Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)



Course Contents (Syllabus) for

Third Year B. Tech. (Civil Engineering) Sem - V to VI

AY 2020-21

Title of the Course:	L	Т	Р	Cr
Soil Mechanics (4CV301)	2	1	0	3

Desirable Courses: Fluid mechanics

Textbooks:

- 1. Das B. M., "Principles of Geotechnical Engineering", Cengage Learning, 7th Edition, 2002.
- 2. Murthy, V. N. S., "Textbook of Soil Mechanics and Foundation Engineering Geotechnical Engineering Series", CBS publishing; 1st edition, 2007.
- 3. Ranjan Gopal and Rao A.S.R., "Basic and Applied Soil Mechanics", New Age International Publishers, 3rd Edition, 2016.

References:

- 1. Gulhati S. K. and Datta M., "Geotechnical Engineering", Tata McGraw-Hill, 1st Edition, 2005
- 2. Couduto, Donald P., "Geotechnical Engineering Principles and Practices", Prentice-Hall.,2nd Edition, 2017.
- 3. Muni Budhu, "Soil Mechanics and Foundations", John Wiley & Sons, Inc, 3rd Edition, 2011.

Course Objectives :

- 1. To provide the knowledge of engineering properties of soil and soil classification.
- 2. To prepare students for competitive examinations and higher studies in the field of geotechnical engineering.

Course Learning Outcomes:

CO	After	the co	omplet	tion of	the co	ourse t	he stu	lent sh	nould l	be	E	Bloom	's Cogni	tive
CO	able	to	1								Le	vel	Descr	iptor
CO1	Expl conce	ain t ept of	he in earth p	dex p pressu	propert re and	ies, e conso	engine lidatio	ering n	prope	erties,	Ι	Ι	Underst	anding
CO2	Solve problems associated with term 'compaction, shearIIIApplyingstrength of soil and earth pressure'.Applying													ying
CO3	Analyse soil properties based on shear strength, earth pressure, and degree of consolidation of soil.IVAnalyzing												yzing	
CO-PO Ma	apping	g :												
РО	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	3												2	3
CO2		3											2	3
CO3			3										2	3
Assessmen	ments :													
Teacher A	ssessm	ent:												
Two compo End Semes	Assessment: aponents of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one mester Examination (ESE) having 20%, 30% and 50% weights respectively.													

Assessment	Marks
ISE 1	10

Title of the	e Cours	e:]	L	Т	Р		Cr
Water Supp	ply and	Freatm	ent Teo	chnolog	gy (4C	V 302)	1				3	0	0		3
Desirable	Courses	: Basic	e hydra	ulics a	nd Eng	gineerir	ig Che	mistry						1	
Textbooks	:														
1. Raj De	ju, B.S.1 lhi, 2 nd H	N., "W Edition	ater Su , 2000.	pply a	ind Wa	istewat	er Eng	ineerin	ıg" Tat	a McG	raw]	Hill P	riva	te limite	ed, New
2. Ga 3. Mo Ed	rg, S. K odi, P. N ition, 20	. "Wate I., "Wa 18.	er Supp iter Suj	oly Eng oply En	gineerii nginee	ng", Kł ring (E	nanna l nviron	Publish mental	ers, 33 Engin	rd Editi eering	on, 2 I)", 5	010. Standa	ard H	Book Ho	ouse, 6 th
References	5:														
1. "M De	anual o velopme	on Wat ent, Go	er Sup vt., of	oply a India, I	nd Tre New D	eatment elhi, 19	", CP 999.	HEEO,	, Minis	stry of	Hou	ising	and	Urban	Affairs
2. Ha 7 th	mmer N Edition.	I, J and 2018.	l Hamr	ner M,	J, "W	ater an	d Was	tewater	Techr	ology"	, PH	l learr	ning	private	limited,
3. Da	vis, M, blishing	L, and	Cornw	vell, D	, A, "I ndian	ntroduo Edition	ction to	o Envir	ronmer	ntal Eng	ginee	ring",	Tat	a McGi	aw Hill
4. Na 200	thanson 09.	, J. A.	, "Basi	ic Env	rironme	ental T	echno	logy",	PHI L	earning	g priv	vate 1	imit	ed, 5 th	Edition,
Course Ob	jectives	5:													
1. To	provide	the pe	rtinent	knowl	edge o	n wate	r suppl	y and t	reatme	nt syste	ems.				
2. To	impart	necessa	ary skil	l for th	e desig	gn and	operati	on of v	water tr	eatmer	nt uni	ts.			
3. To	prepare	studen	its for l	nigher	studies	and re	search	in the	field of	f water	treat	ment	tech	nology.	
4. To	familia	rize the	studer	nts with	n latest	trends	in wat	er treat	tment.						
Course Le	arning	Outcor	nes:												
CO	Δfter	the co	mnleti	on of th		se the	studen	t should	d be ab	le to		Bloo	om's	Cognit	tive
	7 mer		mpien			se the	studen	t should			Le	vel		Descri	ptor
CO1	Expl techn	ain wa ologies	ter qua s.	lity, w	ater su	pply sy	stem a	nd trea	itment]	Ι	Un	derstand	ding
CO2	Solve conve	e the pr eyance	oblems and tre	s on wa eatmen	ater rel t.	ated to	quality	y, quan	tity,		Ι	II	Ap	plying	
CO3	Desig	gn wate	er treat	ment u	nits, aı	nd pipe	line sy	stem.			١	/I	Cre	eating	
СО-РО М	apping	:													
РО	1	2	3	4	5	6	7	8	9	10	11	1	2	PSO1	PSO2
CO1	3													2	3
CO2		3												3	3
CO3			3											3	3
Assessmen	ts :														
Teacher A	ssessme	ent:													

Title of the	Course	e:]	Ĺ	Т	Р	Cr
Design of st	eel Str	ucture	s (4C	V303)						,	2	1	-	3
Desirable C	ourses	: Solid	Mech	anics &	z Struct	tural M	lechan	ics						
Textbooks:														
1. Duggal Edition,	S.K., ' 2014.	'Limit	state c	lesign	of stee	el struc	tures"	, Tata	McGra	aw-Hill	Publ	catio	ns, Nev	Delhi, 2
2. Shiyekar 2013.	:, M.R	., "Lin	nit stat	e desig	gn in s	tructur	al stee	el", PH	II learr	ning Pv	/t.Ltd	Publi	cations	2 nd Editio
3. Subrama	inian N	[., "Des	sign of	steel s	tructure	es", Ox	xford U	Inivers	ity Pres	ss, 201	0.			
References:1. Dayaratr2. Englekir3. Gaylord, Company4. IS 800-2 Practice New Del	nam, P. k, Rob , Edwi y Ltd., 2007 'C for De lhi.	, "Desi ert, "St in and New I Code of esign I	ign of s teel str Gaylo Delhi, 3 f Pract Loads (steel str uctures ord, Cl rd Editi ice for (other	ructure contra harles, on, 201 Genera than ea	s", S. C olling l "Desi 10. al Con urthqua	Chand behavio gn of structio ke) fo	Publica or throus steel on in s r build	ation, N ugh des structu teel', a ing str	New Design", J res", T nd IS uctures	elhi, 20 John W Tata N 875-1 s, Bure	008. /iley : 1cGra 987 p eau o	and Son w Hill part 1 to f Indian	s, 2003. Publishin 5; Code o Standard
New Delhi. Course Objectives: 1. To illustrate various design philosophies and concept of plastic analysis. 2. To impart the knowledge of design of various steel members and their connections. 3. To provide knowledge of design practical steel structures such as industrial sheds, steel buildings etc.														
Course Lean	rning (Outcor	nes:											
												Bloo	m's Cog	nitive
CO	CO After the completion of the course the student should be able to Bloom's Cognitive													
	CO1 Apply the concept of limit state for design of steel structures IV Applying													
CO1	Appl	y the c	oncept	of lim	it state	for des	sign of	steel st	tructure	es.	Г	vei V	De Aj	scriptor oplying
CO1 CO2	Appl Calcu conne	y the co ulate the ections	oncept ne strer	of limi	it state steel st	for des	sign of al merr	steel st	nd	es.	Г	vei V	Aj Ev	scriptor oplying aluating
CO1 CO2 CO3	Appl Calcu conne Desig etc.	y the co ulate the ections gn steel	oncept ne strer l struct	of liming the of ures su	it state steel st ch as in	for des ructura	al mem	steel st ibers an ls, steel	nd buildi	es. ngs	Le r v	√ √ 7 1	Ev C	scriptor oplying aluating reating
CO1 CO2 CO3 CO-PO Ma	Appl Calcu conne Desig etc.	y the constant of the sections of the section of th	oncept ne strer l structi 1, 2, 3	of limi ngth of ures su as Cor	it state steel st ch as in relatio	for des ructura ndustria	al mem al shed	steel st ibers an ls, steel	nd l buildi	es. ngs		vei / / I	Ev C	scriptor oplying aluating reating
CO1 CO2 CO3 CO-PO Ma PO	Appl Calcu conne Desig etc. pping :	y the constructions ulate the ections on steel : (Use : 2	oncept ne strer l struct 1, 2, 3 3	of limiting of lim	it state steel st ch as in relatio	for des ructura ndustria n Stre 6	al mem al shed ngths)	steel st bers at s, steel	tructure nd l buildi	es. ngs 10	Le [7] V V 11	vei // /1 12	Ev C	scriptor oplying aluating reating 1 PSO
CO1 CO2 CO3 CO-PO Ma PO CO1	Apply Calcu conne Desig etc. pping : 1 3	y the constant of the sections of the section of th	oncept ne strer l struct 1, 2, 3 3	of limiting of lim	it state steel st ch as in relatio 5	for des ructura ndustria on Stre 6	al mem al shed ngths) 7	steel st ibers an ls, steel 8	tructure nd l buildi 9	ngs	Ге Г V 11	vel / / / 12	Ev C PSC 1	scriptor oplying aluating reating 1 PSO 1
CO1 CO2 CO3 CO-PO Maj PO CO1 CO2	Appl Calcu conne Desig etc. pping : 1 3	y the constructions ulate the ections gn steel : (Use 2 3	oncept ne strer l struct 1, 2, 3 3	of limiting of lim	it state steel st ch as in rrelatio	for des ructura ndustri on Stre 6	al mem al shed ngths) 7	steel st bers and s, steel 8	tructure nd buildi 9	ngs	Le [7] V 11	vel v 1 12	DeA)EvCPSC12	scriptor oplying aluating reating 1 PSO 1 2
CO1 CO2 CO3 CO-PO Ma PO CO1 CO2 CO3	Appl Calcu conne Desig etc. pping 3	y the constructions of the sections of the section	oncept ne strer l struct 1, 2, 3 3 3	of limiting of lim	it state steel st ch as in relatio	for des ructura ndustri. on Stre 6	al mem al shed ngths)	steel st abers an ls, steel 8	tructure nd buildi	es. ngs 10	Le [] [] [] [] [] [] [] [] [] []	V 7 1 12	DeA)EvCPSC123	scriptor oplying aluating reating 1 PSO 1 2 3
CO1 CO2 CO3 CO-PO Ma PO CO1 CO2 CO3 Assessments	Apply Calcu conne Desig etc. pping : 1 3	y the constructions and steel : (Use) 2 3 : ther As	oncept ne strer l struct 1, 2, 3 3 3 ssessm	of limiting of lim	it state steel st ch as in relatio	for des ructura ndustria n Stre 6	al mem al shed ngths) 7	steel st abers an ls, steel 8	tructure nd buildi 9	ngs 10	Le [7] V 11	V 7 1 12	DeA)EvCPSC123	scriptor oplying aluating reating 1 PSO 1 2 3
CO1 CO2 CO3 CO-PO Maj PO CO1 CO2 CO3 Assessments Two compor	Appl Calcu conne Desig etc. pping : 1 3 s: Teac ments o	y the constructions ulate the ections on steel : (Use 2 3 : ther As f In Ser	oncept ne strer l struct 1, 2, 3 3 3 ssessm mester	of limiting of lim	it state steel st ch as in relatio 5	for des ructura ndustri on Stre 6 SE), O	al mem al shed ngths) 7 ne Mid	steel st ibers at ls, steel 8 8	tructure nd buildi 9 ster Ex	ngs 10 aminat	11 ion (M	vel 7 12 15E)	De A) Ev C PSC 1 2 3 and one	scriptor oplying aluating reating 1 PSO 1 2 3 End
CO1 CO2 CO3 CO-PO Ma PO CO1 CO2 CO3 Assessments Two compor Semester Ex	Apply Calcu conne Desig etc. pping s 1 3 s: Teach nents of aminat	y the constructions and steel constructions	oncept he strer l struct 1, 2, 3 3 3 ssessm mester SE) hav	of limiting of limiting of limiting of limiting of limiting subset of	it state steel st ch as in relatio 5 ation (I.)%, 309	for des ructura ndustria 6 SE), O % and 5	al mem al shed ngths) 7 ne Mic 50% w	steel st ibers an ls, steel 8 I Seme eights	tructure nd l buildi 9 ster Ex respect	ngs 10 aminat ively.	Le P V 11 ion (M	vel // // 12 1SE)	Ay Ev C PSC 1 2 3 and one	scriptor oplying aluating reating 1 PSO 1 2 3 End
CO1 CO2 CO3 CO-PO Maj PO CO1 CO2 CO3 Assessments Two compor Semester Ex	Apply Calcu conne Desig etc. pping : 1 3 : Teach nents of aminat	y the constructions in steel (Use 1 2 3 cher As f In Section (ES Assess	oncept ne strer l struct 1, 2, 3 3 3 ssessm mester SE) hav	of limiting of limiting of limiting of limiting of limiting subset of	it state steel st ch as in rrelatio 5 ation (I. 0%, 309	for des ructura ndustri on Stre 6 SE), O % and f	sign of al mem al shed ngths) 7 7 ne Mic 50% w	steel st ibers an ls, steel 8 8 1 Seme eights	tructure nd buildi 9 ster Ex respect	es. ngs 10 aminat ively.	Le F V 11 ion (M Marks	vel / / 12 ISE)	De A) Ev C PSC 1 2 3 and one	scriptor oplying aluating reating 1 PSO 1 2 3 End
CO1 CO2 CO3 CO-PO Ma PO CO1 CO2 CO3 Assessments Two compor Semester Ex	Appl Calcu conne Desig etc. pping 3 1 3 s: Teac nents of aminat	y the constructions in steel : (Use : 2 3 :her As f In Section (Es Assess ISH	oncept he strer l struct 1, 2, 3 3 3 ssessm mester SE) hav sment E 1	of limiting of limiting of limiting of limiting of limiting subset of	it state steel st ch as in relation 5 ation (I. 0%, 309	for des ructura ndustria on Stre 6 SE), O % and f	al mem al shed ngths) 7 7 ne Mic 50% w	steel st abers an ls, steel 8 I Seme eights	tructure nd l buildi 9 ster Ex respect	ngs 10 aminat ively.	11 ion (M Marks	V 7 1 12 1SE)	Ay Ev C PSC 1 2 3 and one	scriptor oplying aluating reating 1 PSO 1 2 3 End

Title of the Course:	L	Т		Р	Cr
Professional Elective-I Construction Equipment and Techniques	2	1		0	3
<u>(40 v 511)</u> Desirable Courses: NII					
Desirable Courses: NIL					
Textbooks:					, nd
1. Kumar NeerajZha, "Construction Project Management",	Pearso	on In	dia	Educat	tion, 2^{10}
edition,2015 2 Robert Paurifov, Clifford I Schevnavder, AviadShapira	Poher	t Sch	mitt	"Con	struction
2. Robert Feathoy, Childred J. Schexhayder, AviadShapira,		t Sen	111111	., Con	struction
3. Sharma S.C. "Construction Equipment and Management". Khar	ina Pu	blishe	rs N	lew Del	hi. 1988.
References:		0110110	101		, 19001
1. Kumar Neeraj Zha, "Formwork for construction" McGraw-Hill, 3	^d repri	int, 20	19.		
Course Objectives :					
U					
1. This course aims at making civil engineering students who new	ed to u	inders	tand	l the bre	eadth and
depth of construction field for possible engagement.					
 To provide knowledge about efficient utilization of the equipment 	ent an	nd tecl	nnia	ues.	
			1		
Course Learning Outcomes:					
After the completion of the course the student should	be	Blo	om'	's Cogn	itive
able to	I	Level		Desci	riptor
CO1 Describe different construction equipment and plants.		2	1	Unders	tanding
CO2 Explain different construction techniques.		2	1	Unders	tanding
CO3 Choose suitable equipment, formwork and technique bas	ed	3		Ann	lving
on project requirements.		3		App	lying
CO-PO Mapping :					
PO 1 2 3 4 5 6 7 8 9 1	0 1	1 1	2	PSO1	PSO2
<u>CO1 3</u>		1	1	1	
<u>CO2</u> 2 2				2	2
CO3 2	,	2		2	
Assessments :					
Teacher Assessment:	on Ex	mino	tion	(MCE)	and ana
End Semester Examination (ESE) having 20% 30% and 50% weights	respe	amma ctivel		(MSE)	and one
Assessment	Ma	rks	у.		
ISE 1	1	0			
MSE	3	0			
ISE 2	1	0			
		U			
ESE	5	0			
ESE I and ISE 2 are based on assignment/declared test/quiz/seminar et	5 	0			

Title of the	Cours	e:]		Т	Р	(Cr
Profession	nal El	ective	e-I: St	ructu	<mark>ıral G</mark>	eolog	y 40	CV312			2	1	-		3
Desirable C	ourses	: Engi	neering	g Geol	ogy					·					
Textbooks:															
1. Gokhale	N. W.	, "The	ory of	Struct	ural Ge	eology'	", CBS	Publis	hers, I	Delhi, 2	019.	6			
2. Marianu 3. Philip K	еarly.]	ngs, s Keith A	A. Klei	ai Geo	rederic	k I. Vi	ine. "G	lobal 7	, inno Fectori	ics". Jo	$h_{1,201}$	Vilev	& Sor	ns I	td Third
Edition,2	2009.		I. IIIoj	, 10, 1	reactive		ine, e	noour .			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	viiey			<i></i>
References:															
1. Leo A. V	W. Wi	egman	, "Eart	h Stru	cture :	An In	troduc	tion T	o Stru	ctural C	Geolo	ogy A	nd Te	ctonics"	, W. W.
Norton &	& Com	pany, l	nc., 2"	^a ed. 2	004. n "Pa	io Mot	hoda	fCtm	tural (Coology	," Do	orcon	Educa	tion 201	17
2. Marshak 3. Gokhale	N.W.	. "A M	anual (of Prol	п, Das olems i	in Struc	ctural (Seolog	v". CB	S Publ	, Pe isher	arson s. Del	Educa	11011; 201 9.	17.
Course Obj	ectives	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;		01110				00000	<i>j</i> , ez	0 1 001		., 2			
1. Introduce	e stude	nts the	neces	sary ki	nowled	lge and	conce	pts of	structu	ral geol	logy	and g	eotecto	onics.	
2. Make the	e stude	nt able	e in rec	ognizi	ng, cla	ssifyin	g and	describ	oing va	rious g	eolog	gical s	tructu	res and s	tructural
2 Enable s	ena. tudents	to un	derctar	d real	orical	nrohle	m befa	ore und	ertakir	ng any c	vivil	engine	ering	project	
Course Loo	rning	Outoo	mos	iu geoi	ogical	produc			CITAKII		.1 V 11	ciigiik	Ling	project.	
Course Lea	rinng	Juico	mes:												
CO	After	the co	mnleti	on of t	he cou	rse the	studer	nt shau	ld he a	hle to		Blo	oom's	Cogniti	ve
	mu		mpicu			ise the	studer	it shou			L	evel		Descrip	otor
CO1	Desci	ribe th	e geot	ectoni	c espec	cially c	contine	ental dr	ift and	l plate		TT	1	Tradausta	n din a
COI	tector	nics.										11		Judersta	nunng
CO2	Expl	ainthe	mecha	nism c	of geol	ogical s	structu	res in t	he fiel	d.		П	τ	Understa	nding
															8
CO3	Appl	ythe 1	knowle	edge (of stru	uctural	geol	ogy to	o solv	e the		III		Applyi	ing
	probl	$\frac{\text{ems re}}{(\mathbf{U}_{ab})}$	$\frac{1}{1}$	$\frac{100}{200}$		on or ex	xcavat:	1000000000000000000000000000000000000							
CO-PO Ma	pping	: (Use	1, 2, 3	as Co	rrelati	ion Str	engtn	s)	0	10	11	1/			DEO1
PU CO1	1	2	3	4	5	0	/	8	9	10	11		<u> </u>	PS01	1
	1	2													1
	1 2	2												1	2
Assessment	<u> </u>	2												T	4
Teacher As	s . sessme	nt:													
Two compo	nents	of In	Semes	ter Ev	aluatio	on (ISI	E). Or	ne Mid	Seme	ester Ex	xami	nation	(MS	E) and o	one End
Semester Ex	aminat	tion (E	SE) ha	ving 2	0%, 30	0% and	50%	weight	s respe	ctively.			(
		Asses	sment						1		Ma	rks			
		ISI	E 1								10)			
		M	SE								30)			
		ISI	Ξ2								1()			
		ES	SE				1				50)			
ISE 1 and IS	E 2 are	e basec	l on as	signme	ent/dec	lared to	est/qui	z/semi	nar etc	•					
MSE: Asses	sment	is base	d on 5	0% of	course	conter	nt (Nor	mally	first th	ree moo	lules)			

Title of the	Cours	e:									L	Т	Р		Cr
Professional	al Elective-I Computational Methods and Optimization2103s (4CV313)2103													3	
<u>1 ecnniques</u>	<u>(</u> 4C V 3	13 <u>)</u>											-		-
Desirable (Courses	s: All	Course	es in M	lathem	atics fo	or UG								
Textbooks: 1. Cha 4th 2. Bab 3. Tah	pra S.C Editior ou Ram a Ham	C. and (n, 2002 . "Numo dy A., '	Canale erical N "Introd	R.P., " Aethod uction	Numer s", Pea to O.R	rical M arson, 1 , 6th	ethods st Edi edition	for En tion, 20 n, (PHI	gineers)10.)	s", Tat	a Mc	Graw I	Hill Pub	licat	ions,
References	:														
1. Bal 200 2. Jain 5th	gurusw 9. n M.K. Editior	amy, E , Iyeng 1, 2007	2. "Nun ar S. R	nerical ., Jain	Metho R. K.,	ods", Ta "Nume	ata Mc erical N	Graw-H Iethods	Hill Pu s", Nev	blishin v Age	g Co. Interr	Ltd., 2	2nd Edit l (P) lin	tion,	l,
Course Ob	jective	s :													
1. To j 2. To j field 3. To j 4. To d	provide provide d of eng provide deliver	e knowl e necess gineerin e pre-re know-l	ledge o sary kn ng. quisite how of	f nume owledg statisti typica	erical a ge of n ical kn l optin	pproac umeric owledg nizatior	h and s al tool ge to th n techn	signific s requin e stude iques a	ance o red for nts for pplical	f error analyz analyz ole to e	analy ing a zing t engine	vsis. nd solv he data eering	ving pro /results. problem	blen	ns in the
Course Lea	rning	Outcol	mes:										~ • •		
со	After	the co	mpletio	on of tl	ne coui	se the	studen	t should	d be ab	le to	Blo	om's (Cognitiv	ve	
			•								Lev	vel	Des	crip	otor
CO1	Sum Optin	marize mizatio	elemen n Tech	nts of (niques	Compu	tationa	l Meth	ods and	d		2		und	ersta	anding
CO2	Solve meth	e linear ods and	, nonlin d analy	near, an ze data	nd diff using	erentia variou	l equat s meth	ions by ods of :	regress	rical sion.	3,4		app anal	lyin; lyzir	g and 1g
CO3	Reco	ommend	d optim	al solu	tion to	linear	progra	mming	g proble	ems	5		eval	luati	ng
CO-PO Ma	pping	: (Use	1, 2, 3	as Cor	relatio	on Stre	engths)	-						DCC
PO CO1	1	2	3	4	5	6	7	8	9	10	11	12	PSC)1	PSO2
	3	3											_		3
CO2			3										3		3
Assessment	s:	1	I	1	1	I	1	1	<u>I</u>	1	1				l
Teacher As	sessme	ent:													
Two compo Semester Ex	nents c kamina	of In Se tion (E	mester SE) hav	Evalua ving 20	ation (1)%, 30	(SE), C % and	0ne Mi 50% w	d Seme veights	ster Ex respec	amina tively.	tion (MSE)	and one	Enc	đ
		Asses	sment							-	Marl	KS			
		ISI	E 1								10				
		M	SE								30				
							1								

Title of the	Course	:								Ι		Т	Р	C	Cr
Profession	al Ele	ctive	I Stru	uctura	al Me	chani	cs (40	CV314)		2	1	-		3
Desirable C	ourses	: Solid	Mecha	nics, S	tructur	al Ana	lysis								
Textbooks:															
1. Gere, J	. M. &	Weav	er, W.	,"Matri	ix Ana	lysis o	f Fram	ed Stru	ctures'	', CBS	Publi	ishers	and Dis	tributo	or, 2^{nd}
Edition	, 2004.														
2. Godbo	le, P. N	J., "Int	roducti	on to 1	Finite I	Elemen	t Meth	ods", I	K Inte	ernation	nal Pu	ıblish	ing Hou	se Pvt.	. Ltd.,
1 st Editi	on, 201	13.	a							ard					
3. Reddy,	C. S.,	"Basic	Struct	ural Ar	nalysis	', McG	raw H	III Educ	cation,	3 rd edit	10n, 2	.017.			
References:	h ant D	M_11			Dlach	Mal	a al E	and W	1.44 D.a	h art I	"Com		and Am	1: 4: /	
1. COOK, RO	bert D	., Maik	cus, Da	1V10 S., 12	Plesha	a, Micr	iael E.,	and w	ш, ко	bert J.,	Con	cepts	and Ap	plicatio	ons of
2 McGuire	Willi	am G	18 , 200 allagha	JJ. r Ricl	hard H	and	7iemie	n Por	ald D	"Mat	riv S	tructu	iral Ana	lveie"	Iohn
2. Wiley 2 ^t	, wim ^{id} Editi	on 200	anagna)()	ii, Kici		. anu	Ziciiii	ui, Koi		., wia		uuuu		iysis ,	JOIIII
3. Meghare	A. S.8	Deshr	nukh S	. K"N	Matrix	Metho	ds of S	tructura	al Anal	lvsis" (Charo	tar Pu	blishing	House	e. 2nd
Edition, 2	2016.		~	, _						-j~-~ -			8		-,
Course Obj	ectives	:													
1. To expla	in the c	oncept	of ma	trix me	thods of	of struc	tural a	nalysis.							
2. To inculo	ate app	olicatio	ons of f	lexibili	ity and	stiffne	ss metł	nods to	solve i	ndeterr	ninate	e struc	ctures.		
3. To illustr	ate the	conce	pt and a	applica	tions o	f finite	eleme	nt meth	od in s	structur	al eng	gineer	ing.		
Course Lean	rning (Outcon	nes:												
CO	After	the co	mpletic	on of th	e cours	se the s	student	should	be abl	e to		Bloo	m's Co	gnitive	
						<u>, , , , , , , , , , , , , , , , , , , </u>		1		• ••	Le	evel	De	script	or
CO1	Apply	y the co	oncepts	sof mat	trix me	thods c	ofstruct	ural an	alysis.			11	A	pplyin	ıg
CO2	Analy	y ze inde	etermin	ate str	uctures	by us	ing str	ucture	oriente	d and	Ι	V	A	nalyzin	ıg
02	eleme	ent app	roach.												
CO3	Calcu	ilate th	nenoda	l displa	acemer	nts and	memt	per force	es by	using	1	V	Ev	aluati	ng
	finite	elemei	nt meth	od.											
CO-PO Maj	oping :	(Use 1	l, 2, 3 a	as Cor	relatio	n Stre	ngths)	1	1						
PO	1	2	3	4	5	6	7	8	9	10	11	12	PSC	01 P	<u>PSO2</u>
C01	3														2
CO2		3													3
<u>CO3</u>		2			2										1
Assessments	5:														
Teacher Ass	essme		7 4	F	1		0	MUL							E al
1 wo compo Semester Ex	nents (aminati	or in a sion (ES	Semesto SE) hav	er Eva ving 20	1000 Nuation	(ISE) 6 and 5	50% we	NIIA S sights re	emeste especti	er Exai velv	minat	ion (1	MSE) ai	ia one	e End
Semester Ex	ammut	Assess	sment	ing 20	/0, 50/	o una c			ospeen	<u>very.</u> N	Aark	5			
		ISI	E 1								10	_			
		M	SE								30				
<u> </u>							L								
		ISE	Ξ2								10				

Title of the Course:	L	Т	Р	Cr
Environmental Engineering Laboratory (4CV 351)	0	0	2	1
Desirable Courses:	U	Ū	-	1
Engineering Chemistry Laboratory and Water supply and Treatment Technology				
Textbooks:				
1. Metcalf and Eddy, "Wastewater Engineering Treatment and Reuse", Tata M	McGra	aw Hill	l Public	ation, 5 th
Edition, 2014.			1111	1 1 . 1 .
2. Sawyer, C.N. And McCarty, P.L., "Chemistry for Environmental Engineers", "	Tata N	AcGrav	w-Hill P	ublishing
Company Emilied, 5° Edition, 2005.				
References:				
1. IS 3025 (Relevant parts), Bureau of Indian Standards.		1 - 1.4	0 01/	7
2. Standard Methods for the Examination of Water and Wastewater, APHA, 23 ^o F	Rev1se	ed Editi	ion, 201	/.
5. User manual of EFAINET and WATEROEWIS.				
Course Objectives :				
1. To provide the students hands-on practice for analyzingphysical, chemical a	and ba	acteriol	ogical q	uality of
water.				
2. To develop the skills required for applying knowledge to decide the chemical de	ose re	quirem	ents.	
3. To expose the students for computer applications in water network analysis.				
Course Learning Outcomes:				
	1	D1	· · · · · ·	:4:
CO After the completion of the course the student should be able to		BIOOIII	i s Cogn	luve
	I	Level	De	scriptor
Apply the analysis techniques to determine the physical, chemical and		III	Appl	ying
bacteriological water quality parameters.				
Design experiment/s to address real-life cases pertinent to water quality.		VI	Crea	ting
02				
Apply modern engineering tool/software to analyse water distribution		III	Appl	ying
system.				
Analyze and interpret the results to assess the quality of water for		IV	Anal	yzing
potability.				
CO-PO Mapping :				
PO 1 2 3 4 5 6 7 8 9 10 1	11	12	PSO1	PSO2
CO1 2 2			2	2
CO2 2 2				
CO3 2 2			2	
CO4 2			2	2

Title of the	Cou	rse:									L	Т	Р	Cr
Soil Mecha	nics	L I I nics Laboratory (4CV352) 0 0											1	
Desirable (Cour	ses: S	oil Mee	chanics										
Textbooks:														
1. Lar	nbe 7	.W.,	Soil Te	sting, V	Willey	Eastern	n Ltd., I	New]	Delhi, 19	78, 1st	Edition	•		
2. Mu	rthy,	V.]	N. S.,	"Text	book	of Soi	il Mec	hanic	s and H	Foundat	tion Er	igineer	ing Ge	otechnical
Eng	ginee	ring S	eries",	CBS p	ublish	ing; 1 ^{°°}	edition	, 2018	3.					
1 Boy	vlec	IFF	Inginee	ring Pr	operti	es of Sc	51 & TI	heir N	leasurem	ent Ta	ta - Mc	Graw_l	Hill Dub	lishing
1. D0.	4^{th}	Editio	n 1992	, ing i i	operu		n a n		leasuren	ient, 1a	ita - 1910	Ulaw-I	u 1111 1 u 0	nsning
2. Bea	uro d	of Indi	ian Sta	ndards,	I.S.2	720 (Va	rious se	ection	s / parts)					
Course Ob	iectiv	ves •		,					1 /					
1. To deve	elop	the sk	ills to t	find In	dex pı	operties	s and e	ngine	ering pro	perties	of soil	and th	e classif	fication of
SOIL.	•	~ 0												
Course Lea	irnin	ig Ou	comes	:										
СО	After the completion of the course the student should be able to Bloom's Cogniti													
			1]	Level	De	escriptor
CO1	Der eng	nonst ineeri	rate th ng proj	e exper perties	riment of soil	al data :	to asses	ss ind	ex prope	rties and	d	III	А	pplying
CO1	An	alyzea	ind inte	erpret tl	he beh	aviour	of soils	based	d on the			IV/	Δ.	nolyzing
02	exp	erime	ntal da	ta.								IV	A	liaryzing
CO-PO Ma	ppir	ng :		1	1									
PO	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1				3									3	3
CO2				3									3	3
Assessmen	ts :			_			_							
Lab Assess	men	t: The	re are f	our co	mpone	ents of l	ab asse	ssme	nt, LA1,	LA2, L	A3 and	Lab E	SE.IMP	: Lab
ESE is a sej	parate	e head	of pas	sing.		Cond	uotod b	• 7	Condu	untion of	nd Mor	ka Sub	mission	Morka
Assessment		I	baseu u	911		Conu	ucteu D	y	Cond		inu iviai	KS SUU	mission	IVIALKS
TA1		Lat	o activi	ties,	T	ah Cou	rsa Fac	ultv	During	Week	1 to We	ek 4		25
LAI		attend	lance, j	ournal	1			Juity	Submis	sion at	the end	of We	ek 5	23
		Lab	activi	ties					During	Week '	5 to We	ek 8		
LA2		attend	lance. i	ournal	Ι	Lab Cou	rse Fac	culty	Submis	sion at	the end	of We	ek 9	25
			J											
LA3		Lat	o activi	ties,	I	.ab Cou	rse Fac	ultv	During	Week	10 to W	eek 14		25
		attend	lance, j	ournal				J	Submis	sion at	the end	of We	ek 14	
1 1 5 6 5	L	ab Pe	rforma	nce and	d .	During Week 15 t						15 to Week 18		
Lab ESE	re	lated	docum	entatio	n	Lab Cot	irse fac	ulty	Submis	sion at	the end	of We	ek 18	25

Title of the	Course	e:									L	Т	Р		Cr
Estimating a	and Co	ontract	<u>ts (</u> 4CV	V321 <u>)</u>							3	0	0		3
Desirable C	ourses	: Bui	lding N	Iateria	ls and	Constru	uction,	Buildi	ing Pla	nning	and D	esign			-
Textbooks:															
1. Dutt 2016	a, B. 1 5.	N., "Es	stimatir	ng & C	Costing	in Ci	vil Eng	gineerir	ng," U	BS Pu	blishe	rs, 28	8th Rev	vised	Edition,
2. Bird	 i G.S	"Text	book o	f Estin	nating (& Cost	ing". I	Dhanapa	at Rai	Sons. 7	th Ed	ition.	2015.		
3. Patil	B. S.,	"Civil	Engine	eering	Contra	cts & E	Estimat	tes", Or	ient Lo	ongma	n Ltd.	, 4th 1	Edition	, 201	5.
References:										_					
1. I.S. o	code 12	200 (Pa	art I to	XXX)	B.I.S.,	Delhi									
2. "Sta	ndard S	Specifi	cation	Vol. I	& II", I	PWD N	Aahara	shtra.							
3. "D.S	5.R.", F	WD N	Iaharas	shtra fo	or the re	ecent y	ear.								
Course Obj	ectives	:													
1. To	provid	e stud	ents w	vith ne	cessar	y knov	wledge	and	skills	in spe	cifica	tion	writing	, est	imating,
2. To n	ng, me nake st	udents	of exec aware	of prev	of work vailing	s. profes	sional	practice	es.						
3. To a	cquain	t the st	udents	with e	stimati	on soft	ware.	1							
Course Lea	rning	Outcor	nes:												
G Q			1.1	6.1							Bloc	om's	Cognit	ive	
CO	After	the co	mpletio	on of th	ne cour	se the	studen	t should	l be ab	le to	Lev	el	De	scrij	otor
CO1	Expl	a in ele	ments	of estir	nating	as well	as coi	ntractin	g.		2		un	derst	anding
CO2	Cons of tra	truct s ditiona	specific al as we	ations ell as u	and qu nconve	antity ntional	sheets l civil	for vari works.	ious ite	ems	3, 6		ap	plyin eating	g,
CO3	Anal identi	yze rat ify an a	es and	estima iate m	te costs ethod f	s of dif for exec	ferent cution	civil wo	orks; a vil worl	nd k.	4		ana	alyzi	ng
CO-PO Ma	pping	: (Use	1, 2, 3	as Cor	relatio	on Stre	ngths)			1				
РО	1	2	3	4	5	6	7	8	9	10	11	12	2 PS	01	PSO2
CO1	3														
CO2		3											3		2
CO3			3								2		3		2
Assessments Teacher Ass	s : sessme	nt:													
Two compor Semester Ex	nents o aminat	f In Se ion (ES	mester SE) hav	Evalua ving 20	ation (I)%, 309	SE), O % and	ne Mi 50% w	d Seme veights	ster Ex respect	amina ively.	tion (N	MSE)	and on	e En	d
		Asses	sment]	Mark	5			
		ISI	E 1								10				
		M	SE								30				
		ISI	Ξ2								10				

Title of	f the Cou	irse:]	L	Т	Р		Cr
Foundation Engineering (4CV322)LIFCI2103															
Desirable Courses: Soil Mechanics, Soil Mechanics Lab															
Textbooks:															
 Dr. Arora K. R. ," Soil Mechanics and Foundation Engineering", Standard Publishers and distributors, 2nd edition, 1989. Gulhati S. K., Datta Manoj, "Geotechnical Engineering", Tata McGraw Hill Delhi, 1st 															
 edition, 2005. 3. Punmia B. C., Jain Ashok Kumar, Jain Arun Kumar, "Soil Mechanics and Foundations", Laxmi Publications Pvt Ltd, 16th Edition, March 2005. 															
References:															
 Bowles J.E., "Foundation Analysis and Design", McGraw Hill International Edition, 4th edition, 1988. Kaniraj S. R., "Design Aids in Soil Mechanics and Foundation Engineering", TMH New Delhi, 2004. Nayak N. V., "Foundation Design Manual", DhanpatRai and Sons, N Delhi. Tomlinson M. J., "Foundation Design and Construction", ELBS, 6th edition, 1995. Murthy V. N. S., "Soil Mechanics and Foundation Engineering", Saikripa Technical Consultants, Bangalore, 2007. Course Objectives : To provide the basic knowledge of the Foundation and interaction with soil. To impart the designing of foundation. 															
СО	After th	e comp	letion	of the	course	e the s	tudent	shoul	d be al	ole to	Le	vel	n's Cog Des	gnit scrij	ptor
CO1	Explain their su	1 the co itability	oncept	of bea	aring c	capacit	y, fou	ndatio	n type	s and	I	I	Unde	rsta	inding
CO2	Analys of giver	e Shall n soil sl	ow an ope co	d deep nfigur	o foun ation	dation	s and	evalua	ate sta	bility	Г	V	An	alyz	zing
CO3	Design parame	the Sh ters.	allow	and de	eep fo	undati	ons oi	n the b	oasis o	f soil	V	Ί	Cr	reat	ing
CO-PC) Mappi	ng :													
PO	1	2	3	4	5	6	7	8	9	10	11	12	PSO)1	PSO2
CO	1 3			ļ									3		3
CO2 3 3 3															
Assessments :															
Teacher Assessment:															
Two co	Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one														

Title of the C	ourse:									Ι		Т	Р	Cr
Waste Manag	gement	and Po	ollution	Contr	ol (4CV	V323)					2	1	0	3
Desirable Co	urses:	Water S	Supply	and Tre	atment	Techno	ology, E	Environr	nental S	Science				
Textbooks:														
1. Natha	nson, J	. A., "B	asic En	vironm	ental Te	chnolo	gy", PF	H Learr	ning pri	vate lim	ited, 5^{t}	ⁿ Editi	on, 2009.	
2. Modi	, Р. N., ^т , Ц С	Powe	water E	ngineei nd Tab	ing Sta	andard	BOOK F. "Envi	louse, 6	tol Eng	on, 2018 ineering	.'' Ма	Grow		Company
J. Feavy Indiar	n Editio	n 2017	D, K, a	nu ren	loballog	ious O	, LIIVI	Ionnen	tai Eiig	meenng	; , wie	Jiaw-		Company,
References:	Laitio	II, 2017	•											
1. Hamr	ner M, .	J and H	ammer	M, J, "	Water a	nd Wa	stewate	r Techn	ology",	PHI lea	arning	private	limited,	7th Edition,
2018. 2. "Man	ual on S	Sewera	pe and S	Sewage	Treatm	ent". C	PHEE	D. Mini	stry of	Housing	and I	Jrban .	Affairs De	evelopment.
Govt.	, of Indi	ia, New	Delhi,	2013.		, -		-,			,			г,
3. "Man	ual on	Munic	cipal S	olid W	aste M	Ianagei	nent",	CPHE	EO, M	inistry	of Ho	using	and Url	an Affairs
Devel	opment	, Govt.	, of Indi	ia, New	Delhi,	2016.								
Course Obje	ctives :													
1. To int	troduce	concep	ts of wa	stewate	er engin	eering,	solid w	aste pro	ocessing	g, air an	d noise	pollu	ion contr	ol.
2. To pro	ovide p	ertinent	knowle	edge for	the des	sign and	d operat	tion of v	vaste m	anagem	ent fac	ilities.		. 1
3. 10 pr	epare st	udents	for high	er stud	les and i	research	h in the	field of	waste	manage	ment a	nd pol	lution cor	trol.
		ients av			uvances	s III was	ste man	agemen	ι.					
Course Learn	ning Ou	itcome	s:											
		_					_					Bloo	m's Cogr	itive
CO	After	the com	pletion	of the	course t	he stud	ent sho	uld be a	ble to		Le	vel	Des	criptor
	Expla	in colle	ection a	nd cha	racterist	tics of	wastew	ater and	d solid	waste;				
CO1	monit	oring	air	qual	ity	and	meteo	rologica	al i	mpact;	T	T	Unde	rstanding
001	treatm	ent/pro	cessing	/contro	l techno	ologies	for pro	eventior	n of po	llution	-	-	e nue	
	associ	ated wi	th waste	ewater,	solid w	aste, ai	r and no	oise.	<u> </u>	1 1.1				
CO2	Solve	the pr	oblems	on wa	stewate	r and a	solid w	aste as	sociate	d with	n	т	٨	nluina
02	noise	nollutic	naracter	isues, c	contectio	m and t	reatme	nt/proce	essing; a	air and	11	1	Ар	prying
	Desig	n sewei	age and	waster	water tre	eatment	t systen	1						
CO3	Desig		uge une	i wuste	water it	cutificiti	i systen				V	Ί	Cr	eating
CO-PO Man	ping :													
PO	1	2	3	4	5	6	7	8	9	10	11	12	PSO	PSO2
CO1	3	_	-	-	-	•	-	•	-				2	3
CO2	-	3											3	3
CO3			3										3	3
005	CO3 3													
Assessments : Teachar Assessment:														
Assessments Teacher Asse	: essment	:	5	1				-	1			<u> </u>		1
Assessments Teacher Asse Two compon	ssment ents of	: In Sei	mester	Evaluat	tion (IS	E), On	e Mid	Semest	er Exa	minatio	n (MS	E) and	1 one En	d Semester
Assessments Teacher Asse Two compon Examination (essment ents of (ESE) h	In Ser aving 2		Evaluat % and :	tion (IS 50% we	E), On ights re	e Mid	Semest ely.	er Exa	minatio	n (MS	E) and	d one En	d Semester
Assessments Teacher Asse Two compon Examination (essment ents of (ESE) h	In Ser aving 2	mester 0%, 30 ^o	Evaluat % and £	tion (IS 50% we	E), On ights re	e Mid	Semest ely.	er Exa	minatio	n (MS Marks	E) and	d one En	d Semester
Assessments Teacher Asse Two compon Examination (ssment ents of ESE) h	In Ser aving 2 Asses	mester 0%, 30 ^o sment E 1	Evaluat % and £	tion (IS 50% we	E), On ights re	e Mid spectiv	Semest ely.	er Exa	minatio	n (MS Marks 10	E) and	l one En	d Semester

Title of the	Course	e:								1	<u> </u>	Т	Р		Cr
Design of Concrete Structures (4CV324) 2 1 - 3															
Desirable Courses: Solid Mechanics, Structural Analysis															
Textbooks:															
1. Punmia, 2013.	 Punmia, B. C. and Jain, A. K. "Limit state design of reinforced concrete", Laxmi Publication, 1st Edition, 2013. Shah, V. and Kama, S. "Limit state theory and design of reinforced concrete". Structure Public dimensional design of the state of the sta														
2. Shah, V Edition,	 Shah, V. and Karve, S. "Limit state theory and design of reinforced concrete", Structures Publications, 4th Edition, 2003. Varghese, P. C. "Limit State Design of Painforced Congrets Structures", Prontice Hell, 4th Edition, 2010. 														
3. Varghes	e, P. C.	. "Limi	it State	Design	n of Re	einforco	ed Con	crete S	tructur	es", Pr	entic	e Hall	4 th Edit	ion,	2010.
References:															
1. IS 456:	2000-	Code o	of Prac	tice for	r Plain	and R	einfor	ced Co	ncrete,	BIS ar	nd SI	9 34-1	987 – H	and	book on
concret	e reinfo	orceme	nt and	detaili	ng.										
2. Pillai, S	. V. an	d Men	on. D,	"Reinf	orced o	concret	e desig	gn", Tat	ta McG	raw Hi	ill Bo	ok Co	$5., 5^{\text{th}} \text{Ed}$	itior	n, 2006.
3. Ramam	ruthm,	<u>S. "De</u>	esign o	f reinfo	orced c	oncrete	e struct	tures", I	Dhanpa	at Rai I	Publis	shing,	17 th Edi	tion	, 2010.
1. To intro	oduce t	: he fur	ndamer	ntal co	ncepts	of lir	nit sta	te met	hod fo	or the	desig	n of	reinforc	ed o	concrete
compone 2 To impa	ents. rt know	مملمات	for stre	angth d	lotormi	nation	of diff	arant k	inds of	PC co	mnoi	nonte i	icina IS	code	2
3. To provi	ide kno	wledge	e for de	esign o	f the va	arious s	structu	ral mer	nbers in	n the b	uildir	ig syst	em as p	er IS	s. S code.
Course Lea	rning (Jutcor	nes:	<u> </u>								0 1			
												Blog	m's Co	onit	ive
СО	After	the co	mpletio	on of th	ne cour	se the	studen	t should	l be ab	le to	-			5	
											L	evel	De	escri	ptor
CO1	Apply concr	y the ete cor	conce _j nponer	pt of 1ts.	limit	state f	for de	sign o	f reinf	forced		III	Apply	ving	
CO2	Calcı	ılate th	ne strer	ngth of	reinfo	rced co	oncrete	membe	ers.			V	Evalu	atin	g
CO3	Desig	n vario	ous cor	nponer	nts of r	einforc	ed cor	ncrete st	tructure	es		VI	Creati	ng	
CO-PO Ma	pping	(Use	1, 2, 3	as Cor	relatio	on Stre	engths)							
РО	1	2	3	4	5	6	7	8	9	10	11	12	PSC)1	PSO2
CO1	3												1		1
CO2		3											2		2
CO3			3										3		3
Assessment	s :														
Teacher As	sessme	nt:													
Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.															
		Assess	sment							Ν	Mark	s			
ISE 1 10															
MSE 30															
ISE 2 10											30				

Title of the C	Course:									L		Т	Р		Cr
PE-II: Design of Hydraulic Structures (4CV331) 2 1 0 3															
Desirable Co	ourses:	Water	Resour	ces Eng	gineerir	ng									
Textbooks:									a						
1. Garg, 2. Modi 2008.	, S.K., " , P.N.," nia B C	'Irrigati Water	ion Eng Recour	ineerin ses Eng B "Irr	g", Kha gineerin tigation	anna pu g and V Water	iblisher, Vater Po Power I	, Delhi, ower E Engine	11 ^m Eongineeri	dition, 2 ng ", Sta axmi P	2014. andaro	d Book	House,	10 ^{ti} mite	^h Edition,
Edition, 2009.															
References:															
 Sharma, R.K, "Hydrology and Water Resources", Dhanpatrai and sons Delhi,8th Edition,2007 Sahasrabudhe, S.R., "Irrigation and Hydraulic structures", S.K Kataria and Sons Dehhi,3rd Edition,2011 Varshney and Gupta "Theory Design of Irrigation Structures", Vol. I, II, III, Nemechand and Brothers,6th Edition,2008 															
Course Obje	ctives :														
1. To in 2. To pr 3. To pr	troduce ovide s epare th	studen tudents ne stude	ts the c with ne ents for	oncepts ecessar higher	s of reso y skill f studies	ervoir p for the c and rea	lanning lesign c search i	g and i of vario n the fi	rrigatior us hydra eld of w	engine ulic str ater res	eering ucture ource	es. s and i	rrigation	n en	gineering.
Course Lear	ning O	utcome	es:										0		<u> </u>
												Blo	om's Co	ogni	tive
CO	After	the con	npletior	n of the	course	the stu	dent sho	ould be	able to		Le	evel	I	Desc	criptor
CO1	Expla canal,	in basic river tra	es of reating v	servoir vork ar	, gravit	y dam, r power	earth d	am, sp	illway, v	veirs,]	II	Ur	nder	standing
CO2	Apply proble	thekr ms ass	nowledg ociated	ge of h with.	nydraul	ic struc	ctures t	o solv	e/analyz	e the	III	, IV	Apply	ying	g Analyzing
CO3	Desig	n hydra	aulic str	uctures	s inirrig	ation er	ngineeri	ng.			V	VI		Cre	eating
CO-PO Map	ping : ((Use 1,	2, 3 as	Corre	lation S	Strengt	hs)								
РО	1	2	3	4	5	6	7	8	9	10	11	12	PSO	1	PSO2
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Two compon	ents of	In Se	mester	Evalu	ation (1	ISE), C	one Mie	d Seme	ester Ex	aminati	ion (N	MSE) a	and one	En	d Semester
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ISE 1: Assign	ment o	n prob	olem ne	rtainin	g to mo	dules 1	to 3 and	d evalu	ated by	test/ani	z/pres	entatio	n/oral.		
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MSE: Assess	ment is	based of	on 50%	of cou	rse con	tent (No	ormally	first th	ree mod	ules)		- 1			
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modules) covered after MSF	modules) covered after Mise.	modules) cove	ered afte	er MSE		.,. .	100 001			.,, wei	0			Smont	(norma	, 1	List unce				

Title of the	e Cours	se:	C		•	• (401100	()]	L	Т	Р	Cr	
Profession	al Elec	tive II	- Conc	erete E	inginee	ering (4	4CV33	<u>(3)</u>	-		2	1	-	3	
Desirable	Course	es: Ci	vil Eng	ineerii	ng Mat	erials									
Textbooks	:														
1. Gambh	ir, M. I	L., "Co	oncrete	Techn	ology"	, Tata	Mc Gra	aw Hill	Publis	hers, 2	2012.				
2. Nevelli	i, A.M.	, "Prop	erties o	of Con	crete",	Prenti	ce Hall	Publis	hers, 5	th Editi	on, 20	12.			
3. Shetty,	M. S.,	"Conc	rete Te	chnolo	ogy", S	. Chan	d and (Compa	ny Ltd,	New I	Delhi,	2014.			
References	References:														
1. Indian codes- IS: 456-2000, IS: 2250-1981, IS: 516-1959, IS: 5816 -1999, IS: 4031(Part 6) - 1988.															
2. Kumar Neeraj Jha, "Formwork for Concrete Structures", https://www.amazon.in/Formwork-Concrete- Structures Kumar Neeraj/dp/1250007332															
Structures-Kumar-Neeraj/dp/1259007332 3 Perkins P.H. "Renair Protection and Waterproofing of Concrete Structures" Elsevier Applied Science															
3. Perkins P.H., "Repair, Protection and Waterproofing of Concrete Structures" Elsevier Applied Science Publishers, 1986.															
4. Krishna	Publishers, 1986.4. Krishna Raju. N, "Design of Concrete Mixes", 2nd Edition, CBS Publishers and Distributors, 2009.														
	4. Krisnna Kaju. N, "Design of Concrete Mixes", 2nd Edition, CBS Publishers and Distributors, 2009.														
Course Ob	jective vide kn	es: owled	ge of a	dvance	ed tech	nique c	of maki	ng of c	concrete	e annl	ication	of co	ncrete t	o roads and	
industr	ial floo	rs, pre	cast co	ncrete,	formw	vork.	/r mun	ing of t		o, uppr	louion	01 00		o roudo una	
2. To imp	 To impart the knowledge of quality control and statistics 														
3. To illus	strate v	arious	technic	ques fo	or testir	ng and i	repair o	of conc	rete str	ucture	s.				
Course Le	arning	Outco	omes:												
				6.1						•		Bloor	n's Cog	nitive	
CO After the completion of the course the student should be able to Level Descriptor														scriptor	
Explain advanced technique of making of concrete application II Understanding													Unde		
	Expla	ain adv	CO1 Explain advanced technique of making of concrete, application II Understanding of concrete to roads and industrial floors, precast concrete,												
CO1	Expla of co	ain advoncrete	vanced to ro	ads ar	nd ind	ustrial	floors	, preca	ist con	crete,				erstanding	
C01	Expla of co formy Asses	ain adv oncrete work. ss qua	to ro ality	ads an	nd ind	ustrial throu	floors.	, preca uality	assess	crete,	1	I	E	valuate	
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CO1 CO2 CO3	Expla of co formy Asses techn Desig	ain advoncrete work. ss qua iques. gn the f	to ro ality	ads ar of co ork for	nd ind	ustrial throu ete strue	floors igh q ctures	, preca	assess	crete,	V V	/ T	E C	valuate reating	
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CO1 CO2 CO3 CO-PO M PO	Expla of co formy Asses techn Desig apping 1	ain advoncrete work. iss qua iques. gn the f	to ro ality formwc	ads ar of co ork for 4	nd ind oncrete concre 5	throu throu ete strue	floors, igh q ctures 7	ypreca uality 8	assess 9	crete, sment	V 11	/ /I 12	E C PSO	valuate reating 1 PSO2	
CO1 CO2 CO3 CO-PO M PO CO1	Expla of co formy Asses techn Desig apping 1 2	ain advoncrete work. s quaiques. gn the f	vanced to ro ality formwo	ads ar of co ork for 4	nd independent of the second s	ustrial throu ete struc 6	floors, ugh q ctures 7	uality 8	assess 9	crete, sment 10	V V	/ /I 12	E C PSO	valuate reating 1 PSO2 2 3	
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CO1 CO2 CO3 CO-PO M PO CO1 CO2 CO3 Assessment	Expla of cc formy Asses techn Desig apping 1 2	ain advoncrete work. ss qua iques. gn the f	ality of formwork of a second	ads an of co ork for 4	nd independent ind	ustrial throu ete strue 6	floors, agh q ctures 7	a lity	sst con assess 9	crete, sment 10	11	/ I 12	E C PSO	valuate reating 1 PSO2 2 3 3	
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CO1 CO2 CO3 CO-PO M PO CO1 CO2 CO3 Assessmen Teacher A	Expl: of cc formy Asses techn Desig apping 1 2 2 ssessm	ain advoncrete work. ss qua iques. gn the f g: 2 ent: of In S	<pre>vanced to ro ality formwc 3 3 3 3</pre>	ads ar of co ork for 4	oncrete concret 5	throu ete struc 6	floors, agh q ctures 7	a Semijaria Semi	st con assess 9	crete, sment 10	11 ation (/ 12 MSE)	E C PSO	valuate reating 1 PSO2 2 3 3 5 End	
CO1 CO2 CO3 CO-PO M PO CO1 CO2 CO3 Assessmen Teacher A Two compo Semester E	Expl: of co formy Asses techn Desig apping 1 2 2 ts : ssessm	ain advorter oncrete work. s quaining of the f s: 2 ent: of In S attion (H	ality formwo 3 3 3 emeste ESE) ha	ads ar of co ork for 4 	nd ind oncrete concret 5 5 uation 20%, 30	throu ete struc 6 (ISE), 0 0% and	floors, ugh q ctures 7 One M 1 50%	8 id Sem	9 ester E s respec	tively	11 ation (/ 12 MSE)	E C PSO and one	valuate reating 1 PSO2 2 3 3 e End	
CO1 CO2 CO3 CO-PO M PO CO1 CO2 CO3 Assessmen Teacher A Two compo Semester E	Expl: of co formy Asses techn Desig apping 1 2 2 ssessm conents cxamina	ain advoncrete work. is quaiques. iques. in the f is: 2 ent: of In S ation (I Asses	ality formwc 3 3 3 3 sment	ads ar of co ork for 4 r Evalu aving 2	nd independent of the second s	throu ete struc 6 (ISE), 0 0% and	floors, igh q ctures 7 One M 1 50%	8 id Sem weights	9 ester E s respec	tively	11 ation (/ 12 MSE)	E C PSO	valuate reating 1 PSO2 2 3 3 2 5 2 4 3	
CO1 CO2 CO3 CO-PO M PO CO1 CO2 CO3 Assessmen Teacher A Two compo Semester E	Expl: of co formy Asses techn Desig apping 1 2 2 ts : ssessm onents cxamina	ain advoncrete work. ss qua iques. gn the f g: 2 ent: of In S ation (I Assess IS	ality formwo 3 3 3 3 emeste ESE) has sment E 1	ads an of co ork for 4 or Evalu- aving 2	the independent of the independe	ustrial throu ete struc 6 (ISE), 0 0% and	floors, ugh q ctures 7 One M 1 50%	a semweights	9 ester E s respec	tively	11 ation (Marks	7 1 12 MSE)	E C PSO	valuate reating 1 PSO2 2 3 3 2 3	

Title of the	Course:			a t in a (71)					L	Т	Р	Cr
Mini Projec	:t 2 -Esth	mating	and Co	osung (<u>40 v 3</u>	<u>/1)</u>					0	0	2	1
Desirable C	Courses:	Buildin	g Mate	rials ar	nd Con	structio	n, Bui	lding P	lanning	g and D	esign			
Textbooks:														
1. Dut	ta, B. N.,	"Estima	ting &	Costin	g in Ci	vil Eng	ineerin	g," UB	S Publ	ishers, i	28th Re	evised H	Edition, 2	2016.
2. Birc	li G.S., "T	Fext boo	ok of Es	stimatir	ng & Co	osting"	, Dhana	apat Ra	i Sons,	7th Ed	ition, 2	2015.		
3. Pati	1 B. S., "C	Civil Eng	gineeri	ng Con	tracts &	& Estin	nates",	Orient	Longm	an Ltd.	, 4th E	dition, 2	2015.	
References	:													
1. I.S.	code 120	0 (Part I	to XX	X) B.I.	S., Del	hi								
2. "Sta	indard Sp	ecificati	on Vol	. I & II	", PWI) Maha	rashtra	•						
3. "D.	S.R.", PW	/D Mah	arashtra	a for th	e recen	t year.								
Course Obj	ectives :													
1. To a	levelop th	ne skills	require	d for f	ormula	ting spe	ecificat	ions an	d carry	ring out	rate ar	nalysis.		
2. To	provide s	tudents	hands-o	on prac	tice for	estima	ting co	ost of ci	vil wo	rks.				
3. To	impart tra	aining to	use co	mputer	r for es	timatin	g and c	osting.						
Course Lea	rning Ou	itcomes	:											
												Bloon	n's Cogn	itive
СО	After the	e comple	etion of	the co	urse th	e stude	nt shou	ld be a	ble to			Level	De	scriptor
CO1	Formula	te speci	fication	is and a	analyze	rates f	or diffe	erent ite	ems of	work	4,6		Anal creat	yzing, ing
CO2	Estimate	e costs o	f the di	fferent	civil w	orks					4		Anal	yzing
CO3	Demons	trate app	olicatio	n of co	mputer	for est	imatin	g and co	osting		3		App	ying
CO-PO Ma	pping : (Use 1, 2	, 3 as (Correla	ation S	trengtl	ns)						·	
РО	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1			3										2	2
CO2			3								2		1	2
CO3					2								2	

T	itle of the	Course	:									L	Т	Р	Cr	
N	<u>Iini Proje</u>	<u>et 3- Str</u>	uctural S	Steel D	esign &	& Drav	ving (4	CV372)			_	-	2	1	
D	esirable C	ourses:	Engineer	ring Me	echanic	s, Soli	d mech	anics, E	Design	of stee	l structu	ıres				
Т	extbooks:		-	-					_							
1	Duggal S 2014.	S. K., "I	imit stat	e desig	n of ste	eel stru	ctures"	, Tata I	McGra	w-Hill	Public	ations,	New D	elhi, 2r	d Edition,	
2	Shiyekar	, M. R.,	"Limit st	ate des	ign in s	structur	al steel	", PHI	earnin	g Pvt.	Ltd Puł	olicatio	ns 2nd I	Edition	2013.	
3	Subrama	nian N.,	"Design	of steel	l struct	ures", (Oxford	Univer	sity Pr	ess, 20	10.					
R	eferences															
1	Dayaratr	am, P.,	"Design of	of steel	structu	ires", S	. Chanc	d Public	ation,	New I	Delhi, 20	008.				
2	Gaylord,	Edwin	and Gayl	ord, Ch	arles, '	'Design	n of ste	el struc	tures",	Tata N	AcGraw	7 Hill P	ublishir	ng Com	pany Ltd.,	
~	New De	lhi, 3rd	Edition, 2	2010.	C	1.0			12	1 10	075 10	07	. 1 . 7	C 1	(D)	
3	IS 800-2	gn Loads (other than earthquake) for building structures, Bureau of Indian Standards, New Delhi.													of Practice	
1	For Design SD : $6(1)$	(other than earthquake) for building structures, Bureau of Indian Standards, New Delhi. 1998, Hand Book for Structural Steel Sections.														
4	Ourse Obi	ectives	1998, Hand Book for Structural Steel Sections.													
1	To imp	ectives	• nowledge	of anal	lvsis ar	nd desig	on of va	arious s	eel me	mhers	and the	ir con	nections			
2	To demo	onstrate	the desig	n of pr	actical	steel st	ructure	s such a	s indu	strial s	heds st	eel bui	ldings e	tc		
3	To prov	ide the l	nowledg	e of det	tailing	of steel	structi	iral dra	vings.	burur b	11043, 50	eer eur	iungs e			
С	ourse Lea	rning C	outcomes	:	0				0							
	CO	A fton t		ation of	Stha ag	umaa th	o studo	nt shoul	dhaa	hla ta			Bloon	n's Cog	nitive	
	CO	Alter u	ie comple	etion of	the co	urse in	e stude	nt snou	d be a	die to			Level	D	escriptor	
	CO1	Estima	te variou	is types	s of loa	nds suc	h as Dl	, LL, V	VL etc	acting	on ste	el	IV	Δ	nalyzing	
	cor	structu	es.										1 4	23	naryzing	
	CO2	Calcul combin	ate designations of	gn forc loads ι	es in sing m	membe nodern	ers of tools.	steel s	tructui	res for	variou	15	V	E	valuating	
	CO3	Design	various	types of	of prac	ctical st	teel str	uctures	and d	evelop	detaile	ed	VI		reating	
	005	structu	al drawin	ngs.									•1	Ň	louting	
C	O-PO Ma	pping :	(Use 1, 2	, 3 as (Correla	ation S	trengtl	ns)		•						
	PO	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2	
	CO1														2	
	CO2		3			2									2	
	CO3		3	3										3	3	
L	ab Asses	sment:	•							•	1		L			
Т	here are f	our con	ponents	of lab	assess	sment,	LA1, 1	LA2, L	A3 ar	nd Lab	ESE.					
П	MP: Lab H	ESE is a	separate	e head	of pas	sing.										
	Assessme	ent	Base	ed on		Co	onducte	d by	Co	onducti	on and	Marks	Submis	sion	Marks	
	ΤΑΊ		Lab ac	tivities	,	Lob		Fooulty	Dur	ing V	Week	1 to	Wee	k 4	25	
	LAI		attendanc	e, jour	nal	Laux	Jourse	raculty	Sub	missio	n at the	end of	Week 5	5	23	
	LA2		Lab ac	tivities	,	Lab (Course	Faculty	Dur	ing V	Week	5 to	Wee	k 8	25	
			attendanc	e, jour	nal	240 (204150	- acuity	Sub	missio	n at the	end of	Week 9)		
	LA3		Lab ac	tivities.	,	Lab C	Course	Facultv	Dur	ing V	Veek	10 to	Week	14	25	
			attendanc	e, jour	nal			5	Sub	missio	$\frac{1}{1}$ n at the	end of	Week 1	4		
	Lab ES	E	ab Perton	mance	and	Lab (Course	faculty	Dur	ing V	Veek	15 to $and af$	Week	81	25	
		re	nated doc	umenta	uion				Sub	11115510	n at the	end of	week I	0		

	Cri	tical depth of open cut in cohesive soil.	
Mo	odul	e 6: Compressibility and Consolidation of soils	5 Hrs.
a)	Co	mpressibility: Definition, compressibility of laterally confined soils. Compressibility of sand	
	and	l clay.	
b)	Co	nsolidation: Terzaghi's theory of one dimensional consolidation, laboratory consolidation	
	tes	t, e-p and e-log p curves, determination of coefficient of volume compressibility, compression	
	ind	ex, coefficient of consolidation, degree of consolidation, time factor, Computations of	
	du	ation and magnitude for consolidation settlement.	
Mo	odul	e wise Outcomes	
At	end	of each module students will be able to:	
	1.	Explain the nature and analyze the engineering behavior of soil mass.	
	2.	Develop flow-net and analyze for quick condition, evaluate seepage quantity / seepage force	
		/ uplift pressure.	
	3.	Explain the Soil compaction methods and apply the laboratory results to interpret field	
		compaction.	
	4.	Analyze and interpret the shear strength parameters for soil.	
	5.	Analyse the earth pressure magnitudes and the depth of unsupported excavation in soils.	
	6.	Analyse degree of consolidation.	
Tu	tori	al	
On	e ho	ur per week per batch tutorial is to be utilized for problem solving to ensure that students	
hav	ve pi	operly learnt the topics covered in the lectures. This shall include assignment, tutorials, quiz,	
sur	pris	e test, declared test, seminar, final orals etc.	