## PAAVAI ENGINEERNG COLLEGE

(Autonomous)

# M.E. - STRUCTURAL ENGINEERING

## **REGULATIONS 2023**

# (CHOICE BASED CREDIT SYSTEM)

## **CURRICULUM**

(For the candidates admitted during the Academic Year 2023 - 24 onwards)

## SEMESTER I

S.No.	Category	Course Code	Course Title	L	T	P	C
heor	у						
1	FC	PMA23102	Advanced Mathematical Methods	3	1	0	4
2	MC	PEN23101	Research Methodology and IPR	3	0	0	3
3	PC	PSE23101	Matrix methods of structural analysis	3	1	0	4
4	PC	PSE23102	Theory of Elasticity and Plasticity	3	0	0	3
5	PC	PSE23103	Advanced Design of Reinforced Concrete Structures	3	0	0	3
6	PE	PSE23* **	Professional Elective I	3	0	0	3
7	AC	PAC23101	English for Research Paper Writing (Audit Course I)	2	0	0	0
Practic	cal						
8	PC	PSE23104	Advanced Structural Engineering Laboratory	0	0	4	2
			TOTAL	20	2	4	22

## SEMESTER II

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory	7	- /-	The production of the second				
1	PC	PSE23201	Experimental Techniques and Instrumentation	3	1	0	4
2	PC	PSE23202	Structural Dynamics	3	0	0	3
3	PC	PSE23203	Advanced Steel Structures	3	0	0	3
4	PC	PSE23204	Finite Element Method	3	0	0	3
5	PE	PSE23***	Professional Elective II	3	0	0	3
6	PE	PSE23***	Professional Elective III	3	0	0	3
7	AC	PAC23201	Pedagogy Studies (Audit Course II)	2	0	0	0
Practic	al						
8	PC	PSE23205	Structural Design Studio	0	0	4	2
		1	TOTAL	20	1	4	21

# SEMESTER III

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory	Y			<u> </u>			
1	PC	PSE23301	Advanced Prestressed Concrete Structures	3	0	0	3
2	PE	PSE23***	Professional Elective IV	3	0	0	3
3	OE	PSE23901	Open Elective I	3	0	0	3
ractic	al						
4	EE	PSE23302	Practical Training (4 weeks)	0	0	2	1
5	EE	PSE23303	Technical Seminar	0	0	2	1
6	EE	PSE23304	Project Work (Phase I)	0	0	12	6
			TOTAL	9	0	16	17

# SEMESTER IV

S.No.	Category	Course Code	Course Title	L	T	P	С
Practica	l						
1	DE	DCE02401	[ K				
1	EE	PSE23401	Project Work (Phase II)	0	0	24	12

TOTAL CREDITS: 72



# LIST OF PROFESSIONAL ELECTIVES

S.NO	Category	Course Code	Course Title	L	T	P	C
1	PE	PSE23151	Structural Optimization	3	0	0	3
2	PE	PSE23152	Fracture Mechanics	3	0	0	3
3	PE	PSE23153	Advanced Concrete Technology	3	0	0	3
4	PE	PSE23154	Corrosion Engineering	3	0	0	3
5	PE	PSE23155	Design of Bridge Structures	3	0	0	3
6	PE	PSE23156	Structural Health Monitoring	3	0	0	3
7	PE	PSE23157	Performance of structures with Soil- Structure Interaction	3	0	0	3
8	PE	PSE23158	Rehabilitation and Retrofitting of Structures	3	0	0	3
9	PE	PSE23159	Design of Sub Structures	3	0	0	3
10	PE	PSE23160	Mechanics of Composite Materials	3	0	0	3
11	PE	PSE23161	Design of Shell and Spatial structures	3	0	0	3
12	PE	PSE23162	Design of Offshore Structures	3	0	0	3
13	PE	PSE23163	Industrial Structures	3	0	0	3
14	PE	PSE23164	Prefabricated Structures	3	0	0	3
15	PE	PSE23165	Design of Formwork	3	0	0	3
16	PE	PSE23166	Analysis and Design of Tall Buildings	3	0	0	3
17	PE	PSE23167	Stability of Structures	3	0	0	3
18	PE	PSE23168	Energy Efficient Buildings	3	0	0	3
19	PE	PSE23169	Earthquake Analysis and Design of Structures	3	0	0	3
20	PE	PSE23170	Wind and Cyclone Effects on Structures	3	0	0	3

# OPEN ELECTIVE I

S.NO	Category	Course Code	Course Title	L	Т.	P	С
1	OE	PSE23901	Climate change and Adaptation	3	0	0	3
2	OE	PED23901	Industrial Safety	3	0	0	3
3	OE	PCS23901	Design of Digital Elements	1	3 CLOT	LEC.	3
4	OE	PCE23901	Big Data Analytics	BOARD	OF GTU	DIES	3
5	OE	PPS23901	Alternate Energy Sources	3	0,00	0	13

COURSE OBJEC		RUCTURES 3 0	0 3
	TIVES		
To enable the stude	nts to		
1 understand	the basic principles of prestressed concrete structures.		
2 discuss the	flexure and shear design for prestressed concrete element	nts.	
3 find the fac	tors influencing deflection and anchorage zone design.		
4 recognize t	ne performance of composite and continuous members.		
5 demonstrate	e various prestressed concrete structural elements.		
UNIT I PRIN	CIPLES OF PRESTRESSED CONCRETE STRUCT	TURES	9
Historical develop	nents; Basic principles of prestressing; Classification	and types: Advantages	OVO
Basic assumptions I.S.1343 Code; Des	GN FOR FLEXURE AND SHEAR  for calculating flexural stresses; Permissible stresses gn of sections of Type I, II and III post – tensioned and	pre-tensioned beams; C	
for strength limit ba	sed on I.S. 1343 Code; Design for shear based on I.S. 13	343 Code.	
UNIT III DEF	LECTION AND DESIGN OF ANCHORAGE ZONE		9
deflections; Check	influencing deflections; Effect of tendon profile on def for serviceability limit state of deflection; Anchorage		
anchorage zone stre code; Design of anc	for serviceability limit state of deflection; Anchorag sses in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.	ge zone – Determination	on of 1343
anchorage zone stre code; Design of anc UNIT IV COMI	for serviceability limit state of deflection; Anchorage sees in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS	ge zone – Determination	on of 1343
anchorage zone streecode; Design of anc  UNIT IV COMI  Analysis and design continuity in continuity transformation; Calculated UNIT V SPECI	for serviceability limit state of deflection; Anchorageses in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important and the strain and its important beams; Analysis for secondary moments; Collation of stresses; Principles of design.  AL STRUCTURES	ge zone – Determination ayon's method and I.S. ance; Methods of achie concordant cable and I	on of 1343 9 eving inear
anchorage zone streecode; Design of anc  UNIT IV COMI  Analysis and design continuity in contitation; Calculation; Calculation of tension and continuity of tension and contin	for serviceability limit state of deflection; Anchorage sees in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important and the secondary moments; Containing the secondary moments and the secondary moments are secondary moments.	ge zone – Determination  ayon's method and I.S.  ance; Methods of achie concordant cable and I	on of 1343 9 eving inear 9 pre-
anchorage zone streecode; Design of anc  UNIT IV COMI  Analysis and design continuity in continuity in continuity transformation; Calc  UNIT V SPECI  Design of tension a stressing — Definition stressing	for serviceability limit state of deflection; Anchorage sees in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important nuous beams; Analysis for secondary moments; Collation of stresses; Principles of design.  AL STRUCTURES  and compression members; Design of tanks, pipes, polent, methods of achieving partial pre-stressing, merits in the service of	ge zone – Determination  ayon's method and I.S.  ance; Methods of achie concordant cable and I	on of 1343 9 eving inear 9 pre-
anchorage zone streecode; Design of anc  UNIT IV COMI  Analysis and design continuity in continuity in continuity transformation; Calcular Specific Specific Stressing — Definition of the	for serviceability limit state of deflection; Anchorage sees in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important nuous beams; Analysis for secondary moments; Collation of stresses; Principles of design.  AL STRUCTURES  and compression members; Design of tanks, pipes, polent, methods of achieving partial pre-stressing, merits in the service of	ge zone – Determination  ayon's method and I.S.  ance; Methods of achie concordant cable and I  es and sleepers; Partial and demerits of partial  TOTAL PERIODS  BT Mapped	9 pre-pre-
anchorage zone stre code; Design of anc UNIT IV COMI Analysis and design continuity in conti transformation; Calc UNIT V SPECI Design of tension a stressing — Definition stressing  COURSE OUTCO At the end of this co	for serviceability limit state of deflection; Anchorage sees in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important nuous beams; Analysis for secondary moments; Coulation of stresses; Principles of design.  AL STRUCTURES  and compression members; Design of tanks, pipes, poleon, methods of achieving partial pre-stressing, merits and members.	ge zone – Determination and I.S. and I.	9 pre-pre-
anchorage zone stre code; Design of anc UNIT IV COMI Analysis and design continuity in conti transformation; Calc UNIT V SPECI Design of tension a stressing — Definition stressing  COURSE OUTCO At the end of this co	for serviceability limit state of deflection; Anchorageses in post-tensioned beams by Magnel's method, Gunorage zone reinforcement.  POSITE BEAMS AND CONTINUOUS BEAMS  of composite beams; Shrinkage strain and its important nuous beams; Analysis for secondary moments; Coulation of stresses; Principles of design.  AL STRUCTURES  and compression members; Design of tanks, pipes, polent, methods of achieving partial pre-stressing, merits and members.  MES  urse, students will be able to	ge zone – Determination  ayon's method and I.S.  ance; Methods of achie concordant cable and I  es and sleepers; Partial and demerits of partial  TOTAL PERIODS  BT Mapped (Highest Level)	9 pre-pre-

CO3	compute of anch	orage zone reir	nforcement.		Appl	ying (K3)
CO4	identify composi	te and continue	ous beams.		Analy	zing (K4)
CO5	examine the vari	ous prestressed	d concrete struct	tural elements.	Analy	zing (K4)
REFE	RENCES					
1.	Rajagopalan.N, l	Prestressed cor	crete, Narosa P	ublishing House,	2020.	
2.	Pandit.G.S. and Second Edition,		restressed conc	rete", CBS Publi	shers and Distri	butors Pvt Ltd,
3.	Krishna Raju N.,	"Prestressed of	concrete", Tata	McGraw Hill Cor	mpany, Fifth Edi	ition, 2018.
4.	Dayaratnam.P ar 2013.	nd Sarah.P, "Pr	restressed concr	ete Structures", V	Viley India Pvt I	td, New Delhi,
5.	IS1343 - 2012 -	IS Code of Pra	actice for Prestr	essed concrete.		
6.	IS748 – 2001 – I	Part III - IS Spe	ecification for P	restressed Concre	ete Pipes.	
7.	IS3370 – 2021 –	Part III - IS Co	ode of Practice	for Concrete Stru	ctures for the sto	rage of liquids.
8.	IS678 – 1998 – Telecommunicat	AT	or Prestressed (	Concrete Poles fo	r overhead Pow	er Traction and
CO-P	O MAPPING:					
Марр	oing of Course Ou		Outcomes	me Outcomes (F PSO's on) 3-Strong, 2-M		
COL		•		PO's		W.II
CO's	s 1	2	3	4	5	6
COI	2	-	3	2	3	2
CO2	3	-	2	2	2	3
CO3	3 2	-	3	2	3	3



2 .

CO4

CO5

PSE2	3302		PRACTICA	L TRAINING (	4 weeks)		0	0	2 1
COU	RSE OBJECTIV	ES							
To en	able the students to	)							
1	train the students to Structural Eng				wledge o	f practical pr	oble	ms re	lated
2	develop skills in	facing and so	olving the field	l problems.					
SYLL	ABUS								
Engine a detai	tudents individua eering during the si iled report on the v ter. The students w	ummer vacati vork done sh	on for a specification on for a specification of the submit of the submi	ied duration of fo	ur weeks ays from	. At the end the commer	of th	e trair ient o	ning, f the
						TOTAL P	ERI	ODS	30
	RSE OUTCOMES								
	end of this course,					BT M (Highe			
COI	describe the Stru					Understa			.)
CO2	identify Conceptechniques.	ts of develo	pment and in	mplementation o	of new	Analyz	zing(	(K4)	
CO-P	O MAPPING:								
Mappi	ing of Course Out		Outcome	mme Outcomes s PSO's ion) 3-Strong, 2			nme	Spec	ific
CO'				PO's		,			
	1	2	3	4	5	5		6	
CO	1 2	2	2	2	3	3		2	
CO	2 2	2	2	3	2	2		2	



.

PSE2	3303			TECHN	IICAL SEMINA	R		0	0	2
COU	RSE C	BJECTIVI	ES							
To en	able th	e students to	)	-						
1					ral Engineering abilities for sem				ills o	fora
2	acqu	ire technica	l writing abili	ties for semina	ars, conferences a	and journ	al public	ations		
SYLL	LABUS	3								
to talk audier a sem will al	c on an nce. A inar of lso ans	y topic of the brief copy of not less that wer the que	eir choice rel f their talk als n fifteen minuries on the to	ated to Structure should be sure and not mappic. The student	ed by a group of ural Engineering bmitted. Similar ore than thirty mants as the audien eport and also on	and to ently, the studinutes on ce also sl	ngage in one of the second interest in the technolist interest in the technolist interest in the second interest i	dialogu II have mical to eract. I	to propic.	h th eser The atio
			mear presente		sport and also on		TOTAL	-		
COU	RSE O	UTCOMES	8				TOTAL		ODS	3
At the	end of	this course	students will	be able to				Mapp hest Le		
CO1		tify the lat	est developr	ments in the	field of Struc	ctural	Remen	nbering	g (K1	)
CO2				• * * * * * * * * * * * * * * * * * * *	to provide techni nsion tests on spr		Anal	lyzing	(K4)	
CO-P	O MA	PPING:								
Марр	oing of		2	Outcome	ion) 3-Strong, 2		Ü		e Spe	cifi
CO	's				PO's		. 1			
		1	2	3	4	5			6	
CO	)1	2	2	2	2 .	3	tic .		2	



CO<sub>2</sub>

	E23304		P.	ROJECT WORK	(PHASE I)		0	0	12	(
CO	URSE OB	JECTIVE	S	19						1
To	enable the	tudents to	)							
1.	develop th		ntal knowledge	for understanding	state of the art in	nformation abo	ut any to	pic re	elevan	t t
2.	develop th	e technical	skill sets in the	e chosen field and a	also to accustom	to research orie	entation.			
3.	develop th	e methodo	logy to solve th	e identified problem	m.					
4.	train the st	udents in p	oreparing projec	t reports and to fac	e reviews and vi	va-voce exami	nation.		2 - 0 - 3 -	
SY	LLABUS									
on t revi	he work do ew related	ne should l to the area	be submitted what of work and r	be theoretical or can nich contains clear methodology for can	definition of the arrying out the	identified prob	lem, deta	iled	literat	ur
thro	ugn a viva-	voce exam	ination by a par	nel of examiners in	cluding one exter	mal examiner.				te
			ination by a par	nel of examiners in	cluding one exter	rnal examiner.  TOTAL	PERIOI	S:	18	
CO	URSE OUT	COMES			cluding one exten		PERIOI BT N			
CO At t	URSE OUT	COMES e course, the	he students will	be able to			100000000000000000000000000000000000000	/IAP	PED	
CO	URSE OUT	COMES e course, the	he students will gineering proble	be able to ems available in lit	erature.	TOTAL	BT N	IAP:	PED evel)	
CO	urse out the end of the reviewed conduct	rCOMES e course, the d Civil En	he students will gineering proble nts / Design and	be able to	erature.	TOTAL	BT M	MAP: est L	PED evel) (K4)	
CO2	the end of the reviewed conductor results in	rCOMES e course, the d Civil En experiment	he students will gineering proble nts / Design and of technical rep	be able to ems available in lit Analysis / solution	erature.	TOTAL	BT M (High Analy	MAP est L zing ying	PED evel) (K4) (K3)	
CO At the	he end of the reviewed conductor results in undertain	rCOMES e course, the divide Enterprimer experiments the form	he students will gineering proble nts / Design and of technical rep n identification,	be able to ems available in lit Analysis / solution port / presentation.	erature. n iterations and d	TOTAL ocument the	BT M (High Analy Appl	MAP. est Lest Lest ying	PED .evel) (K4) (K3)	
CO2	he end of the reviewed conductor results in undertain	rCOMES e course, the divide En experiment of the form the form engineering	he students will gineering proble nts / Design and of technical rep n identification,	be able to ems available in lit Analysis / solution port / presentation. formulation and so	erature.  n iterations and d	TOTAL ocument the	BT M (High Analy Appl	MAP. est Lest Lest ying	PED .evel) (K4) (K3)	
CO2	he end of the reviewed conductor results in design of	rCOMES e course, the decivit Enterprime of the form the form engineering PING	he students will gineering problems / Design and of technical repaidentification, g solutions to co	be able to ems available in lit Analysis / solution port / presentation. formulation and so emplex problems un ourse Outcomes with	erature. In iterations and description. Italians a systems Italians a systems	ocument the approach	BT M (High Analy Appl Appl Appl	MAP. est Lest Lest ying	PED .evel) (K4) (K3)	
CO2	he end of the reviewed conductor results in design of	rCOMES e course, the decivit Enterprime of the form the form engineering PING	he students will gineering problems / Design and of technical repaidentification, g solutions to co	be able to ems available in lit Analysis / solution port / presentation. formulation and so	erature. In iterations and description. Italians a systems Italians a systems	ocument the approach	BT M (High Analy Appl Appl Appl	MAP. est Lest Lest ying	PED .evel) (K4) (K3)	
CO2 CO3 CO4	he end of the reviewed conductor results in design each of the reviewed conductor results in the results in the reviewed conductor reviewed conductor results in the reviewed conductor reviewed	e course, the decivit En experiment the form the problem engineering PING	he students will gineering problemts / Design and of technical repaidentification, g solutions to compare the mapping of Compared the mapping of Communicates strength.	be able to ems available in lit l Analysis / solution port / presentation. formulation and so omplex problems ut ourse Outcomes wingth of correlation Programme C	erature.  In iterations and description.  Itilising a systems  Ith Programme Company 2-M  Outcomes(POs)	ocument the approach	BT M (High Analy Appl Appl Appl	MAP. est Lest Lest ying	PED .evel) (K4) (K3)	
CO2 CO3 CO4 CO	he end of the reviewed conductor results in design of the reviewed conductor results in the reviewed conduct	e course, the divide En experiment the form the problem engineering PING	he students will gineering problemts / Design and of technical repaidentification, g solutions to compare the mapping of Compared to the compa	be able to ems available in lit Analysis / solution port / presentation. formulation and so emplex problems un ourse Outcomes wingth of correlation Programme C PO3	erature.  In iterations and descriptions and description.  It is in a systems of the Programme Control of the Programme C	ocument the approach	BT M (High Analy Appl Appl Appl	MAP. est L zing ying ying	PED .evel) (K4) (K3)	
CO2 CO3 CO4 CO3	he end of the reviewed conductor results is undertained design early property of the property	e course, the decivit Enterprime of the form the form engineering PING (1/2/3	he students will gineering problems / Design and of technical repaidentification, g solutions to compare the management of Compared the management of Compar	be able to ems available in lit Analysis / solution port / presentation. formulation and so emplex problems un ourse Outcomes wingth of correlation Programme C PO3 3	erature. In iterations and description. Italians a systems Italians a	ocument the approach outcomes:	BT M (High Analy Appl Appl Appl	MAP. est L zing ying ying ying Pe	(K4) (K3) (K3)	
CO2 CO3 CO4	he end of the reviewed conductor results is undertained design early property of the property	e course, the discourse, the discourse, the discourse, the discourse, the discourse respectively. The experiment of the form the form regimeering regimeering pince.  (1/2/3)	he students will gineering problemts / Design and of technical repaidentification, g solutions to compare the mapping of Compared to the compa	be able to ems available in lit Analysis / solution port / presentation. formulation and so emplex problems un ourse Outcomes wingth of correlation Programme C PO3	erature.  In iterations and descriptions and description.  It is in a systems of the Programme Control of the Programme C	ocument the approach outcomes:	BT M (High Analy Appl Appl Appl	MAP. est L zing ying ying Pe	PED (K4) (K3) (K3) (K3)	



CO4

	23401		DJECT WORK (	PHASE II)		0	0	24	12
COL	JRSE OBJECTIV	VES						100.00	754000
To e	nable the students	to							-
1.	carry out analytica	al and / or experime	ental research ories	nted work in th	e field of Structu	ıral Engi	neer	ing.	
2. 1	the project aims to	provide an opport	tunity of designing	and building c	omplete system	or subsys	stem	s base	d or
		dents like the acqu						ouo.	u 01
3.	solve the identified	d problem based or	n the formulated m	ethodology.					
		nalyze and discuss			sions.				
	LABUS								
The s	student should con	tinue the phase I	work on the selecte	ed tonic as ner	the formulated	mathada	l	- 1	41
ame	supervisor At the	e end of the seme	ster after complete	ing the week to	the formulated i	nemodo	logy	unde	tne
anie.	supervisor. At the	e end of the semes	ster, after completi	ing the work to	the satisfaction	of the	supe	rvisor	and
eviev	w committee, a de	tailed report shoul	d be prepared and	submitted to th	e head of the de	partment	. Th	e stud	ents
vill b	e evaluated based	on the report sub-	nitted and the viva	-voce examina	tion by a panel of	of exami	ners	inclu	ding
ne e	xternal examiner.								
					TOTAL P	ERIOD	S:	36	)
COU	RSE OUTCOME	ES				BT	MA	PPED	
At the	e end of the course	, the students will	be able to			(High	nest	Level	
101	demonstrate any	challenging pract						(TEO)	
.01	demonstrate and	chancinging pract	ical problem and f	inal better solu	tions.	Appl	ying	g (K3)	
	apply engineer	ing and managem	nent principles the	ough efficient	handling of				
CO1	apply engineer	ing and managem lear idea of his/her	nent principles the	ough efficient	handling of			g (K3) g (K3)	
CO2	apply engineer project have a c out the work in	ing and managem lear idea of his/her a systemic way	nent principles the area of work and t	ough efficient hey are in a pos	handling of sition to carry	Appl	ying	g (K3)	
CO2	apply engineer project have a c out the work in design engineer	ing and managem lear idea of his/her a systemic way ing solutions to co	nent principles the area of work and t mplex problems ut	rough efficient hey are in a pos ilising a systen	handling of sition to carry	Appl	ying ying	g (K3)	
CO2	apply engineer project have a c out the work in design engineer analyze and pre	ing and managem lear idea of his/her a systemic way ing solutions to con pare the report fo	nent principles the area of work and t mplex problems ut	rough efficient hey are in a pos ilising a systen	handling of sition to carry	Appl	ying ying	g (K3)	
CO2 CO3 CO4	apply engineer project have a c out the work in design engineer analyze and pre	ing and managem lear idea of his/her a systemic way ing solutions to co	nent principles the area of work and t mplex problems ut	rough efficient hey are in a pos ilising a systen	handling of sition to carry	Appl	ying ying	g (K3)	
CO2 CO3 CO4	apply engineer project have a cout the work in design engineer analyze and prepaper based on the state of the	ing and management idea of his/her a systemic way ing solutions to compare the report for the research work.	nent principles the area of work and t implex problems ut or a given project,	rough efficient hey are in a po- ilising a systen write and pres	handling of sition to carry as approach sent technical	Appl	ying ying	g (K3)	
CO2 CO3 CO4	apply engineer project have a cout the work in design engineer analyze and prepaper based on the paper based on the property and prepaper based on the project and prepape	ing and management idea of his/her a systemic way ing solutions to compare the report for the research work.	ment principles the area of work and t implex problems ut or a given project, ourse Outcomes wi	rough efficient hey are in a po- ilising a systen write and pres th Programme	handling of sition to carry as approach sent technical Outcomes:	Appl Appl Analy	ying ying	g (K3)	
CO2 CO3 CO4	apply engineer project have a cout the work in design engineer analyze and prepaper based on the paper based on the property and prepaper based on the project and prepape	ing and managemalear idea of his/her a systemic way ing solutions to contract the report for the research work.  Mapping of Co	ment principles the area of work and t implex problems ut or a given project, ourse Outcomes wi	rough efficient hey are in a po- ilising a system write and pres th Programme ) 3-Strong, 2-N	handling of sition to carry as approach sent technical Outcomes:	Appl Appl Analy	ying ying	g (K3)	
03 04 0-1	apply engineer project have a cout the work in design engineer analyze and prepaper based on the PO MAPPING:	ing and managemalear idea of his/her a systemic way ing solutions to contract the report for the research work.  Mapping of Co	ment principles the area of work and to implex problems ut or a given project, ourse Outcomes with gth of correlation	rough efficient hey are in a po- ilising a system write and pres th Programme ) 3-Strong, 2-N	handling of sition to carry as approach sent technical Outcomes:	Appl Appl Analy	ying ying yzin	g (K3)	
CO2 CO3 CO4 CO-1	apply engineer project have a cout the work in design engineer analyze and prepaper based on the PO MAPPING:  (1/2)  PO1  2	ing and management idea of his/her a systemic way ing solutions to compare the report for the research work.  Mapping of Com/3 indicates strength.	ment principles the area of work and to mplex problems ut or a given project, ourse Outcomes with of correlation of Programme O	rough efficient hey are in a po- ilising a system write and pres th Programme ) 3-Strong, 2-Nutcomes(POs)	handling of sition to carry as approach sent technical Outcomes:	Appl Appl Analy	ying ying yzin	g (K3) g (K3) g (K4)	
CO2 CO3 CO4 CO - 1	apply engineer project have a cout the work in design engineer analyze and prepaper based on the PO MAPPING:  PO1  2  2  2	ing and managemelear idea of his/her a systemic way ing solutions to compare the report for the research work.  Mapping of Com/3 indicates strength	ment principles the area of work and to mplex problems ut or a given project, ourse Outcomes with of correlation area of work and to programme O	rough efficient hey are in a po- ilising a system write and pres th Programme 3-Strong, 2-N utcomes(POs)	handling of sition to carry as approach sent technical Outcomes:  Medium , 1-Wea	Appl Appl Analy	ying ying yzin	g (K3) g (K3) g (K4)	
CO2 CO3 CO4 CO-1	apply engineer project have a cout the work in design engineer analyze and prepaper based on the PO MAPPING:  (1/2)  PO1  2	ing and management idea of his/her a systemic way ing solutions to control the research work.  Mapping of Control indicates strenger and indicates and indica	ment principles the area of work and to area of a given project, ourse Outcomes with of correlation area of PO3  PO3  2	rough efficient hey are in a pos- illising a system write and pres th Programme () 3-Strong, 2-Notemores(POs) PO4 3	handling of sition to carry as approach sent technical Outcomes:  Medium, 1-Wea 3	Appl Appl Analy	ying ying yzin	g (K3) g (K3) g (K4)	



PSE	23163		INDUSTRIAL STRUCTURES		3	0 (	0 3
COU	RSE OBJECT	TIVES					
To er	nable the studen	7.5					
1			l requirements of industries				
2	impart a broa	ad knowledge	about functional requirements for ind	ustrial structures			
3	understand th	ne design conc	epts of RC structures				
4	understand tl	ne concepts of	gantry girders, steel bunkers of indus	trial building			
5	gain the know	wledge on pre-	engineered buildings				
UNIT	r I INTRO	DUCTION T	O INDUSTRIAL STRUCTURES				9
Class	ification of In	dustries and	Industrial Structures - Specific re	quirements for	Indus	tries	like
			Site layout and external facilities requ				inco
UNIT			DUIREMENTS				9
Natur			tion from the sun light - Services Ele	ctrical wiring five	lires	cabl	23
			n, substations, Effluent disposal, es - fire alarm, extinguishers and hyd				
act							
UNIT	TIII DESIG	ON OF RC ST	RUCTURES				9
Desig	n and detailing	of R.C. gable f	rames, corbels and nibs, bunkers, sile	s, R.C.C chimney	y, Pri	ncipl	es of
	l plates and shel						
UNIT	IV DESIG	OF STEEL	STRUCTURES				9
Desig	n of Gantry gird	lers; Steel chin	nneys; Steel Bunker and Silo.			11:4	
UNIT	V PREEN	GINEERED	BUILDINGS				9
	pricated building		es and Disadvantages, Primary and ofing.	secondary struct	ural	elem	ents,
COIII	RSE OUTCOM	IFC		TOTAL PE	RIO	DS	45
A.S. S. A.S. S. A.S. S. A.S. S.	end of this cou	Oleman Carl	till be able to			- 21	
r re ente	cha or this cou	ise, students w	in be able to	BT M (Highes			
CO1	describe the v	arious specific	requirements of industries.	Understan		100000	1
CO2	determine the	functional req	uirements of various industries.	Applyir	ng (K	3)	
CO3	compute vario	ous RC structu	res.	Applyir	ng (K	3)	
CO4			girder, chimneys and silo.	Applyir	ng (K	3)	
CO5	ELECTRON CONTRACT ALL IS SEND CONTRACT	t pre-engineere	ed buildings.	Understan	ding	(K2)	
REFE	RENCES						
1.	Culomanian	NI 100	Steel Structures", 3rd Edition, Oxfor				

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- 3. Srinivasulu P and Vaidyanathan.C, "Handbook of Machine Foundations", Tata McGraw Hill, 2004.
- Jurgen Axel Adam, KatharriaHausmann, Frank Juttner, Klauss Daniel, "Industrial Buildings: A Design Manual", Birkhauser Publishers, 2004.
- 5. IS 6060 -1971 Code of practice for Day lighting of factory buildings
- 6. IS 3103 -1975- Code of practice for industrial ventilation
- 7. IS 3483 -1965 Code of practice for Noise reduction in industrial buildings
- 8. IS 6533 (Part 1 & Part 2) -1989 Code of practice for design and construction of steel chimneys
- 9. IS:875 (Part 1 to 5) Code of Practice for Design loads.
- 10. IS:9178-1980 Criteria for Design of Steel Bins for Storage of Bulk Materials
- IS: 3370-1967 Part 2 to 4 Code of Practice for Concrete Structures for the storage of liquids -Reinforced Concrete Structures.

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's				PO's	rearum, 1- vv car	
cos –	1	2	3	4	5	6
CO1	3	•	1	2	3	3
CO2	2	180	2	2	3	2
CO3	2	-	1	2	3	3
CO4	2	-	1	2	3	2
CO5	2	-	2	2	2	3



COURSE OBJECTIVES	RES 3 0 0 3
COULDE OBJECTIVES	
To enable the students to	
impart the basic knowledge about prefabrication.	
2 know about the different types of connection.	
3 understand the design for stripping forces during manufacture	
4 know about the forces in shear walls.	
5 understand the different roof trusses used in industrial building	gs.
UNIT I DESIGN PRINCIPLES	9
General Civil Engineering requirements - specific requirements for pl	anning and layout of prefabrication
plant. IS Code specifications; Modular co-ordination; standardiza	tion; Disuniting of Prefabricates
Production, transportation, erection, stages of loading and code p	rovisions, safety factors, materia
properties, Deflection control.	
UNIT II REINFORCED CONCRETE	9
Prefabricated structures - Long wall and cross-wall large panel	ouildings, one way and two way
prefabricated slabs, Framed buildings with partial and curtain walls;	Connections - Beam to column and
column to column.	
UNIT III FLOORS, STAIRS AND ROOFS	9
Types of floor slabs - analysis and design example of cored and panel	ypes and two-way systems, Design
analysis for product manufacture, handling and erection, staircase slai	types of roof slabs and insulation
requirements, Description of joints, their behavior and reinforcement	31 5x8
short term and long-term loads, Ultimate strength calculations in shea	•
UNIT IV WALLS	and nexure.
UNIT IV WALLS	9
	9
Types of wall panels - Blocks and large panels, Curtain, Partition and	9 d load bearing walls, Hoisting and
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer	d load bearing walls, Hoisting and tricity and stability of wall panels
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak p	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwich
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwich
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls  UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls as, R.C. Roof Trusses, Roof Panels
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls  UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system corbels and columns, wind bracing; Cylindrical - Folded plate and paragraphs.	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls as, R.C. Roof Trusses, Roof Panels
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls  UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system corbels and columns, wind bracing; Cylindrical - Folded plate and paragraphs.	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls approximate sealants.  9 ns, R.C. Roof Trusses, Roof Panels boloid shells, Erection and jointing
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system corbels and columns, wind bracing; Cylindrical - Folded plate and para of components in industrial buildings.	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls as, R.C. Roof Trusses, Roof Panels
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system corbels and columns, wind bracing; Cylindrical - Folded plate and para of components in industrial buildings.	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls approximate sealants.  9 ns, R.C. Roof Trusses, Roof Panels boloid shells, Erection and jointing
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls  UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls approximate design of shear walls boloid shells, Erection and jointing TOTAL PERIODS 45
Types of wall panels - Blocks and large panels, Curtain, Partition and placing, load transfer from floor to wall panels, vertical loads, Eccer Design Curves, types of wall joints, their behavior and design, Leak panels, Lateral load resistance, Location and types of shear walls UNIT V INDUSTRIAL BUILDINGS AND SHELL ROOFS  Components of single - storey industrial sheds with crane gantry system corbels and columns, wind bracing; Cylindrical - Folded plate and para of components in industrial buildings.  COURSE OUTCOMES  At the end of this course, students will be able to	d load bearing walls, Hoisting and tricity and stability of wall panels revention, joint sealants, sandwick approximate design of shear walls approximate design of shear walls boloid shells, Erection and jointing TOTAL PERIODS 45  BT Mapped (Highest Level)

CO4	determine the force	ces in shear wa	lls.		Apply	ing (K3)
05	identify the differ	ent roof trusses	s used in industr	rial buildings.	Analyz	ring (K4)
J. C. C.						
	RENCES			6	D.P.C. L. Wiss	C Elliott CDC
1.	Precast Concrete	Structures, Pre	cast Concrete S	tructures, Second	Edition by Kim	S. Ellion, CRS
	Publishers, 2016.					
2.	Hubert Bachman					
3.	Donald Watson	and Michael J	.Crosbie, "Time	e Saver Standard	s for Architectu	ıral Design",8tl
	Edition, Tata Mc					
4.				lculations", McGr	aw Hill 2nd Edit	ion, USA 2010
.530				Using prefabricat		
5.						
6.		Code of practi	ce for construct	ion with large par	lei piciaoricates	•
	O MAPPING:					~
Mapı	ping of Course Ou	tcome (CO's)	with Programs Outcomes 1	me Outcomes (Po	O's) and Progr	amme Specific
	(1/2/3 inc	dicates strengt		n) 3-Strong, 2-M	edium, 1-Weak	
				PO's		
CO'	's 1	2	3	4	5	6
		1	1	2	3	
CO	1 2					1
CO	•	1	1	2	2	1 -
	2 2		1 2	9277	2	1 - 1
CO	2 2 3 2	1		2	965	



	3165		DESIGN OF FORMWORK	3 0	0
COU	RSE O	BJECTIVES			
To en	able the	e students to			
1	selec	t proper formwork	c, accessories and material.		
2	analy	yze the formwork i	for beams, slabs, columns, walls and foundat	ions.	
3	unde	rstand the formwo	rk design for special structures.		
4	mana	age the working of	flying formwork.		
5	judge	e the formwork fai	lures through case studies.		-
UNIT	'I	INTRODUCTIO	ON TO FORMWORK		9
Requi	rements	s and Selection -	Formwork materials - Timber, Plywood, S	teel. Aluminum, Plasi	tic and
			ertical Formwork supports.	, , , , , , , , , , , , , , , , , , , ,	iro une
UNIT		FORMWORK D			9
Desig	n Conce	epts - Formwork S	ystems and Design for Foundations, Walls, (	Columns Slab and Bes	1623
UNIT			ESIGN FOR SPECIAL STRUCTURES	- Stab and Bea	9
Design			tructures - Shells, Domes, Folded Plates, Ov	erhand Water Tenks N	1 6
		g Tower, Bridges.	Shells, Bolles, Folded Flates, Ov	ernead water Taliks, I	vatura
UNIT		FLYING FORM	WORK		10
					9
	d Post		Form - Formwork for Precast Concrete, For	mwork Management Is	ssues -
UNIT		**************************************			
UNI		CODMOUNTE	A TI TIDEC		100
119172 CO1910		FORMWORK FA			9
Cause	s - Cas	se studies in Form	AILURES  nwork Failure, Formwork Issues in Single	and Multi - Story Bu	1
Cause		se studies in Form		and Multi - Story Bu	1
Cause: Constr	s - Cas	se studies in Form		and Multi - Story Bu	uilding
Cause: Constr	s - Cas ruction.	se studies in Form	nwork Failure, Formwork Issues in Single		uilding
Cause: Constr	s - Cas ruction.	se studies in Form	nwork Failure, Formwork Issues in Single	TOTAL PERIODS  BT Mapped	uilding
Couse: Coustin	s - Cas ruction.	UTCOMES this course, studen	nwork Failure, Formwork Issues in Single	TOTAL PERIODS  BT Mapped (Highest Level)	uilding
COUF At the	RSE OU	UTCOMES this course, studen	nwork Failure, Formwork Issues in Single  ats will be able to  ork, accessories and material.	BT Mapped (Highest Level) Analyzing (K4)	uilding
Couse: Coust: Coust: At the	RSE OU end of	UTCOMES this course, studen	nwork Failure, Formwork Issues in Single	TOTAL PERIODS  BT Mapped (Highest Level)	uilding
COUF At the	end of exami	UTCOMES this course, studentine proper formwork	nwork Failure, Formwork Issues in Single  ats will be able to  ork, accessories and material.  a for beams, slabs, columns, walls and	BT Mapped (Highest Level) Analyzing (K4) Applying (K3)	uilding
COUF At the	end of exami	UTCOMES this course, studentine proper formwork	nwork Failure, Formwork Issues in Single  ats will be able to  ork, accessories and material.	BT Mapped (Highest Level) Analyzing (K4)	uilding
COUF At the	end of exami	UTCOMES this course, studen ine proper formwork lations mine the formwork	nwork Failure, Formwork Issues in Single  ats will be able to  ork, accessories and material.  a for beams, slabs, columns, walls and	BT Mapped (Highest Level) Analyzing (K4) Applying (K3)	ailding
Courte COURT At the CO1 CO2	end of exami	UTCOMES this course, studentine proper formwork tations mine the formwork	nwork Failure, Formwork Issues in Single atts will be able to ork, accessories and material.  It for beams, slabs, columns, walls and a for special structures.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3) Applying (K3) Understanding (K3)	uilding 3 45
Couser Coustr Coustr At the CO1 CO2	end of exami	UTCOMES this course, studentine proper formwork lations mine the formwork in the formwork m	nts will be able to  ork, accessories and material.  a for beams, slabs, columns, walls and a for special structures.  anagement issues.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3)	uilding 3 45
Couser Coustr Coustr At the CO1 CO2 CO3 CO4 CO5 REFE	end of exami	UTCOMES this course, studentine proper formwork lations mine the formwork in the formwork mannethe formwork failu	nts will be able to  ork, accessories and material.  for beams, slabs, columns, walls and  a for special structures.  canagement issues.  ures through case studies.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3) Applying (K3) Understanding (K) Remembering (K)	ailding  3 45
Couser Coustr Coustr At the CO1 CO2 CO3 CO4	end of exami	UTCOMES this course, studentine proper formwork lations mine the formwork in the formwork manne the formwork failures the	nts will be able to  ork, accessories and material.  a for beams, slabs, columns, walls and a for special structures.  anagement issues.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3) Applying (K3) Understanding (K) Remembering (K)	2)
Couser Couser Couser At the CO1 CO2 CO3 CO4 CO5 REFE 1.	end of exami complete found determine a solve  RENCI	UTCOMES this course, studentine proper formwork lations mine the formwork must be formwork failutes  ES t I. PeurifoyGaro 2010.	nts will be able to  ork, accessories and material.  for beams, slabs, columns, walls and  a for special structures.  canagement issues.  ures through case studies.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3)  Applying (K3)  Understanding (K)  Remembering (K)	ailding  3 45
Couser Couser Couser At the CO1 CO2 CO3 CO4 CO5 REFE 1.	end of exami complete found determine explair solve RENCI Rober India, Formy	UTCOMES this course, studentine proper formwork lations mine the formwork in the formwork failu ES t I. PeurifoyGaro 2010. work for Concrete	nts will be able to  ork, accessories and material.  for beams, slabs, columns, walls and  a for special structures.  nanagement issues.  ures through case studies.	BT Mapped (Highest Level) Analyzing (K4) Applying (K3)  Applying (K3)  Understanding (K Remembering (K)  e structures"Mc Grav	ailding  45  2)

Mapping o			Outcomes	PSO's	PO's) and Progr Medium, 1-Weal	
CO's				PO's	realum, 1- Wear	
	1	2	3	4	5	6
CO1	1	-	1	3	3	1
CO2	1	-	1	2	2	2
CO3	2	-	2	2	3	1
CO4	1	_	1	3	3	3
CO5	1	-	2	3	3	1



PSE2	3166	ANALYSI	S AND DESIGN OF TALL BUILDING	GS	3 0	0	3
COU	RSE OBJECT	IVES					
To en	able the studen	ts to				T	
1			dition on high rise buildings.				
2	gain knowled	lge on power	transmission structures.				
3	gain on powe						
4			dation for towers.				
5	familiar with	analysis and	design of high rise buildings:		A		
UNIT	I LOADI	NG OF HIC	GH RISE BUILDINGS				9
Loadi	ng- sequential	loading, Gra	vity loading, Wind loading, Earthquake	loading, - Eq	uivalen	t late	eral
force,	modal analysis	s - combinat	ion of loading, - Static and Dynamic app	roach - Analy	tical a	id w	ind
tunnel	experimental r	methods - De	sign philosophy - working stress method,	limit state met	hod and	l pla	stic
design	1.						
UNIT	II POWE	R TRANSM	ISSION STRUCTURES				9
Cable	s -Transmission	line towers,	Substation Structures; Tower foundations	s; Testing tow	ers.		
UNIT	III POWE	R PLANT S	TRUCTURES				9
Chim	neys and Coolin	g Towers - H	igh pressure boilers and piping design - N	uclear contain	ment st	uctu	ires
UNIT	IV FOUNI	OATION			- Qu		9
Design	n of foundation	for Towers, 0	Chimneys and Cooling Towers - Machine	Foundation - D	esign o	fTu	rbo
Gener	ator Foundation	1.					
UNIT	V ANALY	SIS AND D	ESIGN OF HIGH RISE BUILDINGS			1	9
Model	ing for analys	is - Assump	tions - Modeling for approximate analy	yses -Modelin	g for a	ccui	rate
analys	is -Reduction t	echniques - l	Dynamic analysis - Response to wind loa	ding - Along-	wind re	spon	ıse-
Across	s - wind respon	se - Estimati	on of natural frequencies and damping - 1	Types of excita	ation D	esigr	ı to
minim	ise dynamic re	esponse - Re	sponse to earthquake motions - Respon	se to ground	acceler	ation	1S -
Respo	nse spectrum ai	nalysis - Estin	nation of natural frequencies and damping	Human respo	nse to b	uild	ing
motion	ns.						111200
				TOTAL PI	ERIOD	s	45
	RSE OUTCOM						
	end of this cou	7/	•	BT M (Highe	lapped st Leve	I)	
CO1	examine the o	concept for v	arious structures subjected to wind.	Analyz	ing (K4	)	
CO2	identify the t	ransmission	line towers and foundations.	Applyi	ng (K3		
CO3	Determine the	e and design	chimneys as per codal provisions.	Applyi	ng (K3	)	
CO4	infer with all	types of mac	hine foundations.	Understa	nding (I	(2)	
CO5	describe the v		ural systems used in the construction of	Understa	nding (I	(2)	

- Rolf Katzenbach, Steffen Leppla, et al.., "Foundation systems for High rise structures", CRC Press, 2016.
- Gupta.Y.P., (Editor), Proceedings of National Seminar on High Rise Structures- Design and Construction Practices for Middle Level Cities, New Age International Limited, New Delhi, 2015.
- 3. Taranath B.S., "Structural Analysis and Design of Tall Buildings", McGrawHill, 2011.
- 4. Santhakumar, A.R. and Murthy, S.S., "Transmission Line Structures", Tata McGraw Hill 2011.
- 5. IS 6060 -1971 Code of practice for Day lighting of factory buildings
- 6. IS 3103 -1975- Code of practice for industrial ventilation
- 7. IS 3483 -1965 Code of practice for Noise reduction in industrial buildings
- 8. IS 6533 (Part 1 & Part 2) -1989 Code of practice for design and construction of steel chimneys
- 9. IS:875 (Part 1 to 5) Code of Practice for Design loads
- 10. IS:802-1977(Part 2) Code of practice for use of structural steel in Over Head transmission line towers
- 11. IS:4091-1979 Code of Practice for Design and Construction of Foundations for Transmission Line Towers and Poles

## **CO-PO MAPPING:**

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's				PO's		
	1	2	3	4	5	6
CO1	1	-	1	3	3	3
CO2	1	-	1	2	3	2
CO3	2	-	2	2	2	1
CO4	1	-	1	3	3	1
CO5	2	-	2	2	3	2



	3167			٠.		TY OF S					3	0 0	)
COU	RSE (	BJECTIV	VES			1117 Terr							
To en	able tl	e students	to										
1	und	erstand the	basic conce	epts an	nd appro	ximate n	nethods	of stabilit	y.				
2	stuc	ly the stabi	lity of colur	mns us	ing theo	retical a	nd nume	rical met	hods.				
3	enu bea		lateral buc	ckling,	lateral	torsiona	l buckli	ng and fl	exural t	orsional	buc	ekling	g of
4	stuc	ly various i	numerical te	echniqu	ues and	energy n	nethods	for buckli	ing of th	in plates			
5	get	accustome	d to beam co	olumn	joint be	haviour	and that	of frames	S.				
UNIT	I	BUCKLI	NG OF CO	OLUM	INS								9
States	of eq	ıilibrium -	Concept of	equilil	brium, e	nergy, in	nperfect	ion and v	ibration	approacl	nes t	to sta	bili
metho	d.		- Rayleigh			17.3			teeningt	ies – Fil	nic	diffe	
UNIT			NG OF BE					110.00.003.00					9
			n - Stability										
distrib	outed I	oad and en	d couples -	Analys	sis of rio	id jointe	d frames	with and	without	t sway; U	Jse o	of sta	bili
functi					313 01 115								
Tuncti	on to	letermine t	he critical le		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, ,							
UNIT			he critical le	load.			1						9
UNIT	Ш	TORSIO		load.	ERAL E	BUCKL	ING	g, Local	buckling	g - Bucl	klin	g of	
UNIT Torsio	'III onal b	TORSIO	NAL AND	load.  LATI torsion	ERAL E	BUCKLI flexural	ING bucklin	700		g - Bucl	klinį	g of	
UNIT Torsio sectio	'III onal b ns, La	TORSIO uckling - 0 teral buckli	NAL AND	load.  LATI torsion ns, Sim	ERAL Enal and ply supp	BUCKLI flexural	ING bucklin	700		g - Bucl	klinį	g of	ope
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## CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's				PO's		
cos	1	2	3	4	5	6
CO1	2	н	2	3	2	3
CO2	1	-	1	-2	3	2
CO3	2	-	2	2	3	1
CO4	1	-	1	3	3	1
CO5	1	-	2	2	2	3



	23168	THE STATE	ENERGY EFFICIENT BU	ILDINGS		3 (	0 0	3
COL	RSE OBJEC	TIVES						
To er	able the stude	nts to						
1	study the E	nergy consumpt	on pattern of various types of	f buildings.				
2	learn the va	rious environme	ntal factors affecting the bui	lding design.				
3	gain knowl	edge on thermal	performance of materials us	ed in the buil	ding.			
4	employ the	energy efficient	and energy conservation con	ncepts with e	nergy auditing	Ţ.		
5	understand	about Energy au	diting of buildings.					
UNI	TI INTR	ODUCTION T	O ENERGY					9
Energ	gy- Power - N	eed of energy in	buildings and its assessment	; Energy con	sumption patte	ern c	of va	rious
types	of buildings;	Factors influence	ng the energy use in building	g; Concepts o	f energy effici	ient l	build	ling -
Rebo	und effect and	Energy efficien	t buildings in India.					
UNI	II STUD	Y OF CLIMA	TE .					9
Study	of Weather	and Climate – C	Classification of climate for	various zone	s - Influence	of c	lima	ite in
build	ing design; Tro	opical climate – (	Drientation; Environmental fa	ctors affectin	ng building des	sign;	Ana	alysis
of the	ermal and visu	al environment.						•
UNI	TIII HEAT	AND LIGHT					_	9
Heat	gain and heat	loss phenomen	on in buildings; Thermal pe	rformance pa	arameters: Rol	le of	f bui	lding
	_		in thermal environment; Bas	1.55				_
			Daylight design of buildings	2 0		, 0		
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- 1. Bruce A Bolt, "Earthquakes" W H Freeman and Company, New York, 2004.
- 2. C. A. Brebbia, "Earthquake Resistant Engineering Structures VIII", WIT Press, 2011
- Mohiuddin Ali Khan "Earthquake-Resistant Structures: Design, Build and Retrofit", Elsevier Science & Technology, 2012
- 4. Pankaj Agarwal and Manish Shrikhande, "Earthquake Resistant Design of Structures", Prentice Hall of India, 2009

## CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's	PO's							
cos –	1	2	3	4	5	6		
CO1	2	-	3	3	2	2		
CO2	1	-	1	2	3	3		
CO3	2	1	2	2	3	3		
CO4	1	-	1	3	3	3		
CO5	3	-	2	2	2	3		



PSE23	170	WIND A	AND CYCLONE EFFECTS ON STRU	CTURES	3 0	) 3	
COUR	SE OBJECT	IVES		- T			
To enat	ole the student	120 2027					
1	study the con	cept of wind	and cyclone effects for analysis and desig	n of structures	3		
2	know the usa	ge of codal p	rovisions for the wind and cyclone design	of structures			
3	study the stat	ic and dynan	nic on tall buildings				
4	design the sp	ecial structur	es based on wind effects				
5	analyse the c	yclone effect	s on tall buildings		· ·		
UNIT I	INTRO	DUCTION	TO WIND			9	
Wind -1	Types of wind	, Characterist	tics of wind; Wind velocity- Method of me	asurement, va	riation of	speed	
with hei	ght shape fact	tor, aspect rat	io; drag and lift effects - Dynamic nature of	f wind, Pressu	re and suc	tions	
Spectra	l studies, Gus	t factor.					
UNIT I	I WIND	TUNNEL ST	TUDIES			9	
Wind tu	nnel studies	- Types of tu	nnels, modelling requirements, interpreta	tion of results	s; aero dy	namio	
and aero	o-elastic mode	els; Prediction	n of acceleration - Load combination factor	rs; Wind tunn	el data ana	lysis	
Calcula	tion of Period	and damping	g value for wind design.				
UNIT I	II WIND	EFFECT OF	N STRUCTURES			9	
Classifi	cation of str	uctures - Ri	igid and Flexible, Effect of wind on	structures; V	ortex she	dding	
translati	onal vibration	of structure	s; Static and dynamic effects on Tall buil-	dings - Chimi	neys.		
UNIT I	V DESIG	N OF SPEC	IAL STRUCTURES			9	
Design	of Structures	for wind lo	pading - as per IS-875, ASCE and NBC	code provis	ions; desi	gn o	
-			gs, Chimneys ;Transmission towers and	The state of the s			
	Roofs and She				200		
UNIT V		ONE EFFEC	TS			9	
			uctures, sloped roof structures, Tall buil	dings: Effect	of cyclo		
			se of code provisions in cladding design				
	ng of cladding		or or code providens in chading design	.,	procedur	- unc	
		2:					
COURS	SE OUTCON	/IES		TOTAL P	ERIODS	45	
			will be able to	DTA	<b>Tapped</b>		
i it the c	na or uno coa	ise, statemes	Will be dote to		est Level)		
120-032-5036	compute the		structures subjected wind load, even	Understa	nding (K2	()	
	examine the for wind load		l provisions for the design of structures	Analyz	zing (K4)		
CO3	describe the v	vind effect or	n a structure	Apply	ing (K3)		
	Substitution of the contract o						
		various type	es of structure as per IS and NBC codal	Remenb	ering (K1	)	
	provision	1 1000-12 170 - 2 1000 - 2 1 - 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	es of structure as per IS and NBC codal		ering (K1	)	

- 1. Wind Effects on Structures: Modern Structural Design for Wind, 2019 by Emil Simiu (Author), DongHun Yeo (Author).
- 2. Cook.N.J., "The Designer's Guide to Wind Loading of Building Structures", Butterworths, 1989
- Kolousek.V, Pirner.M, Fischer.O and Naprstek.J, "Wind Effects on Civil Engineering Structures", Elsevier Publications, 1984
- 4. Lawson T.V., "Wind Effects on Building Vol. I and II", Applied Science Publishers, London, 1980

#### CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

COL	PO's								
CO's	1	2	3	4	5	6			
CO1	2	-	3	2	2	2			
CO2	1	-	1	3	3	3			
CO3	2	-	2	2	3	3			
CO4	1	-	1	3	3	3			
CO5	3	-	2	2	2	3			



PSE2			CLIMATE CHANGE AND ADAPTA	TION	3 0	0
COU	RSE OBJECTI	IVES				
To en	able the students	s to				
1	realize the Ea	rth's clima	te system and concept of global warming.	8		
2			phere and its components.			
3	recognize the	impact of	climate change on society.			
4	study the obse	erved chang	ges and its causes.			
5	identify the in	pact of cli	mate change on society and mitigation me	easures.		
UNIT			ATE SYSTEM			
Role o	f ozone in enviro	onment - oz	zone layer, ozone depleting gases, Green H	Ouse Effect Dad	intina	
of Gre	enhouse Gases;	Hydrologic	cal Cycle; Green House Gases and Global	Warming Corl	ianve e	errec
UNIT	II ATMOS	PHERE A	ND ITS COMPONENTS	warming - Carr	on Cy	cie.
Import			sical Chemical Characteristics of Atmospl	noro Vantinal		
atmosp	here, Composi	tion of th	ne atmosphere, Atmospheric stability,	Towns and	ucture	of the
atmosp	here, Lapse rate	s, Temper	ature inversion, effects of inversion on pol	llution 4:	offile o	of th
UNIT	III IMPAC	TS OF CL	LIMATE CHANGE	nution dispersior	1.	
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CO2	describe the physical and chemical characteristics of atmosphere.	understanding (K2)
CO3	evaluate the relative opportunities and needs for mitigation and adaptation (including vulnerability assessments) in a variety of sectoral contexts.	Analyzing (K4)
CO4	evaluate the scientific insights underlying the assessment reports of the IPCC with a focus on impacts, adaptation and mitigation.	Analyzing (K4)
CO5	develop the need for mitigation and adaptation in environment.	Applying (K3)

- Dash Sushil Kumar, "Climate Change An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007
- 2. Adaptation and mitigation of climate Change-Scientific Technical Analysis. Cambridge University Press, Cambridge, 2006.
- J.M. Wallace and P.V. Hobbs, "Atmospheric Science An Introduction Survey", Elsevier / Academic Press 2006.
- 4. Jan C. van Dam, Impacts of "Climate Change and Climate Variability on Hydrological Regimes", Cambridge University Press, 2003.

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

co.	PO's						
CO's	1	2	3	4	5	6	
CO1	( <b>=</b> 0)	-	1	*	-	2	
CO2	( <b>-</b> )	-	1	.750		2	
CO3	:=::	-	1	7	-	3	
CO4	-	-	1	-		1	
CO5		5 <del>-</del>	1	-		2	



PSE23901		LIMATE CHANGE AN		ON 3 0		
COUR	SE OBJECTIV	VES		VIII		
	le the students					
1	realize the Eart	th's climate	system and concept of gl	obal warming.		
2	know the basics	s of atmosph	ere and its components.			
3	recognize the i	mpact of cl	imate change on society.			
4	study the obser	rved change	s and its causes.			
5	identify the imp	pact of clin	ate change on society and	mitigation meas	sures.	
UNIT I	EARTH'	S CLIMA	TE SYSTEM			9
Role of	ozone in enviro	nment - ozo	ne layer, ozone depleting	gases, Green Hor	use Effect, Radiative e	ffects
of Green	nhouse Gases; I	Hydrologic	al Cycle; Green House Ga	ses and Global V	Warming - Carbon Cy	cle.
UNIT I	I ATMOSI	PHERE AN	D ITS COMPONENTS			9
Importa	nce of Atmosph	here - Phys	cal Chemical Characterist	ics of Atmosphe	ere, Vertical structure	
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UNIT I			MATE CHANGE	resident on point	ation dispersion.	9
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CO2	describe the physical and chemical characteristics of atmosphere.	understanding (K2)
CO3	evaluate the relative opportunities and needs for mitigation and adaptation (including vulnerability assessments) in a variety of sectoral contexts.	Analyzing (K4)
CO4	evaluate the scientific insights underlying the assessment reports of the IPCC with a focus on impacts, adaptation and mitigation.	Analyzing (K4)
CO5	develop the need for mitigation and adaptation in environment.	Applying (K3)

- Dash Sushil Kumar, "Climate Change An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007
- Adaptation and mitigation of climate Change-Scientific Technical Analysis. Cambridge University Press, Cambridge, 2006.
- 3. J.M. Wallace and P.V. Hobbs, "Atmospheric Science An Introduction Survey", Elsevier / Academic Press 2006.
- Jan C. van Dam, Impacts of "Climate Change and Climate Variability on Hydrological Regimes", Cambridge University Press, 2003.

#### CO-PO MAPPING:

# Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's	PO's							
cos –	1	2	3	4	5	6		
CO1	: <del>-</del>	-	1	-	1=	2		
CO2	S=	-	1	-	1.E.	2		
CO3	-		1	-	-	3		
CO4	-		1	-	-	1		
CO5	-		1		-	2		



PSE23901			CLIMATE CHANGE ANI			1 1	
COU	RSE OBJE	CTIVES					
To ena	able the stud	ents to	<u> </u>			-	
1			e system and concept of glol	oal warming.			
2	know the b	basics of atmos	here and its components.				
3	recognize	the impact of	elimate change on society.				
4	study the o	observed char	ges and its causes.				
5	identify th	e impact of cl	mate change on society and i	nitigation measi	ures.		T
UNIT	I EAR	TH'S CLIM	TE SYSTEM				9
Role of ozone in environment - oz		vironment - c	one layer, ozone depleting ga	ses, Green Hou	se Effect, Rad	iative et	ffec
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UNIT			ND ITS COMPONENTS			on eye	T
Importance of Atmosphere - Phy				s of Atmospher	e Vertical str	neturo	
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CO2	describe the physical and chemical characteristics of atmosphere.	understanding (K2)
CO3	evaluate the relative opportunities and needs for mitigation and adaptation (including vulnerability assessments) in a variety of sectoral contexts.	Analyzing (K4)
CO4	evaluate the scientific insights underlying the assessment reports of the IPCC with a focus on impacts, adaptation and mitigation.	Analyzing (K4)
CO5	develop the need for mitigation and adaptation in environment.	Applying (K3)
REFE	RENCES	

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# Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO's	PO's						
	1	2	3	4	5	6	
CO1	-		1	-	-	2	
CO2		-	1	-	-	2	
CO3	-	-	1	<u>ur</u>	-	3	
CO4	-	•	1	-	-	1	
CO5	-	-	1	-	84	2	



PSE23	901	C	DIMITE CIPATO	E AND ADA		OIN	3 0		
COUR	SE OBJECTIV	/ES							1_
To enal	ble the students	to							
1			system and concept	of global war	rming.				
2	know the basics	of atmosphe	ere and its component	s.					-
3	recognize the in	mpact of cli	mate change on soc	iety.					
4	study the observ	ved change	and its causes.						-
5	identify the impact of climate change on society and mitigation measures.						_		
UNIT	EARTH'S	S CLIMAT	E SYSTEM						9
Role of	ozone in enviror	nment - ozo	ne layer, ozone depl	eting gases, G	reen Hou	ıse Effect, R	adiative	effe	c
			l Cycle; Green Hou						
UNIT I			D ITS COMPONE					T	
Importa	nce of Atmosph	ere - Physic	al Chemical Charac	cteristics of A	tmosphe	re, Vertical	structure	of	
			atmosphere, Atmo						
			ure inversion, effect					\$7. W	-
			MATE CHANGE						
UNITI	II IMPACI	TS OF CLI	MATE CHANGE						_
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CO3	evaluate the relative opportunities and needs for mitigation and adaptation (including vulnerability assessments) in a variety of sectoral contexts.	Analyzing (K4)
CO4	evaluate the scientific insights underlying the assessment reports of the IPCC with a focus on impacts, adaptation and mitigation.	Analyzing (K4)
CO5	develop the need for mitigation and adaptation in environment.	Applying (K3)

- Dash Sushil Kumar, "Climate Change An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007
- Adaptation and mitigation of climate Change-Scientific Technical Analysis. Cambridge University Press, Cambridge, 2006.
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- Jan C. van Dam, Impacts of "Climate Change and Climate Variability on Hydrological Regimes", Cambridge University Press, 2003.

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CO's	PO's						
	1	2	3	4	5	6	
CO1	-	-	1	-		2	
CO2	-	-	1	-	5 <b>7</b> 8	2	
CO3	-	-	1	-	-	3	
CO4	-	V=	1		•	1	
CO5	-		1	-	-	2	

