# Walchand College of Engineering

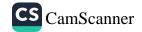
(Government Aided Autonomous Institute)

Vishrambag, Sangli. 416415



# Proposed Credit System for F.Y. M. Tech. (Civil-Structural Engineering)

2023-24





# Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

# Credit System for F.Y. M. Tech. Civil (Structural Engineering) Sem-I AY 2023-24

Sr. No.	Category	Course Code	Course Name	L	T	P	I	Hrs	Cr	MSE/LA1	ISE/LA2	ESE	Remark
			Professional Core (Theory	()									
1	PC	7IC501	Research Methodology and IPR	3	0	0	0	3	3	30	20	50	
2	PC	7ST501	Mechanics of Structures	3	0	0	0	3	3	30	20	50	
3	PC	7ST502	Theory of Elasticity and Plasticity	3	0	0	0	3	3	30	20	50	
4	PC	7ST503	Structural Dynamics and Earthquake Engineering	3	0	0	0	3	3	30	20	50	
			Professional Core (Lab)										
5	PC	7ST551	Modern Materials Lab	0	0	2	0	2	1	30	30	40	
6	PC	7ST552	Dynamics of Structures Lab	0	0	2	- 0	2	1	30	30	40	
7	PC	7ST553	Computer Aided Design Lab	0	0	2	0	2	1	30	30	40	_
			Professional Elective (Theo	ry)		7							
8	PE	Refer List	Professional Elective 1	3	0	0	0	3	3	30	20	50	
9	PE	Refer List	Professional Elective 2	3	0	0	0	3	3	30	20	50	
			Total	18	0	6	0	24	21				

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## Professional Elective Course List for F.Y. M. Tech. Civil (Structural Engineering) Sem-I AY 2023-24

Sr.No.	Track	Course Code	Course Name
		Professional E	Elective 1
1	Advanced Design of Structures	7ST511	Advanced Design of Reinforced Concrete Structures
2	Advanced Structural Analysis and Computational Methods	7ST512	Analysis and Design of Bridges
		Professional I	Elective 2
1	Advanced Design of Structures	7ST513	Computer Aided Design
2	Advanced Structural Analysis and Computational Methods	7ST514	Numerical Methods in Structural Engineering

#### Notes:

For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (LA1, LA2, ESE). The ESE is a separate head of passing.

For further details, refer to Academic and Examination rules and regulations.

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(Government Aided Autonomous Institute)

# Credit System for F.Y. M. Tech. Civil (Structural Engineering) Sem-II AY 2023-24

Sr. No.	Category	Course Code	Course Name		L	T	P	I	Hrs	Cr	MSE/LA1	ISE/LA2	ESE	Remark
			Professi	onal Core (Theor	ry)									
1	PC	7ST521	Theory of Plates and Shells		3	0	0	0	3	3	30	20	50	
2	PC	7ST522	Finite Element Method		3	0	0	0	3	3	30	20	50	
3	PC	7ST523	Advanced Earthquake Engineering		3	0	0	0	3	3	30	20	50	
			Profes	sional Core (Lab	)									
4	PC	7ST571	Structural Health Monitoring Lab		0	0	2	0	2	1	30	30	40	1
5	PC	7ST572	Finite Element Lab		0	0	2	0	2	1	30	30	40	
6	PR	7ST545	Seminar	-	0	0	2	0	2	1	30	30	40	
			Profession	nal Elective (The	ory)									
7	PE	Refer List	Professional Elective 3		3	0	0	0	3	3	30	20	50	
8	PE	Refer List	Professional Elective 4		3	0	0	0	3	3	30	20	50	
			C	pen Elective										
9	OE	Refer List	Open Elective		3	0	0	0	3	3	30	20	50	
				Total	18	0	6	0	24	21				

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(Government Aided Autonomous Institute)

## Professional Elective Course List for F.Y. M. Tech. (Structural Engineering) Sem-II AY 2023-24

Sr. No.	Track	Course Code	Course Name
	Profession	nal Elective 3	
1	Advanced Design of Structures	7ST531	Advanced Prestressed Concrete
2	Advanced Structural Analysis and Computational Methods	7ST532	Stability of Structures
3	Advanced Structural Analysis and Computational Methods	7ST533	Structural Health Monitoring and Smart Materials
	Profession	al Elective 4	
1	Advanced Design of Structures	7ST534	Advanced Design of Steel Structures
2	Advanced Structural Analysis and Computational Methods	7ST535	Design Optimization

## Open Elective Course List for F.Y. M. Tech. (Structural Engineering) Sem-II AY 2023-24

Sr.No.	Offering Programme	Course Code	Course Name
1	Environmental Engg.*	70E501	Solid Waste Management
2	Structural Engg.*	7OE502	Structural Health Monitoring
3 Design Engg.		7OE503	Industrial Product Design
4	Heat Power Engg.	7OE504	Waste to Energy
5	Production Engg.	7OE505	Advanced Production systems
6	Power System Engg.	70E506	Control Techniques for Electrical Drives
7	Control System Engg	7OE506	Control Techniques for Electrical Drives
8	Electronics Engg.	7OE508	Introduction to Embedded Systems
9	Computer Science & Engg.	7OE509	Machine Learning in Practice
10	Information Technology	7OE510	Machine Learning & Applications

#### Notes:

\*Open Elective offered by Civil (Structural Engg) Programme is allowed for students of all other Programmes (Except Environmental and Structural Engg. Programme)

For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (LA1, LA2, ESE). The ESE is a separate head of passing.

For further details, refer to Academic and Examination rules and regulations.

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			Y 2023-24	nomine)		
			se Information		190101	
Progra	amme	M. Tech. Structur				
	Semester	First year M. Tec				
Cours	e Code	7ST501				
Cours	e Name	Mechanics of Str				
Desire	d Requisites:	Solid Mechanics,	Structural analys	is, Structural Mechar	nics	
	aching Scheme		41 1000	Scheme (Marks)	т	otal
Lectu		MSE	ISE	ESE		100
Tutor	ial	30	20	50		100
			Cr	edits: 3		
		Cou	rse Objectives			~ .
1	To impart the know			ural analysis		
2	To provide knowled				of struct	ural
3	analysis	s to develop compu	ter programs by u	sing matrix methods	or struct	urai
	anarysis					
	Cou	rse Outcomes (CO	)) with Bloom's T	Caxonomy Level		
At the	end of the course, the			axonomy Level		
CO1	Apply advanced m				Apr	olying
CO2	Calculate forces ar			es		uating
CO3	Formulate program					
	field applications	,			Cre	eating
Modu	le	Modi	ule Contents			Hours
				the system of the second secon		110013
		Diagrams for Inde	terminate Struct			Hours
I	Concept of ILD	Diagrams for Inde , Muller-Breslau's p	terminate Struct	ures pplication for continu	uous	7
I	Concept of ILD, beams. ILD for	Diagrams for Inde , Muller-Breslau's p two hinged arches	terminate Struct		uous	
	Concept of ILD, beams. ILD for Beams Curved	Diagrams for Inde , Muller-Breslau's p two hinged arches in Plan	terminate Struct principle and its a	pplication for continu	s	7
I	Concept of ILD, beams. ILD for Beams Curved Structural beha	Diagrams for Inde , Muller-Breslau's p two hinged arches in Plan aviour of curved	terminate Struct principle and its a beam. Analysi		s	
	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be	Diagrams for Inde , Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan	terminate Struct principle and its a beam. Analysi	pplication for continu	s	7
	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns	Diagrams for Inde , Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan	terminate Struct principle and its a beam. Analysi bent beams.	pplication for continu	and	7
П	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge	Diagrams for Inde , Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan	terminate Struct principle and its a beam. Analysi bent beams.	s of determinate	and ntial	7
	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan ometric and mate	beam. Analysi beam beams.	s of determinate , governing different loadings	and ntial	7
П	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan ometric and mate visis of beam-colurons. Buckling of	beam. Analysi beam beams. beat beams.	s of determinate governing differed different loadings cal and unsymmetr	and ntial and ical,	7
П	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan ometric and mate visis of beam-colurons. Buckling of	beam. Analysi beam beams. beat beams.	s of determinate , governing different loadings	and ntial and ical,	7
П	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions tiffness and can	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan cometric and mate rsis of beam-colur ons. Buckling of	beam. Analysi beam beams. beat beams.	s of determinate governing differed different loadings cal and unsymmetr	and ntial and ical,	7
П	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and can various loads Beams on Elast Basic concept of	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan cometric and mate visis of beam-colur ons. Buckling of try-over factors for ic Foundations	beam. Analysi beam heams. beam beams. rial nonlinearity mns subjected to frames—symmetri beam-columns,	s of determinate governing differed different loadings cal and unsymmetr	and ntial and ical, ie to	7
III	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and can various loads Beams on Elast Basic concept of and finite beams	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan cometric and mate visis of beam-colur ons. Buckling of rry-over factors for ic Foundations beams on elastic for	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns,	pplication for continues  s of determinate  , governing different loadings cal and unsymmetrixed end actions du	and ntial and ical, ie to	7 7 6
II III	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and can various loads  Beams on Elast Basic concept of and finite beams  Matrix method	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan cometric and mate visis of beam-colur ons. Buckling of rry-over factors for ic Foundations beams on elastic for of analysis: Flexib	beam. Analysis, bent beams.  erial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis	pplication for continues  s of determinate  , governing differed   different loadings   cal and unsymmetr   fixed end actions du  s of infinite, semi-infi	and ntial and ical, ie to	7 7 6
III	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and can various loads Beams on Elast Basic concept of and finite beams Matrix method Element approace	Diagrams for Inde, Muller-Breslau's patwo hinged arches in Plan aviour of curved eams curved in plan cometric and mate axis of beam-colurons. Buckling of arry-over factors for ic Foundations beams on elastic for of analysis: Flexible, flexibility matric	beam. Analysis, bent beams.  erial nonlinearity mns subjected to frames—symmetric beam-columns, bundation, analysis bility Method x, equivalent load	pplication for continues  s of determinate  , governing different loadings cal and unsymmetrixed end actions du	and ntial and ical, ie to	7 7 6
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II IV V	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and car various loads Beams on Elast Basic concept of and finite beams Matrix method Element approact frames and truss Matrix method	Diagrams for Inde Muller-Breslau's p two hinged arches in Plan aviour of curved eams curved in plan cometric and mate visis of beam-colur ons. Buckling of rry-over factors for ic Foundations beams on elastic for of analysis: Flexib ch, flexibility matric es, lack of fit, temp of analysis: Stiffne	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis bility Method x, equivalent load erature stresses ess Methods	pplication for continues  s of determinate  , governing different different loadings cal and unsymmetr fixed end actions du  s of infinite, semi-infinite, semi-infinite, semi-infinite, applications to beau	and ntial and ical, ie to inite	7 7 6
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III  IV  V  VI	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and car various loads Beams on Elast Basic concept of and finite beams Matrix method Element approach frames and truss Matrix method Element approach frames and truss Matrix method Element approach frames and truss	Diagrams for Inde, Muller-Breslau's patwo hinged arches in Plan aviour of curved eams curved in plan cometric and maters of beam-colurons. Buckling of arry-over factors for ic Foundations beams on elastic for of analysis: Flexibility matrix es, lack of fit, temporal factors for the column of analysis: Stiffner, stiffness matrix es, direct stiffness real Ratwani M.M., "A	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis bility Method ax, equivalent load erature stresses ess Methods are equivalent loads to the columns are the	pplication for continues  s of determinate  , governing different loadings cal and unsymmetre fixed end actions du  s of infinite, semi-infinite, semi-infinite, semi-infinite, applications to beautiful to beautifu	and ntial and ical, ic to inite ams,	7 7 6 6 7
III IV V	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and can various loads Beams on Elast Basic concept of and finite beams Matrix method Element approach frames and truss Matrix method Element approach frames Alement Element approach frames Alement Element Alement Element Alement Element Alement Element Elem	Diagrams for Inde, Muller-Breslau's patwo hinged arches in Plan aviour of curved eams curved in plan cometric and materies of beam-colurons. Buckling of arry-over factors for ic Foundations beams on elastic for of analysis: Flexibility matrixes, lack of fit, tempof analysis: Stiffnesh, stiffness matrixes, direct stiffness real Ratwani M.M., "AP. & Gere. J. M., "T	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis bility Method ax, equivalent load erature stresses ess Methods are equivalent loads to the columns are the	pplication for continues  s of determinate  , governing different loadings cal and unsymmetre fixed end actions du  s of infinite, semi-infinite, semi-infinite, applications to beautions  s, applications to beautions	and ntial and ical, ic to inite ams,	7 7 6 6 7
III  IV  V  VI  1 2	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and car various loads Beams on Elast Basic concept of and finite beams Matrix method Element approach frames and truss Matrix M	Diagrams for Inde, Muller-Breslau's patwo hinged arches in Plan aviour of curved eams curved in plan cometric and materies of beam-colurons. Buckling of arry-over factors for ic Foundations beams on elastic for of analysis: Flexibility matrices, lack of fit, tempof analysis: Stiffnesh, stiffness matrix es, direct stiffness reaction, 1985	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis beility Method erature stresses ess Methods, equivalent loads method  Textbooks Advanced Theory of Elastic Scheory of Elastic Scheoric principle and its analysis beam-columns, bundation, analysis bundation, ana	pplication for continues  s of determinate  , governing different loadings cal and unsymmetre fixed end actions du  s of infinite, semi-infinite, semi-infinite, applications to beautions  of Structures", Khanna in Stability", Tata McGr	and ntial and ical, ic to inite ams, ams,	7 7 6 6 7 hers, 2008 Publishing
III  IV  V  VI	Concept of ILD, beams. ILD for Beams Curved Structural beha indeterminate be Beam Columns Concept of ge equation. Analy support conditions stiffness and car various loads Beams on Elast Basic concept of and finite beams Matrix method Element approach frames and truss Matrix M	Diagrams for Inde, Muller-Breslau's patwo hinged arches in Plan aviour of curved earns curved in plan cometric and materies of beam-colur ons. Buckling of try-over factors for ic Foundations beams on elastic for of analysis: Flexibility matrices, lack of fit, tempof analysis: Stiffnesh, stiffness matrix es, direct stiffness response in Ratwani M.M., "A P. & Gere. J. M., "The Edition, 1985 Weaver. W., "Matrices arches in Muller in Ratwani in Ratwan	beam. Analysis, bent beams.  rial nonlinearity, mns subjected to frames—symmetric beam-columns, bundation, analysis beility Method erature stresses ess Methods, equivalent loads method  Textbooks Advanced Theory of Elastic Scheory of Elastic Scheoric principle and its analysis beam-columns, bundation, analysis bundation, ana	pplication for continues  s of determinate  , governing different loadings cal and unsymmetre fixed end actions du  s of infinite, semi-infinite, semi-infinite, semi-infinite, applications to beautiful to beautifu	and ntial and ical, ic to inite ams, ams,	7 7 6 6 7 hers, 2008 Publishing

4	Krishna Raju N., "Advanced Mechanics of Solids and Structures", McGraw-Hill
	Education, 08-Nov-2018 - Technology & Engineering
-	References
1	Mcquire and Gallghar. R. H. "Matrix Structural Analysis", John Wiley, 2 <sup>nd</sup> Edition, 2000
2	Beaufit F.W. et al. "Computer Methods of Structural Analysis", Prentice Hall, illustrated,
3	John L. and Meek, "Matrix Structural Analysis", McGraw Hill Book Company, illustrated, 1971
4	Pandit G. and Gupta S., "Structural Analysis - A Matrix Approach2008", McGraw Hill Education; 1st edition
	Useful Links
1	https://nptel.ac.in/courses/105/105/105105108/
2	https://nptel.ac.in/courses/105/101/105101086/
3	http://engineeringvideolectures.com/course/281?pn=0#videolist
4	https://nptel.ac.in/courses/105/105/105109/

			CO-PO Ma	pping						
	Programme Outcomes (PO)									
	1	2	3	4	5	6				
CO1			2	2		3				
CO2			2	2		3				
CO3	1		2			2				

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

		W		ege of Engine			
-			(Government	Aided Autonomous	Institute)		
			Col	AY 2023-24 urse Information			
Progr				ural Engineering			
Class,		The second secon	First year M. Te				
Cours			7ST502	en., seni. i			
Cours	-		And in contrast of the last of	icity & Plasticity			
Name and Address of the Owner, where the		quisites:	Solid Mechanic				
-					Colores (Marks)		
	and the same of th	ng Scheme 3 Hrs./week	MSE	ISE	n Scheme (Marks) ESE	Total	
Lectu Tutor		3 Hrs./week	30	20	50	100	
Lutor	ıaı		30		redits: 3	100	
			Co	urse Objectives			
1				theories of ela	sticity and apply them	to solve 2D	
	Car	tesian and pol	ar problems			<b>a</b> D	
2		impart knowle blems	dge of various th	neories of torsion	and apply them to solve	2D torsiona	
3	To		edge of various th	neories of plastic	behaviour and apply ther	n to solve 2D	
	Pict		rea Outcomes (C	O) with Bloom's	Taxonomy Lovel		
At the	end o		e students will be		Taxonomy Level	A. Maria and an	
CO1					city for 2-D Cartesian and	Ι	
	Pola	ar problems				Applying	
CO2		alyse torsional polems.	problems and app	rise various theori	es to solve 2-D torsional	Analysing	
CO3			material yielding	and plastic behavio	our of structures.	Evaluating	
Modu	ile		Mod	lule Contents		Hours	
1	I S a	Stress & Strain and three dime Strain displace	Elasticity: Body, Transformation ensions in Cartes	of stress, Equilisian co-ordinates, Compatibility	force, Stress at a point, brium equations in two, Boundary conditions, equations, Generalized	8	
II	c f c	ompatibility, unction appro ylinder under	n Cartesian co-o Plane stress an ach, 2D probler	d Plane strain	ons of equilibrium and problems, Airy stress rdinates, Thick walled concentration.	8	
III	Torsion Introduction to Torsion: St. Venant's theory, Warping function,						
IV	P In so	Plasticity ntroduction to olids, Similar	plasticity: Plast ities & differer	ic behavior of sonces when com	olids, Idealized plastic pared with elasticity, nodel for elasticity and	8	



v	Hydrostatic stresses Hydrostatic stresses, Deviatoric stresses, Invariants of deviatoric stresses, Yield criteria, Graphical representation of yield criteria, Flow rules, Stress-strain relation for perfectly plastic flow, Elastic-plastic analysis of beam in bending, Thick-walled cylinder and circular shaft under torsion.	7
VI	Plastic analysis of structures Plastic analysis of structures – plastic hinge, Moment – curvature relation, Shape factor, Upper bound, lower bound & uniqueness theorems, Methods of analysis to find collapse loads for beams and frames.	7
	Textbooks	
1	Ameen M., "Computational Elasticity", Alpha Science International, Edition, 2008	1st Revised
2	Singh Sadhu, "Theory of Elasticity", Khanna Publishers, 4th Edition, 201	2
3	Singh Sadhu, "Theory of Plasticity", Khanna Publishers, 3rd Edition, 201	3
	References	. TI'll 11
1	Timoshenko. S & Goodier. J. N., "Theory of Elasticity", McGrav Company, 3 <sup>rd</sup> Edition, 2010	
2	Chakrabarthy. J, "Theory of Plasticity", Tata McGraw-Hill P. Co. Ltd., 2007.	2 <sup>nd</sup> Edtion,
3	Johnson W. and Mellor P. B., "Engineering Plasticity", Van Nostran London, 1973.	d Reinhold,
	Useful Links	

	NAME OF STREET		CO-PO Ma	pping						
	Programme Outcomes (PO)									
	1	2	3	4	5	6				
CO1		3								
CO2		2								
CO3	2									
The streng	th of mappin	g is to be writte	n as 1: Low, 2: N	ledium, 3: High						
		must map to at								

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

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For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Course Contents for M. Tech Programme, Applied Mechanics Department, AY 2023-24

CS CamScanner

		Walchand Coll (Government	Aided Autonomous			
			AY 2023-24			
			urse Information			
	amme		tural Engineering			
	Semester		ech., Semester I			
	e Code	7ST503		les Engineering		
	e Name		mics and Earthqua			
Jesire	d Requisites:	Engineering Me	echanics, Engineer	ing Geology		
Te	aching Scheme		Evaminatio	n Scheme (Marks)		
Lectur		k MSE	ISE	ESE	To	tal
Tutor		30	20	50	10	
utor				redits: 3		
				reditor b		
		Co	ourse Objectives		LINE PLAN	
	To impart know			and its effect on Civil E	ngineeri	ng
1	structures		.e	over and the second	5	
2	100000000000000000000000000000000000000	ente to solve problem	s on dynamics of	structures in SDOF and	MDOE	System
						-
3		ional and global code		esign of earthquake resis	tant stru	ctures
	and implementa	tion of same for seisi	nic retroitt.			
		Course Outcomes (C	(O) with Plaamia	Toronomy Lovel	D. C. C.	
1 + +ba		, the students will be		Taxonomy Level		
CO1				for development of		
COI	response spectra	-	its characteristics	for development of	App	lying
CO2			hiected to earthqu	ake loads for various		2 22
COZ	building config		ojected to earthqu	iake loads for various	Ana	lyzing
CO3		hods of earthquake re	esistant and Structu	ıral R	Cre	ating
COS	roimulate met	nous of cartifquake re	Sistant and Struct	nai K	Cit	ating
Modu	le	M	odule Contents			Hour
		Aspect in Earthqua		- V. Son Say . De l'Espain a sonne de		
I	Characteristics Magnitude,	s of Earthquakes, Elas Intensity, magnitud	stic rebound theory le relationship,	y, Measurement of eartho Seismograph, Liquef ce of various structures	action.	6
II	SDOF System Earthquake res Concept of ea Construction of	arthquake response so of design response sp uivalent static metho	F systems and its a spectrum, Tripartite ectrum. Use of Co	pplication in dynamic an te plot of response spe ode Spectra to find response near and its distribution	ctrum, onse of	7
III	MDOF Syste Earthquake res	ms and Dynamic Ar	OF systems, Modal	analysis, Participation f	actors,	6
IV	ERD of Struc Concept of ea ductility. Over	ture and Roll of Due rthquake resistant der strength, Response	ctility sign, Objectives, I reduction factor, I	Ductility and different ty Ductile Detailing of strudesign, Building configu	uctural	7
		of Lateral Forces and			ration.	
v	Floor diaphrag Torsionally un	gm, Rigid floor diap n-coupled and couple	hragm, Center of ed systems, Latera	mass and center of still load distribution, Min Base shear, Applicat	nimum	7

1818123



VI	Differer modelin	nt lateral long. Concepts	and Retroficad resisting of structural with advanced	systems, Con Control, Energy	figuration of dissipating de	tall structures vices. Retrofit	with issues 6	
	T une une	i cordirono :						
				Textbooks				
1	Clough R. W. and Penziene Joseph, "Dynamics of Structures", McGraw Hill Education (ISE Editions); International 2 Revised edition August 1993.							
2	Chopra A.K., "Dynamics of Structure: Theory & Application to Earthquake Engineering", Pearson Education Lim., 4th Edition, 2014							
3	Agarwal P. and Shrikhande M., "Earthquake Resistant Design of Structures", PHI Learning Pvt. Ltd., 2006.							
		P 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		References				
1		vid, "Earthquidention, 2006.	uake Design	Practice for Bui	ldings", Thoma	as Telford Publ	ication Londo	
2	2nd Edi	tion, 1987.		tant Design for l				
3	Manual 2000.	of "Earthqu	uake Resista	nt Non-Enginee	ring Construc	tion", Univers	ity of Roorke	
	MORE A		7.11	Useful Links				
1	https://n	ptel.ac.in/co	urses/105/10	1/105101209/	11 15 15 15 15 15 15 15 15 15 15 15 15 1			
2				4/105104200/				
3	https://n	ptel.ac.in/co	urses/105/10	8/105108204/				
4				7/105107204/				
				CO-PO Mappi	ıg			
				Programme	Outcomes (Po	O)		
		1	2	3	4	5	6	
	01		1	2	2	2	2	
	CO2	2		3	2			
	:03					3	3	

#### Assessment

The assessment is based on MSE, ISE and ESE.

Each CO of the course must map to at least one PO.

MSE shall be typically on any three modules out of six.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

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				ed Autonomous Insi	titute)	
				2023-24		
			promise the second contract of the second con	Information		
	amme		M. Tech. Structu			
	Semeste	•	First Year M. To	ech., Semester I		
	e Code		7ST551			
and the second second	e Name		Modern Materia			
Desire	ed Requis	ites:	Concrete Techno	ology		
	Touching	Scheme		Evamination	Scheme (Marks)	
Practi		2 Hrs/ Week	LAI	LA2	Lab ESE	Total
	ction	21113/ WCCK	30	30	40	100
micro	ction		30		redits: 1	
			Cours	se Objectives		
1			necessary knowle		& techniques of Mix de	esign of
1	advance	ed types of concr	ete.			
2	-	ride the technica	l information of m	odern concrete su	ch as SCC, RMC, FRP	, FRC and HPC
	etc.					
3					for repair and rehabili	
4	To imp				d in non-destructive tes	ting of concrete
	1 - 64		Outcomes (CO)		ixonomy Level	
			dents will be able		rious grades	Analyzin
COL			r high performance y properties of va			Evaluatin
CO2			vibration measure			Creating
COS	Design	experiments for	violation measure	cincins & data acq	disition system.	Creating
		I	ist of Experimen	ts / Lab Activitio	s/Topics	
-						
List o	f Lab Ac	tivities (Any 8):				
				s of elasticity of co	oncrete and strain meas	surement.
2	. Evalua	tion of flexural s	trength of concret	e.		
3	. Evalua	tion Mix Design	by I.S. Code metl	nod (with OPC Ce	ement).	
		_	by I.S. Code metl			
		_	by I.S. Code meth		•	
			ng curve of Mix a			
		estructive testing	_	ggregate & sieve	anarysis.	
_		_	on's ratio of concr	-4-		
8					· · · ·	
			rties of SCC, RM			
1	u. Experi	ments based on \	libration measure	ments and data ac	quisition system.	
				7		S/019/07
	Gas	nhhir M. I. "Co		extbooks	Hill Dublications 3rd	Edition 2004
	Lia				Hill Publications, 3rd lations, Latest Edition 2	
1 2		,, conc				
1 2 3	She Sar	thakumar A. R., Edition 2006	"Concrete techno	logy", Oxford Hig	gher Education/Oxford	University Pre

Lue F.M., "Chemistry of Cement and Concrete", Edward Arnold, 3rd Edition, 1970.

Neville A. M., "Concrete Technology", Addision Weslley. Neville A.M., Properties of Concrete, Pitman, 1968.

2

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	The state of the state of		CO-PO Map	ping			
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
COI	2	2					
CO2		3					
CO3		3		1	2		

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment
There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing (min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
LAI	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

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			the state of the s	2023-24	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Hilli	No.		THE RESERVE OF THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER.	Information		
Progra	amme		M. Tech. Structura			
	Semester		First Year M. Tec			A
The same of the	e Code	-	7ST552	,		
Cours	e Name		Dynamics of Struc	ctures Laborato	ry	
Desire	d Requis	ites:	Structural Dynami			•
	Teaching				n Scheme (Marks)	
Practi		2 Hrs/ Week	LA1	LA2	Lab ESE	Total
intera	ction		30	30	40	100
					redits: 1	Marie Coletti and Coletti
			Course	Objectives		: CCt tumos o
1	problem	s.			nic loading by solving d	
2		rate behavior of s by conducting		er various dyna	mic loading by solving d	ifferent types
3				outed mass mod	lel by conducting experin	nents.
			Outcomes (CO) w			
At the	end of the		dents will be able to			
COI			amics to solve SDO		ystems.	Applying
CO2	Apprais	e behavior of di	screte systems.			Evaluatin
CO3	Evaluat	e behavior of	continuous system	n and judge	effect of sloshing and	d Evaluating
COS	liquefact	ion.				
		L	ist of Experiments	/ Lab Activition	es/Topics	
					4.5	
List of	Lab Act	ivities: (Any 8 e	experiments in add	ition to assigni	ments)	
1.	Dynami	cs of a three stor	ried building frame	subjected to nar	rmonic base motion.	onic base
2.	motions		ed building frame w	itin pianar asym	nmetry subjected to harm	ionic base
2			ied building frame	subjected to per	riodic (non-harmonic) ba	se motion
			secondary system.	subjected to per	Todic (non-narmonic) of	se motion.
		cs of a vibration				
				vith and withou	t an open ground floor.	
	•		nd two-span beams.			
			es in rectangular wa			
9.			ng rigid bodies unde			
10			ion, liquefaction an			
190			Tex	tbooks		
	Clou	gh R. W. and P	enziene Joseph, "D	ynamics of Str	uctures", McGraw Hill	Education (IS
1			al 2 Revised edition			
2	Craig	Roy, "Structura	al Dynamics", John	Willy & Sons.		
3	Chop	ra A.K., "Dyna	amics of Structure: im., 4th Edition, 201	Theory & Ap	oplication to Earthquake	e Engineering
				erences		
1	Muh	onadhvav "Dv		erences s". Ane Books	Pyt. Ltd., 2nd Edition, 20	10
1 2			namics of Structure	s", Ane Books	Pvt. Ltd., 2 <sup>nd</sup> Edition, 20 Distributors, 5 <sup>th</sup> Edition	
1 2 3	Paz N	Mario, "Structura	namics of Structure al Dynamics", CBS	s", Ane Books Publishers and	Pvt. Ltd., 2 <sup>nd</sup> Edition, 20 Distributors, 5 <sup>th</sup> Edition Earthquake Engineering	, 2003.

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			CO-PO Map	ping			
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
COI				3	2		
CO2				2	3	1	
CO3				3	1	1	

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		Wald	chand College (Government Aid			
				2023-24	isinine)	
			THE RESIDENCE OF THE PARTY OF T	Information		NE TRUE
Progr	amme		M. Tech. Structu			
Class,	Şemester		First Year M. Te			
the state of the s	e Code		7ST553			
	e Name		Computer Aided			
Desire	ed Requisi	tes:	Structural Analy Dynamics and E		Concrete Structures and Speering.	Structural
	Teaching	Scheme		Examination	on Scheme (Marks)	
Practi		2 Hrs/ Week	LA1	LA2	Lab ESE	Total
Intera	ction	-	30	30	40	100
				(	Credits: 1	
				e Objectives		
1					ance of analysis by com	
2	the field	of engineering.			d for analyzing and solv	
3	1 7	de pre-requisite nal software.	knowledge to the	students for ana	lyzing and designing str	ructures by
			Outcomes (CO)		axonomy Level	
At the			dents will be able t			
CO1	Execute	various program	ns using software	for modeling of	structures.	Applying
CO2	Analyze	various reinford	ced concrete and s	teel structures.		Analyzing
CO3	Design o	f various reinfo	rced concrete and	steel structures.		Creating
A)	i) Anal		Steel Structures ame for lateral load ame by using diffe		acing systems.	
	iii) Anal	ysis and Design	of Industrial Stru	ctures.		
B)	•	and Design of I				
		ysis of RCC Bu		uras		
			of high-rise struct lateral loading usi			
				xtbooks		
1		Shesha Prakasl ition (1 January		Computer Aided	Design Laboratory" Lan	kmi Publications
2	D. Ra	jendran "Analy	vsis & Design of ation) (1st Edition,		Building using STAAD.	Pro & E-TABS
				ferences		
1					3N-13-978-0470824610	
2	Cloug	h R. W. and Pe		Dynamics of St	ructures", McGraw Hil	
	Lanio	,,				

Subs

Realing



	Useful Links
1	NPTEL - https://nptel.ac.in/courses/112104031
2	https://onlinecourses.nptel.ac.in/noc23_ce73/preview
3	https://archive.nptel.ac.in/courses/105/105/105105162/
4	https://www.iitk.ac.in/nicce/IITK-GSDMA/EQ26.pdf- Design of Six Storied building II Kanpur

			CO-PO Ma	pping			
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
COI	1		1				
CO2	2		2				
CO3	3		3				

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			ided Autonomous Ir	isititie)	
		AND RESIDENCE OF COMPANY AND ADDRESS OF THE PARTY OF THE	Y 2023-24		
2		A SECURE AND ADDRESS OF THE PARTY OF THE PAR	se Information		
	mme Semester	M. Tech. Structur First year M. Tecl			
	Code	7ST511	1., 3011. 1		
-	Name	AND DESCRIPTION OF THE PARTY OF	nced Design of Re	einforced Concrete Stru	ctures
_	d Requisites:			esign of Concrete Struc	
			,		
	aching Scheme	n rusium [4]		Scheme (Marks)	
ectur		MSE	ISE	ESE	Total
utori	al	30	20	50	100
-			Cro	edits: 3	
		Com	rse Objectives		
1	To provide advance			kinds of RC structural n	nembers
2				nds of RC structures usi	
_			and the same of th	ctural members designed	
3	codes.	a knowledge for de	talling of the struc	Adiai members designed	as per is
	Cou	rse Outcomes (CO)	with Bloom's Ta	axonomy Level	
t the	end of the course, the				
01	Analyze various rei				Analyzing
02	Decide the sizes of				Evaluating
03	Design the appropri	ate section for struc	tural members usi	ng codal provisions.	Creating
odul	1 is in the line	Modu	le Contents		Hours
ouu	Flat Slabs and (		ie Contents		Hours
I	Introduction to f Circular slabs.	lat slabs, Codal pro	visions, Analysis	and design of flat slab,	7
II		ined footing, (Recta		zoidal), Introduction to of pile foundation, Pile	6
Ш	beams, Checking			nents, Design of deep	6
IV		sign of overhead wa		gular and Circular with	7
v	Retaining Walls Retaining Walls wall, Reinforced Counterfort retain	d concrete retaini	s of earth pressure ng walls, Canti	e, Stability of retaining lever retaining wall,	7
VI		s - Classification,		Circular bunkers, Silos, ns, Deep bins, Design	6
9102 (813		m	awth a alter		
1	Ramamruthm, S., Edition, 2010.		extbooks ced Concrete Stru	ctures", Dhanpat Rai Pu	blishing, 17
2			heory and Design	of Reinforced Concrete	e", Structure
			A V 61 !!4 C4	ate Design of Reinforce	10



	References
1	Purushothaman, P. "Reinforced Concrete Structural Elements", Tata McGraw Hill, 3rd Edition, 2004.
2	Pillai. S. V. and Menon. D, "Reinforced Concrete Design", Tata McGraw Hill Book Co., 5th Edition, 2005.
3	Park. R and Paulay. T, "Reinforced Concrete Structures", John Wiley and Sons, 1975.
4	1S 456: 2000 Indian Standard Plain and Reinforced Concrete - Code of Practice
	Useful Links
1	https://nptel.ac.in/courses/105/105/105105108/
2	https://nptel.ac.in/courses/105/101/105101086/
3	http://engineeringvideolectures.com/course/281?pn=0#videolist
4	https://nptel.ac.in/courses/105/105/105105109/

			CO-PO Ma	pping			
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
COI			2	2		3	
CO2			2	2		3	
CO3	1		2			2	

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		AND RESIDENCE OF THE PARTY OF T	AY 2023-24	nsimile)	
	LESSE HOLDEN		rse Information		
Program	me	M. Tech. Structu			
Class, Sc		First year M. Tee			· · · · · · · · · · · · · · · · · · ·
Course C		7ST512			
Course N		Elective 1 - Ana	lysis and Design of	of Bridges	
	Requisites:	Design of Concr			
Teac	hing Scheme		Examination	n Scheme (Marks)	
Lecture	3 Hrs./week	MSE	ISE	ESE	Total
Tutorial		30	20	50	100
				redits: 3	,
		Co	urse Objectives		No. of the last
1 7	To provide know			fferent types of bridge	S.
-		•	*	of bridges including s	
7	o impart knowle vith relevant cod		i different types	of bridges including s	uostructures
	CENTRAL STORY				
3 7	o provide knowie	eage for construction	on, inspection and	maintenance of bridges.	
	Cou	rse Outcomes (Co	O) with Bloom's	Taxonomy Level	
At the en		ne students will be		**************************************	
		bridges, their com		tion of bridge site.	Applying
		pes of bridges wit			Analyzing
		d bearings along w			Creating
Module		Mod	lule Contents		Hours
Module	Introduction to		tute Contents		
			e of bridge, Type	s of bridges, Selection	of 7
I	bridge type and	site, Economic sp	oan, Superstructur	e - Alignment, Drainag	
	Clearance, Road	d curb, Design load	ds for bridges, IRC	Loading	
II	Analysis of Cu				6
	Design of RC C	Culvert, Pipe culver	t, Box culvert.		
	RC Deck Slabs				
Ш				bridge, Pigeaud's theor	ry, 6
		y, Balanced cantile	ver bridge.		
		ncrete Bridges	I A	duantana Dasian af m	7
IV				dvantages, Design of pr	re- 7
	Design of Com	ost-tensioned conc	rete bridge decks.		
v	Design of com	posite bridges. Rei	nforced concrete	slab on steel plate gird	er
•		ar connectors, Conr		siao on sieer piate gira	7
	Design of Subs		iccirons.		
VI			nent, Pier, Appro	oach slab, Pile and w	ell
		arings and expansion			6
			Touthanks		
	Krishna Pain N	L "Design of Bride	Textbooks pes. Oxford and II	BH Publishing Co. Ltd.'	'. New Delhi and
1	Kolkata, 2001.				
	Jagdeesh T. R.,	Jayaram M. A., "D	esign of Bridge St	ructures, Prentice Hall o	f India Pvt. Ltd.",
2	New Delhi, 200		-		
	The second secon		dge Engineering.	Oxford and IBH Publish	ing Co. Ltd.". 5th
3	Edition, 2001.	,	6,		3 , 0

References

**CS** CamScanner

1	Raina V. K., "Concrete Bridge Practice: Construction and maintenance and rehabilitation" Tata Mc Graw Hill Publishing Company, New Delhi.
2	Raina V. K., "Concrete Bridge Practice: Analysis, design and economics", Tata Mc Graw Hil Publishing Company, New Delhi.
3	IRC Codes.
BW	Useful Links
1	Reinforced Concrete Road Bridges - Course (nptel.ac.in)
2	NPTEL :: Civil Engineering - NOC: Reinforced Concrete Road Bridges

Harrie II		le le la	CO-PO Ma	pping		
			Programme	Outcomes (PO)	)	
	1	2	3	4	5	6
COI			2			3
CO2				2		
CO3	1		2			

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	Semest	er	First Year M. Te			
	e Code		7ST513	, ciii, cciii, cciii		
	e Namo		A solid later of the Color of the Assessment Color of the	puter Aided Design	1	
	d Requ	the second secon			esign of Steel Structures	
	Teachi	ng Scheme			Scheme (Marks)	
cctu		3 Hrs/week	MSE	ISE	ESE	Total
utor	ial	•	30	20	50	100
				Cree	lits: 3	
			Course	e Objectives		
1	Ton	wide knowledge o			of analysis by computer	c
					r analyzing and solving p	
2		ld of engineering.		an tools required to	and out ting p	
_	To pr	ovide pre-requisite	knowledge to the	students for analyzi	ing and designing structur	res by
3		sional software.	, , ,	•		<del>.</del>
				with Bloom's Taxo	nomy Level	
			dents will be able t			
COL				for modeling of stru	ictures.	Applying
CO2			ced concrete and st			Analyzin
CO3	Creat	e various program	s for design of stru	ictures.		Creating
Modu	ıle		Modul	e Contents		Hours
		gorithm Develop		nming Languages		
					s, Algorithm essentials:	
	pr	oblem analysis ar	nd flowcharting,	fundamentals of so	equential programming:	5
I	V	ariables, data type	- 0 Constians			
	de	minores, anim typ	es & functions +	input-output + a	ata handling + various	3
	Q.	velopment units,	Introduction to pro	ogramming in MS	ata handling + various EXCEL®, MATLAB®,	3
		velopment units, la THON.	Introduction to pro	ogramming in MS	EXCEL®, MATLAB®,	3
	P' M	velopment units, YTHON. atrix Methods an	Introduction to production depression of the desired control of the	ogramming in MS	EXCEL®, MATLAB®,	
	P' M	velopment units, YTHON. atrix Methods an	Introduction to production depression of the desired control of the	ogramming in MS	ata handling + various EXCEL®, MATLAB®,	5
11	P' M M an	velopment units, YTHON.  atrix Methods an atrix operations: alysis method, Alg	Introduction to production to product-inverse etgorithm /Programm	ogramming in MS tc., Simultaneous ning techniques of a	EXCEL®, MATLAB®, linear equations, Eigen	
п	M M an	velopment units, YTHON.  atrix Methods an atrix operations: alysis method, Algumerical Method.	Introduction to product-inverse et gorithm /Programmis and Programmis	ogramming in MS tc., Simultaneous ning techniques of a	EXCEL®, MATLAB®, linear equations, Eigen	
	M M an	rvelopment units, YTHON.  atrix Methods an atrix operations: alysis method, Algumerical Methods umerical Integration	d Programming product-inverse et gorithm /Programming s and Programmin on methods, Num	tc., Simultaneous ning techniques of a ng erical differentiation	linear equations, Eigenabove methods.	5
III	PY M M an N N	rvelopment units, YTHON.  atrix Methods an atrix operations: alysis method, Algumerical Method: umerical Integrationalysis tools and	d Programming product-inverse engorithm / Programming and Programming on methods, Num curve fitting, Nu	tc., Simultaneous ning techniques of a ng erical differentiation	EXCEL®, MATLAB®, linear equations, Eigen	
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Textbooks

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rogramme, A

1	PratapRudra, "Getting started with MATLABTM", Oxford University press, 2010.
2	Jain M. K., Iyengar S. R. K. & Jain R. K. " Numerical Methods for Scientific and Engineering Computation", 4th ed. 2004.
3	Pundit & Gupta "Structural Analysis", Tata MC Graw Hill Book company.
	References
1	Steve Otto and James P. Denier "An Introduction to Programming and Numerical Methods" in Springer International books, 1st Edition, 2007
2	Cotes, R.C., Couties, M.G., and Kong, F.K., Structural Analysis, ELBS.
3	Chopra A. K., "Structural Dynamics for Earthquake Engineering", Pearson Publications.
	Useful Links
1	https://nptel.ac.in/courses/105/105/105105180/
2	http://www.nptelvideos.in/2012/11/numerical-methods-in-civil-engineering.html
3	https://in.mathworks.com/matlab/trial
4	http://www.gnumeric.org/freewarespreadsheetshttps://d.wps.com/?from=premiumpage#/

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	1	2	3	4	5	6
COI	2					
CO2		3		== -	2	
CO3			3		1	

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Course			atics, Structural En	Structural Engineering		
Jesirea	Requisites:	Applied Mathema	aties, Structural En	gineering		
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ecture		MSE	ISE	ESE	Total	
lutoria		30	20	50	100	
			Cred	its: 3		
			,			
			Objectives			
	To provide knowledge of h					
	To impart knowledge of nu		tiation, integration,	root finding, curve fitti	ing and other	
	numerical approximations.			·		
3	To provide exposure to fie	id application of	numerical methods	in structural engineerin	ıg.	
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At the e	nd of the course, the studer			nomy Level		
	Execute numerical recipes				Applying	
CO2	Examine different numeri				Analyzing	
CO3	Discuss numerical scheme				Evaluating	
Modul		Module	Contents		Hours	
	Solving Linear Algebra					
	System of linear alge					
		Classification of solution approaches as direct and iterative, solution by matrix decomposition, Introduction to methods for solving Block-diagonal, triangular, block-triangular systems. Introduction to sparse linear systems: Thomas				
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	algorithm for tridiago Jacobi, Gauss-Siedel a					
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II	Secant method, regular Newton method with Leverberg-Marquardt r	afalsi method, N Broyden's updat	vative free iterative Modified Newton's	s solution approaches, method and qausi-	7	
II	Newton method with Leverberg-Marquardt r Solving Ordinary Diff	afalsi method, N Broyden's update method ferential Equation	vative free iterative Modified Newton's e, Optimization batter and Approximation batter and Appr	e solution approaches, s method and qausi- sed formulations and	7	
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1	Edition, 2012	n and Canale Ray				
2	Gourdin A. ar 2000.	nd Boumhrat M.,				
3	Joe D Hoffma 2001.	n, "Numerical Mo	ethods for Engir	eers and Scientis	ts", Marcel Dek	ker, 2nd Editio
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1	Gilbert Strang	, "Computational	Science and E	ngineering", Well	lesley-Cambridg	ge Press.
2	Gilbert Strang 2009.	, "Linear Algebra	a and Its Applic	ations", Wellesle	y Cambridge Pr	ess, 4th Editio
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