60	100
Theory with	n Practical Course (s)								
20CE604	Highway Engineering	PC	3	0	2	4	50	50	100
Employme	nt Enhancement Course (s)								
20CE605	Mini Project	EEC	0	0	2	1	50	50	100
20CE606	Internship	EEC	2	wee	eks	1	100	0	100

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	SEMESTER VII										
Sub Code	Course	Category	Peri	ods/	Week	С	Maximum Marks				
			L	т	Ρ		СА	FE	Total		
Theory Cou	irse (s)										
20CE701	Structural Dynamics and Earthquake Engineering	PC	3	0	0	3	40	60	100		
20CE702	Estimation Costing and ValuationEngineering	PC	3	0	0	3	40	60	100		
20CE703	Water Resource and Irrigation Engineering	PC	3	0	0	3	40	60	100		
20CEEXX	Professional Elective-III	PE	3	0	0	3	40	60	100		
20CEEXX	Professional Elective-IV	PE	3	0	0	3	40	60	100		
20YYOXX	Open Elective-III	OE	3	0	0	3	40	60	100		
Practical C	ourse (s)	I		1			I				
20CE704	Computer Aided Design and Drawing Laboratory (Concrete and Steel)	PC	0	0	4	2	50	50	100		
Employmer	nt Enhancement Course (s)	<u>                                     </u>		1			I	1			
20CE705	Design Project	EEC	0	0	2	1	50	50	100		
		Total	18	0	6	21	340	460	800		

	SEME	STER VIII							
Sub Codo	Course	Cotogony	Per	iods/\	Neek	0	Мах	imum	Marks
	Course	Calegory	L	т	Ρ	C	CA	FE	Total
Theory Co	urse (s)								
20CEEXX	Professional Elective-V	PE	3	0	0	3	40	60	100
20CEEXX	Professional Elective-VI	PE	3	0	0	3	40	60	100
Employme	nt Enhancement Course (s)								
20CE801	Major Project	EEC	0	0	20	10	50	50	100
		Total	6	0	20	16	130	170	300

	PROFESSIONAL ELECTIVES (PE)									
STREAM	I : ENVIRONMENTAL AND WAT	ER RESOU	RCE	ENG	INEE	RING				
	0	0-1	Per	iods/	Week	•	Max	imum	Marks	
Sub Code	Course	Category	L	Т	Ρ	C	CA	FE	Total	
20CEE01	Hydrology	PE	3	0	0	3	40	60	100	
20CEE02	Ground Water Engineering	PE	3	0	0	3	40	60	100	
20CEE03	Air Pollution and Control Engineering	PE	3	0	0	3	40	60	<mark>100</mark>	
20CEE04	Water Resources Systems Analysis	PE	3	0	0	3	40	60	100	
20CEE05	Integrated Water Resources Management	PE	3	0	0	3	40	60	100	
20CEE06	Hospital Waste Management	PE	3	0	0	3	40	60	100	
20CEE07	Municipal Solid Waste Management	PE	3	0	0	3	40	60	100	
20CEE08	Participatory Water Resources Management	PE	3	0	0	3	40	60	100	
20CEE09	Air Pollution Management	PE	3	0	0	3	40	60	100	
20CEE10	Industrial Waste Management	PE	3	0	0	3	40	60	100	
20CEE11	Environmental and Social Impact Assessment	PE	3	0	0	3	40	60	100	
20CEE12	Geo- Environmental Engineering	PE	3	0	0	3	40	60	100	

STREAM-I	STREAM-II : STRUCTURAL ENGINEERING											
			Peri	ods/	Week		Max	imum Marks				
Sub Code	Course	Category	L	Т	Р	С	СА	FE	Total			
20CEE21	Building Services	PE	3	0	0	3	40	60	100			
20CEE22	Disaster Management	PE	3	0	0	3	40	60	<mark>100</mark>			
20CEE23	Industrial Structures	PE	3	0	0	3	40	60	100			
20CEE24	Maintenance, Repair and Rehabilitation of Structures	PE	3	0	0	3	40	60	100			
20CEE25	Design of Prestressed Concrete Structures	PE	3	0	0	3	40	60	100			
20CEE26	Experimental Analysis of Stress	PE	3	0	0	3	40	60	100			
20CEE27	Bridge Structures	PE	3	0	0	3	40	60	100			

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20CEE28	Storage Structures	PE	3	0	0	3	40	60	100
20CEE29	Ground Improvement Techniques	PE	3	0	0	3	40	60	100
20CEE30	Cost Effective Construction and Green Building	PE	3	0	0	3	40	60	100
20CEE31	Tall Buildings	PE	3	0	0	3	40	60	100
20CEE32	Prefabricated Structures	PE	3	0	0	3	40	60	100
20CEE33	Rock Mechanics	PE	3	0	0	3	40	60	100
20CEE34	Reinforced Soil Structure	PE	3	0	0	3	40	60	100
20CEE35	Geotechnical Exploration and Instrumentation	PE	3	0	0	3	40	60	100
20CEE36	Design of Masonry, Timber & Steel Elements	PE	3	0	0	3	40	60	100

STREAM-III	STREAM-III : CONSTRUCTION ENGINEERING AND MANAGEMENT												
Cub Cada	Courses	Ostanamu	Peri	ods/	Week	•	Мах	imum	Marks				
Sub Code	Course	Category	L	Т	Ρ	C	СА	FE	Total				
20CEE41	Construction Planning and Scheduling	PE	3	0	0	3	40	60	100				
20CEE42	Modern Construction Materials	PE	3	0	0	3	40	60	100				
20CEE43	Housing Planning and Management	PE	3	0	0	3	40	60	100				
20CEE44	Construction Project Management	PE	3	0	0	3	40	60	100				
20CEE45	Economic and Finance Management in Construction	PE	3	0	0	3	40	60	100				
20CEE46	System Integration in Construction	PE	3	0	0	3	40	60	100				
20CEE47	Contract Laws and Regulation	PE	3	0	0	3	40	60	100				
20CEE48	Resource Management and Control in Construction	PE	3	0	0	3	40	60	100				
20CEE49	Quality Control and Assurance in Construction	PE	3	0	0	3	40	60	100				
2 <mark>0CEE50</mark>	Design of Energy Efficient Building	PE	3	0	0	3	40	60	100				
20CEE51	Project Formulation and Appraisal	PE	3	0	0	3	40	60	100				

20CEE52	Project Safety Management	PE	3	0	0	3	40	60	100
20CEE53	Railway, Airport, Docks and Harbor Engineering	PE	3	0	0	3	40	60	100

	OPEN ELECTIVE COURSES (For Other Branches)										
Sub Codo	Course	Periods/V			Week	6	Мах	imum Marks			
Sub Code	Course	Calegory	L	т	Ρ	C	CA	FE	Total		
20CEO01	Energy Conservation and	OE	3	0	0	3	40	60	100		
	Management										
20CEO02	Environment and Agriculture	OE	3	0	0	3	40	60	<mark>100</mark>		
2 <mark>0CEO03</mark>	Renewable Energy Sources	OE	3	0	0	3	40	60	100		
20CEO04	Vibration and Noise Control	OE	3	0	0	3	40	60	100		
20CEO05	Climate Change and its Impacts	OE	3	0	0	3	40	60	100		
20CEO06	Green Building Design	OE	3	0	0	3	40	60	<mark>100</mark>		
20CEO07	Selection of Materials	OE	3	0	0	3	40	60	100		
20CEO08	Testing of Materials	OE	3	0	0	3	40	60	100		

ONE CREDIT COURSES											
	0.000	Cotomore	Peri	ods/	Week	•	Maximum Marks				
Sub Code	Course	Category	L	Т	Ρ	J	СА	FE	Total		
20CEA01	Drafting and Documentation of Construction Projects	PC	1	0	0	1	100	0	100		
20CEA02	3D Modeling Techniques of BIM	PC	1	0	0	1	100	0	100		
20CEA03	3DModelling of Buildings	PC	1	0	0	1	100	0	100		
20CEA04	Total Station Survey	PC	1	0	0	1	100	0	100		
20CEA05	Tekla	PC	1	0	0	1	100	0	100		
20CEA06	Vasthu	PC	1	0	0	1	100	0	100		
20CEA07	Pre-Engineered Building	PC	1	0	0	1	100	0	100		

	VALUE ADDED COURSES									
Sub Code	Course	Category	Peri	ods/	Week	С	Мах	imum	Marks	
			L	Т	Ρ		CA	FE	Total	
20CEB01	Auto cad	OE	2	0	2	3	100	0	100	
20CEB02	Revit Architecture	OE	2	0	2	3	100	0	100	
20CEB03	E tabs	OE	2	0	2	3	100	0	100	
20CEB04	3 DX Max	OE	2	0	2	3	100	0	100	
20CEB05	Stadd Pro.	OE	2	0	2	3	100	0	100	
20CEB06	Primavera	OE	2	0	2	3	100	0	100	
20CEB07	Drone Survey	OE	2	0	2	3	100	0	100	

ei					Cre	dits p	oer Se	emes	ter		
No.	Category	I	II	III	IV	v	VI	VII	VIII	Total Credits	By AICTE
1	HSS	3	3							6	10-14
2	BS	8	8	4	4					24	22-28
3	ES	7	8	7	4					26	24
4	PC		2	11	15	16	14	11		69	48
5	PE					3	3	6	6	18	18
6	OE					3	3	3		9	9
7	EEC						2	1	10	13	12-16
8	MC			0				0		0	
	Total	18	21	22	23	22	22	21	16	165	143-157

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- HSS Humanities and Social Sciences
- BS Basic Sciences
- ES Engineering Sciences
- PC Professional Core
- PE Professional Electives
- OE Open Electives
- EEC Employability Enhancement Courses
- MC Mandatory Courses (Non-Credit Courses)
- CA Continuous Assessment
- FE Final Examination



	Environmental Science	L	Т	Ρ	С
20MC201	(Common to Agriculture, Food Technology, Aero, Civil, Mechanical and Fire and Safety Engineering)	2	0	0	0
Nature of Course	Mandatory				
Prerequisites	Nil				

### **Course Objectives**

The course is intended to

- 1. Understand the concept of eco system and environment.
- 2. Become conversant with ecological balance and values of bio diversity.
- 3. Know the role of human in prevention of pollution and making a clean environment.
- 4. Get knowledge about conservation of non conventional energy resources.
- 5. Study about the nature and management of e-waste and solid waste.

### **Course Outcomes**

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Describe the ecosystem and environment	Understand
CO2	Understand the ecological balance and preservation of bio diversity	Understand
CO3	Demonstrate various types of pollution in order tocontrol pollution	Apply
CO4	Classify the energy sources for the conservation of non conventional energy sources	Understand
CO5	Identify the nature and management of e-waste and solid waste	Apply

### **Course Contents**

### Unit-I Ecosystem

Eco system-Food chains, Food webs and Ecological pyramids. Ecosystem-(a) Forest eco system,(b) Aquatic eco system(pond ecosystem and marine ecosystem).

### Unit-II Biodiversity

Introduction to Bio diversity, Values of Bio diversity, Threads to Bio diversity, Endangered and Endemic species of India, Hotspots of biodiversity. Conservation of Bio diversity: In-Situ and Ex-Situ conservation of bio diversity.

### **Environmental Pollution** Unit-III

Definition Causes, Effects and Control of (a) Air pollution (b) Water pollution (c) Soil pollution. Electrostatic Precipitator for controlling air pollution.

### Unit-IV Non Conventional Energy Resources

Introduction, Types: Solar Energy, Wind Energy and Geo Thermal Energy.

#### Unit-V **Environmental Management**

Sustainable Development, Role of Information technology in Environment and Human.HIV and AIDS: causes and control measures. Green chemistry: Definition and Principles

### **Activity Component**

S.No	Name of the Experiment	CO Mapping	RBT
1	Field study of simple eco system: pond, river and hill slopes	CO1	Understand
2	Case study regarding environmental management	CO5	Apply

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### Textbooks

1. AnubhaKaushik and C.P. Kaushik, "Environmental Science and Engineering, New Age International Publishers, New Delhi, 2<sup>nd</sup> Edition, 2015.

2. V. Kumar, "An Introduction to Green Chemistry" Vishal publishing Co. Reprint Edition, 2010.

### **Reference Books**

- 1. Masters, Gilbert M, "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi, 2<sup>nd</sup> Edition, 2012.
- 2. Santosh Kumar Garg and Rajeshwari Garg "Ecological and Environmental Studies", Khanna Publishers, Nai Sarak, Delhi, 2<sup>nd</sup> Edition, 2014.

### Additional Resources

- 1. https://nptel.ac.in/courses/122103039/38
- 2. https://bch.cbd.int/cms/ui/collaboration/download/download.aspx?id=909
- 3. https://nptel.ac.in/courses/105102089/air%20pollution%20(Civil)/Module-3/3a.htm
- 4. www.vssut.ac.in/lecture\_notes/lecture1428910296.pdf
- 5. nptel.ac.in/courses/120108004/module7/lecture8.pdf

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs									PSOs					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1							3					3			
CO2							3					3			
CO3							3					3			
CO4							3					3			
CO5							3					3			
	3 High			2	Medium			1	Low						

Bloom's	Continuous Assessment										
Level	IAE1 [20]	IAE 2 [20]	IAE 3 [20]	Attendance [10]	Activity [30]						
Remember	30	20	20								
Understand	10	20	20								
Apply	10	10	10								
Analyze											
Evaluate											
Create											

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### **II TEST ON BITUMEN**

- a) Specific Gravity of Bitumen
- b) Penetration Test
- c) Viscosity Test
- d) Softening Point Test
- e) Ductility Test

### **III TESTS ON BITUMINOUS MIXES**

- a) Stripping Test
- b) Determination of Binder Content
- c) Marshall Stability and Flow Values

### IV DEMONSTRATION OF ANY ONE FIELD TESTING EQUIPMENT LIKE SKID RESISTANCE TESTER/ BENKELMAN BEAM ETC

### OUTCOME:

### **TOTAL: 60 PERIODS**

• Student knows the techniques to characterize various pavement materials through relevant tests.

### **REFERENCES:**

- 1. Highway Materials and Pavement Testing, Nem Chand and Bros., Roorkee, Revised Fifth Edition, 2009
- 2. Methods for testing tar and bituminous materials, IS 1201–1978 to IS 1220– 1978, Bureau of Indian Standards
- 3. Methods of test for aggregates, IS 2386 1978, Bureau of Indian Standards
- 4. Mix Design Methods Asphalt Institute Manual Series No. 2, Sixth Edition,1997, Lexington, KY, USA.

SI.No	Description of Equipment	Quantity
1.	Concrete cube moulds	6
2.	Concrete cylinder moulds	3
3.	Concrete Prism moulds	3
4.	Sieves	1set
5.	Concrete Mixer	1
6.	Slump cone	3
7.	Flow table	1
8.	Vibrator	1
9.	Trovels and planers	1 set
10.	UTM – 400 kN capacity	1
11.	Vee Bee Consistometer	1
12.	Aggregate impact testing machine	1
13.	CBR Apparatus	1
14.	Blains Apparatus	1
15.	Los - Angeles abrasion testing machine	1
16.	Marshall Stability Apparatus	1

### LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS

### CE8612 IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING L T P C

### 0042

### **OBJECTIVE:**

• At the end of the semester, the student shall conceive, design and draw the irrigation and environmental engineering structures in detail showing the plan, elevation and Sections.

### PART A: IRRIGATION ENGINEERING 1. TANK COMPONENTS

Fundamentals of design - Tank surplus weir – Tank sluice with tower head - Drawings showing foundation details, plan and elevation

### 2. IMPOUNDING STRUCTURES

Design principles - Earth dam – Profile of Gravity Dam

### 3. CROSS DRAINAGE WORKS

General design principles - Aqueducts – Syphon aqueduct (Type III) – Canal drop (Notch Type) – Drawing showing plan, elevation and foundation details.

### 4. CANAL REGULATION STRUCTURES

General Principles - Direct Sluice - Canal regulator - Drawing showing detailed plan, elevation and foundation details.

### PART B: ENVIRONMENTAL ENGINEERING

### 1. WATER SUPPLY AND TREATMENT

Design and Drawing of flash mixer, flocculator, clarifier – Rapid sand filter – Service reservoirs – Pumping station – House service connection for water supply and drainage.

### 4. SEWAGE TREATMENT & DISPOSAL

Design and Drawing of screen chamber - Grit channel - Primary clarifier - Activated sludge process – Aeration tank – Trickling filter – Sludge digester – Sludge drying beds – Septic tanks and disposal arrangements.

### TOTAL: 60 PERIODS

### OUTCOME:

• The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

### TEXTBOOKS:

- 1. Satya Narayana Murthy Challa, "Water Resources Engineering: Principles and Practice", New Age International Publishers, New Delhi, 2002.
- 2. Garg, S.K., "Irrigation Engineering and Design of Structures", New Age International Publishers, New Delhi, 1997.
- 3. Manual on Water Supply and Treatment, CPHEEO, Government of India, New Delhi, 1999.
- 4. Manual on "Sewerage and Sewage Treatment Systems- Part A, B and C" CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2013.

### **REFERENCES:**

- 1. Mohanakrishnan. A, "A few Novel and Interesting Innovative Irrigation Structures: Conceived, Designed and Executed in the Plan Projects in Tamil Nadu", Publ. No. 44 and Water Resources Development & Management Publ.No.43, IMTI Thuvakudy, Trichy, 2011.
- 2. Raghunath, H.M. "Irrigation Engineering", Wiley India Pvt. Ltd., New Delhi, 2011.
- 3. Sharma R.K., "Irrigation Engineering and Hydraulic Structures", Oxford and IBH Publishing Co., New Delhi, 2002.
- 4. Peary, H.S., ROWE, D.R., Tchobanoglous, G., "Environmental Engineering", McGraw-HillBook Co., New Delhi, 1995.
- 5. Metcalf and Eddy, "Wastewater Engineering, Treatment and Reuse", Tata McGraw-Hill,New Delhi, 2010.
- 6. Qasim,S.R., Motley, E.M and Zhu.G. "Water works Engineering Planning, Design and Operation", Prentice Hall, New Delhi, 2009.
- 7. Qasim, S. R. "Wastewater Treatment Plants, Planning, Design & Operation", CRC Press, New York, 2010

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### **REFERENCES**:

- 1. R.Subramanian, Surveying and Levelling, Oxford University Press, Second Edition, 2012.
- 2. Laurila, S.H. Electronic Surveying in Practice, John Wiley and Sons Inc, 1993.
- 3. Guocheng Xu, GPS Theory, Algorithms and Applications, Springer Verlag, Berlin, 2003.
- 4. Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3<sup>rd</sup> Edition, 2004.
- 5. Seeber G, Satellite Geodesy, Walter De Gruyter, Berlin, 1998

### GE8071

### **DISASTER MANAGEMENT**

### LT P C 300 3

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### **OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

### UNIT I INTRODUCTION TO DISASTERS

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

### UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

### UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

### UNIT IV DISASTER RISK MANAGEMENT IN INDIA

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

### UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

### TOTAL: 45 PERIODS

### OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

### TEXTBOOKS:

- 1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
- 2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
- 3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
- 4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

### **REFERENCES:**

- 1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
- 2. Government of India, National Disaster Management Policy, 2009.

### GE8074

### HUMAN RIGHTS

### LTPC 3003

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### **OBJECTIVE:**

• To sensitize the Engineering students to various aspects of Human Rights.

### UNIT I

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

### UNIT II

Evolution of the concept of Human Rights Magana carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

### UNIT III

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

### **UNIT IV**

Human Rights in India - Constitutional Provisions / Guarantees.

### UNIT V

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights - National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

### TOTAL: 45 PERIODS

### **OUTCOME:**

Engineering students will acquire the basic knowledge of human rights.

### **REFERENCES:**

- 1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
- 2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
- 3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi

#### CE8001 **GROUND IMPROVEMENT TECHNIQUES** LTPC 3003

**OBJECTIVE:** 

Students will be exposed to various problems associated with soil deposits and methods to • evaluate them. The different techniques will be taught to them to improve the characteristics of difficult soils as well as design techniques required to implement various ground improvement methods.

#### UNIT I **PROBLEMATIC SOIL AND IMPROVEMENT TECHNIQUES**

Role of ground improvement in foundation engineering - Methods of ground improvement -Geotechnical problems in alluvial, lateritic and black cotton soils - Selection of suitable ground improvement techniques based on soil conditions.

#### UNIT II DEWATERING

Dewatering Techniques - Well points – Vacuum and electroosmotic methods – Seepage analysis for two dimensional flow for fully and partially penetrated slots in homogeneous deposits - Design for simple cases.

#### UNIT III INSITU TREATMENT OF COHESIONLESS AND COHESIVE SOILS

Insitu densification of cohesionless soils - Shallow as deep compaction - Dynamic compaction -Vibroflotation, Sand compaction piles and deep compaction. Consolidation of cohesionless soils -Preloading with sand drains, and fabric drains, Stabilization of soft clay ground using stone columns and Lime piles-Installation techniques - Simple design - Relative merits of above methods and their limitations.

#### **UNIT IV** EARTH REINFORCEMENT

Concept of reinforcement – Types of reinforcement material – Reinforced earth wall – Mechanism - Simple design - Applications of reinforced earth; Functions of Geotextiles in filtration, drainage, separation, road works and containment applications.

#### UNIT V **GROUTING TECHNIQUES**

Types of grouts – Grouting equipments and machinery – Injection methods – Grout monitoring – Stabilization with cement, lime and chemicals - Stabilization of expansive soil.

### **TOTAL: 45 PERIODS**

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### **REFERENCES:**

- 1. Tamil Nadu Town and Country Planning Act 1971, Government of Tamil Nadu, Chennai
- 2. Goel S.L., Urban Development and Management, Deep and Deep Publications, New Delhi, 2002
- 3. Thooyavan, K.R., Human Settlements A Planning Guide to Beginners, M.A Publications, Chennai, 2005
- 4. CMDA, Second Master Plan for Chennai, Chennai 2008

#### **AIR POLLUTION AND CONTROL ENGINEERING** CE8005

### **OBJECTIVE:**

To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous • air pollutant and its emerging trends.

#### UNIT I INTRODUCTION

Structure and composition of Atmosphere - Definition, Scope and Scales of Air Pollution -Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards –Ambient and stack sampling and Analysis of Particulate and Gaseous Pollutants.

#### UNIT II METEOROLOGY

Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns- Atmospheric Diffusion Theories - Dispersion models, Plume rise.

#### UNIT III CONTROL OF PARTICULATE CONTAMINANTS

Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle, Design and performance equations of Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators – Operational Considerations.

#### UNIT IV **CONTROL OF GASEOUS CONTAMINANTS**

Factors affecting Selection of Control Equipment – Working principle, Design and performance equations of absorption, Adsorption, condensation, Incineration, Bio scrubbers, Bio filters -Process control and Monitoring - Operational Considerations.

#### UNIT V INDOOR AIR QUALITY MANAGEMENT

Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness- Sources and Effects of Noise Pollution - Measurement - Standards - Control and Preventive measures.

### OUTCOMES:

The students completing the course will have

- an understanding of the nature and characteristics of air pollutants, noise pollution and • basic concepts of air quality management
- ability to identify, formulate and solve air and noise pollution problems
- ability to design stacks and particulate air pollution control devices to meet applicable standards.
- Ability to select control equipments.
- Ability to ensure quality, control and preventive measures. •

### TOTAL: 45 PERIODS

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### TEXTBOOKS:

- 1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, "Air Pollution Control Engineering", Tokyo, springer science + science media LLC,2004.
- 2. Noel de Nevers, "Air Pollution Control Engineering", Waveland press, Inc 2017.
- 3. Anjaneyulu. Y, "Air Pollution and Control Technologies", Allied Publishers (P) Ltd., India 2002.

### **REFERENCES:**

- 1. David H.F. Liu, Bela G. Liptak, "Air Pollution", Lweis Publishers, 2000.
- 2. Arthur C. Stern, "Air Pollution (Vol.I Vol.VIII)", Academic Press, 2006.
- 3. Wayne T.Davis, "Air Pollution Engineering Manual", John Wiley & Sons, Inc, 2000.
- 4. M.N Rao and HVN Rao, "Air Pollution", Tata Mcgraw Hill Publishing Company limited. 2007.
- 5. C.S.Rao, "Environmental Pollution Control Engineering", New Age International(P) Limited Publishers, 2006.

#### GE8075 INTELLECTUAL PROPERTY RIGHTS LT PC 3003

### **OBJECTIVE:**

• To give an idea about IPR, registration and its enforcement.

#### UNIT I INTRODUCTION

Introduction to IPRs. Basic concepts and need for Intellectual Property - Patents. Copyrights. Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO -TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

#### UNIT II **REGISTRATION OF IPRs**

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

#### AGREEMENTS AND LEGISLATIONS UNIT III

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

#### UNIT IV DIGITAL PRODUCTS AND LAW

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws - Case Studies.

#### **ENFORCEMENT OF IPRs** UNIT V

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

### TOTAL:45 PERIODS

### OUTCOME:

Ability to manage Intellectual Property portfolio to enhance the value of the firm.

### **TEXTBOOKS:**

- 1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
- 2. S. V. Satakar, "Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002

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### OUTCOMES:

Upon completion of this course, students will be able to

- Know the requirements of various industries and get an idea about the materials used and planning of various industrial components
- Understand the functional requirements for industrial structures.
- Design special steel structures like bunkers, silos, crane girders, chimneys and preengineered buildings.
- Design special RC structures like corbels, silos, bunkers, chimneys, plates and shells.
- Understand the principles of prefabrication and prestressing

### **TEXTBOOKS:**

- 1. Ramamrutham.S., Design of Reinforced Concrete Structures, Dhanpat Rai Publishing Company, 2007.
- 2. Varghese.P.C., Advanced Reinforced Concrete Design, PHI, Eastern Economy Editions, Second Edition, 2005.
- 3. Subramanian, N., Design of Steel Structures, Oxford University Press, 2008.
- 4. Ramachandra and Virendra Gehlot, Design of steel structures –Vol. 2, Scientific Publishers, 2012.

### **REFERENCES:**

- 1. Henn W. Buildings for Industry, Vol.I and II, London Hill Books, 1995
- 2. Handbook on Functional Requirements of Industrial buildings, SP32–1986, Bureau of Indian Standards, 1990.
- 3. Handbook of Industrial Lighting, Stanley L.Lyons, Butterworths, London.1981
- 4. Koncz, J., Manual of Precast Construction Vol. I and II, Bauverlay GMBH, 1971.
- 5. Handbook on Precast Construction, An Indian Concrete Institute Publication, 2016

#### ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT LTPC CE8010

### **OBJECTIVE:**

To impart the knowledge and skills to identify, assess and mitigate the environmental and • social impacts of developmental projects

#### UNIT I INTRODUCTION

Impacts of Development on Environment - Rio Principles of Sustainable Development-Environmental Impact Assessment (EIA) – Objectives – Historical development – EIA Types – EIA in project cycle -EIA Notification and Legal Framework-Stakeholders and their Role in EIA-Selection & Registration Criteria for EIA Consultants

#### UNIT II ENVIRONMENTAL ASSESSMENT

Screening and Scoping in EIA – Drafting of Terms of Reference, Baseline monitoring, Prediction and Assessment of Impact on land, water, air, noise and energy, flora and fauna - Matrices -Networks - Checklist Methods - Mathematical models for Impact prediction - Analysis of alternatives

### UNIT III ENVIRONMENTAL MANAGEMENT PLAN

Plan for mitigation of adverse impact on water, air and land, water, energy, flora and fauna -Environmental Monitoring Plan – EIA Report Preparation – Review of EIA Reports – Public Hearing-Environmental Clearance Post Project Monitoring

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### UNIT IV SOCIO ECONOMIC ASSESSMENT

Baseline monitoring of Socio economic environment – Identification of Project Affected Personal – Rehabilitation and Resettlement Plan- Economic valuation of Environmental impacts – Cost benefit Analysis-

### UNIT V CASE STUDIES

EIA case studies pertaining to Infrastructure Projects – Real Estate Development - Roads and Bridges – Mass Rapid Transport Systems - Ports and Harbor – Airports - Dams and Irrigation projects - Power plants – CETPs- Waste Processing and Disposal facilities – Mining Projects.

### TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have ability to

- carry out scoping and screening of developmental projects for environmental and social assessments
- explain different methodologies for environmental impact prediction and assessment
- plan environmental impact assessments and environmental management plans
- evaluate environmental impact assessment reports

### TEXTBOOKS:

- 1. Canter, R.L, "Environmental impact Assessment ", 2nd Edition, McGraw Hill Inc, New Delhi, 1995.
- Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt, Richard A. Carpenter, and S.L. Tu, "Environmental Impact Assessment for Developing Countries in Asia", Volume 1 – Overview, Asian Development Bank, 1997.
- 3. Peter Morris, Riki Therivel "Methods of Environmental Impact Assessment", Routledge Publishers, 2009.

### **REFERENCES:**

- 1. Becker H. A., Frank Vanclay, "The International handbook of social impact assessment" conceptual and methodological advances, Edward Elgar Publishing, 2003.
- 2. Barry Sadler and Mary McCabe, "Environmental Impact Assessment Training Resource Manual", United Nations Environment Programme, 2002.
- 3. Judith Petts, "Handbook of Environmental Impact Assessment Vol. I and II", Blackwell Science New York, 1998.
- 4. Ministry of Environment and Forests EIA Notification and Sectoral Guides, Government of India, New Delhi, 2010.

### CE8011 DESIGN OF PRESTRESSED CONCRETE STRUCTURES L T P C 3 0 0 3

### **OBJECTIVES:**

- To introduce the need for prestressing in a structure
- To explain the methods, types and advantages of prestressing to the students.
- To make the students to design a prestressed concrete structural elements and systems
- To introduce the students the effect of prestressing in the flexural and shear behaviour of structural elements.

### UNIT I INTRODUCTION – THEORY AND BEHAVIOUR

Basic concepts – Advantages and disadvantages – Materials required – Systems and methods of prestressing – Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections - Losses of prestress – Estimation of crack width.

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