Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
				(Government Alded)	021-22						
				Course Ir	oformation						
Progr	amr	ne		B Tech (Civil Eng	ineering)						
Class	Sen	nester		Second Year B Tec	h Sem III						
Cours		nde		Becolia Tear D. Tea							
Cours	e N	ame		Probability and Stat	istics						
Desire	d R	equisite	s:								
				Mathematics course	wathematics course at migner Secondary Junior College						
Teaching Scheme				Examination Scheme (Marks)							
Lectu	re	2	Hrs/week	T1	T2	Total					
Tutor	ial		-	20	20	60	100				
Practi	ical		-		1	1					
Intera	octio	n	-	Credits: 2							
				Course (Objectives						
1	Fa	miliarize	e the students	with techniques in n	nultivariate integration	on and statistics.					
	1			Course Ou	tcomes (CO)						
<u>CO1</u>	A	oply con	nputational to	ools to solve Mathem	atical and Statistical	problems					
CO2 Solve problems in probability, statistics and multivariable calculus.											
Module Module Contents Hours											
	Random Variable										
т		Discrete	e random var	iable, Continuous ra	ndom variable , Prot	bability mass	4				
		function	n, cumulative	bility distribution function	i, Bivariate discrete i	andom	4				
		dimensi	onal discrete	random variable							
		Probab	oility Distrib	ution							
11		Gaussia	n Distributio	on, Exponential Distri	bution, Uniform Dis	tribution	5				
		Statisti	cal Methods								
III		Measur	3								
		deviatio	on, mean dev	Symmetry Skewness							
		Popula	tion and Sar	nnle	s, Kurtosis and type.						
IV		Introduc	ction, Types	of Characteristics: At	ttributes and Variable	es, Collection	4				
		and Org	ganization of	data, Population and	sample, Methods of	f Sampling.	4				
		Exact S	Sampling Dis	stribution							
		Chi-squ	are distributi	on : Definitions and	its properties, Studer	nt t-distribution:	7				
		Denniti	ons and its p	ropernes,.							
				Text	Books						
1		Fundam	nentals of Ma	thematical Statistics	by Gupta and Kapoc	or.					
2		An Intro	oduction to P	robability and Statist	ics by Vijay Rohatgi	i					
					¥						
	1	D 1 1	11. 1.~ .	Refe	rences						
1		Probabi	lity and Stati	stics for Engineers a	nd Scientists by S. R	OSS					
				Icofu	l I inks						
1		https://w	www.voutube	e.com/watch?v=aKoł	1 B81Pueg						
1		ps.//									

CO-PO Mapping														
	Programme Outcomes (PO) PSO													
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2												
CO2	2	3												
CO3														
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 r	nap to	at leas	t one F	Ю.							

Assessment

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	T1	Τ2	ESE	Total					
Remember									
Understand									
Apply									
Analyze									
Evaluate									
Create									
Total	20	20	60	100					

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
AY 2021-22									
	Course Information								
Progr	ProgrammeB. Tech. (Civil Engineering)								
Class,	Class, Semester Second Year B. Tech., Sem III								
Cours	e Code		5CV202						
Cours	e Name		Fluid Mechanics						
Desire	ed Requi	sites:	Engineering Physics	s, Engineering Mec	chanics and Matl	nematics			
		~ .	1						
	Teaching	Scheme		Examination Sch	eme (Marks)				
Lectu	re	2 Hrs/week		12	ESE	Total			
Tutor		I Hr/week	20	20	60	100			
Practi		-							
Intera	Interaction - Credits: 3								
									
	1		Course	Objectives					
1	To prov	vide the student	fundamentals of fluid	mechanics.					
2	To prov students flow sy	ride the student s shell be provi stem.	necessary knowledge ided with necessary sl	and concept in the cills for flow and lo	field of fluid me sses of water dis	chanics. The tribution pipe			
3	To prep	are the students	for higher studies and	d research in the fie	ld of fluid mech	anics.			
			Course Out	tcomes (CO)					
CO1	Explain	the fundamenta	als of fluid mechanics						
CO2	Apply t	he knowledge o	f fundamental of fluic	l mechanics to solv	e and analysis of	fluid at rest and			
<u> </u>	In motio	on. o the different l	access and flow in ning	flow system					
			usses and now in pipe	now system.					
Modu	ıle		Module Co	ntents		Hours			
	Flui	d Properties ar	nd Statics						
Fluid Properties and StaticsScope and importance of Fluid Mechanics, Physical Properties: density, specific weight, specific volume, specific gravity, dynamic and kinematic viscosity, compressibility, surface tension and capillarity and Vapor pressure.IThe basic equation of hydrostatics, Pascal's law, Concept of pressure head, datum, absolute and gauge pressure, Measurement of pressure, Application of the basic equation of hydrostatics. Principle of floatation and Buoyancy, Equilibrium of floating bodies,									
	Stab	ility of floating	bodies						

Π	Fluid Kinematics Introduction of basic terms: Path line, streak line, stream line and stream tube, Velocity and acceleration of fluid particle. Types of flow: steady and unsteady, uniform and non-uniform, Laminar and Turbulent, one, two, three- dimensional flow, rotational and irrotaional flow. Flow net: Equation of stream line and equipotential line, methods of developing the flow net and its uses	3
III	Fluid Dynamics Forces acting on fluid mass in motion, Euler's equation of the motion along a streamline, Bernoulli's equation: assumptions, applications and its limitations. Momentum equation and its application in fluid mechanics. Applications of Bernoulli's Equation: Analysis of the hydraulic coefficients for the discharge measuring devices: orifices, mouthpieces, venturimeter, pitot tube, notches and weirs. Analysis of losses in closed and open channel flow	6
IV	Flow in Pipes Laminar Flow: Reynolds's Experiment, laminar flow through fixed parallel plate, Coutte's flow and Hazen Poiselle's equation for circular pipes. Turbulent Flow: Velocity distribution and shear stresses in turbulent flow, Nikuradse's experiments, Elementary concepts of turbulent flow in smooth and rough pipes. Losses in Pipes: Losses in Pipes: Darcy Weisbach equation and minor losses in flow through pipe, Concept of equivalent length of pipe and diameter of pipe. Analysis of losses in pipe for the pipes connected in series, parallel and Siphon. Solving the two reservoir problem, three-reservoir problem and Pipe Network analysis.	5
V	Boundary Layer Theory Concept of boundary layer, Development of boundary layer on a flat plate, different thickness. Drag and lift of submerged bodies, Hydro dynamically smooth and rough boundaries, Boundary layer.	3
	Text Books	
1	Bansal R.K., "A textbook of Fluid mechanics and hydraulic machines", Laxmi Ltd., New Delhi, 9th Edition, 2010	Publications (P)
2	Garde- Mirajgaonkar, "Engineering Fluid Mechanics", SCITECH Publication, 2010	1 st Edition,
3	ModiP.M. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book H Book House Since; 21 St Edition , 2018	HouseStandard
	References	
1	Kumar D.S., "Fluid Mechanics and Fluid Power Engineering", KatariaS K and Edition, 2010	l Sons, 2 th
2	Jain A.K., "Fluid Mechanics Including Hydraulic Machines", Khanna Publishe 8th Edition, 2003	ers, New Delhi,
3	Streeter, V.L. and Wylie E.B. "Fluid Mechanics", McGraw Hill, New York, 8t	th Edition,1985
	Useful Links	
1		
2		
3		
4		

CO-PO Mapping

		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												1	1
CO2		3											2	2
CO3			3										3	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 r	nap to	at leas	t one F	Ю.							

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	T1	T2	ESE	Total					
Remember									
Understand									
Apply									
Analyze									
Evaluate									
Create									
Total	20	20	60	100					

AY 2021-22									
Total									
100									
uilding									
ntegrated behavior									
of the building as a whole.									
3 The role played by various building components and their interactions for an integrated behavior									
of the building as a whole.									
essing and									
arameters as per standards, and interpret their applications in building									
o strength, durability and energy efficiency.									
ponents and their relationships in buildings of different structural systems									
s and construction techniques to be adopted for different building									
vings.									
0									
Hours									
on, 5									
σν									
53									
7									
.									
A									
u 7									
Bu iii iii iii iii iii iii iii iii iii i									

IV	Foundations, Walls and Columns Foundations: Definition and Functions, Structural Requirements, Bearing Capacity of Soils, Materials used and their properties, Types of Shallow and Deep foundations, Conditions for their applications, Plinth and Plinth Beams. Walls and Columns: Structural and Functional requirements, Types of Units and Mortars and their properties, Factors affecting strength and stability of walls, Functions of wall in buildings, Construction joints in masonry, Types: Stone masonry, Brick masonry, Concrete Block masonry, Types of Bonds, Procedure for construction of walls, Strength and stability of walls, Function and types of columns.	7
v	Openings in Buildings Physical and Functional roles of Openings, Materials Involved, Means of providing openings, Criteria for sizes of Openings, Functional types of Doors, Windows, Ventilators., Openings vs. Internal Comfort, Role of Lintel and Chajja. Stair Cases- Characteristics, types, design criteria.	7
VI	Roofs and Floors Definitions, Accessible and Inaccessible roofs, Structural and functional requirements, Load considerations, Types of Sloped roofs, Types of Flat roof/floor, Roof covering materials, Types of RC slabs, Role of concrete and steel reinforcement, Formwork, Application of DPC, Joints in construction, Cost effective and Sustainable roofs.	7
1	Text Books	1
1	R. K. Kalput, Eligineering Materials, S. Chand Fublications, New Denn, 201	4. Lavmi
2	Publications, 5 th Edition, 2005.	Laxim
3	Bindra and Arora, "Building Construction", Dhanpat Rai and Sons, 1997.	
	D.C	
	Keierences	nd
1	P. C. Varghese, "Building Materials" PHI Learning, Eastern Economy Edition 2015	, 2 nd Edition,
2	S. K. Duggal "Building Materials" New Age International, 3 rd Edition, 2008	
3	Birdie and Ahuja, "Building Construction and Construction Materials", Dhanp 4 th Edition, 2012	at Rai and Sons,

Useful Links

	CO-PO Mapping													
	Programme Outcomes (PO) PSO													
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		3					1						2	2
CO2			3				1						2	1
CO3			2										2	1
The streng	gth of 1	nappir	ng is to	be wr	itten as	1,2,3;	Where	e, 1:Lo	w, 2:M	[edium	, 3:Hig	gh		

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

Assessment

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	T1	T2	ESE	Total					
Remember									
Understand									
Apply									
Analyze									
Evaluate									
Create									
Total	20	20	60	100					

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 2	021-22					
			Course I	nformation					
Progr	amme		B. Tech. (Civil Eng	ineering)					
Class,	, Semeste	r	Second Year B. Teo	ch., Sem III					
Cours	se Code		4CV204						
Cours	se Name		Engineering Geolog	ду					
esired	Requisit	es:	Nil						
			1						
	Teaching	Scheme		Examination Sch	eme (Marks)				
Lectu	re	2 Hrs/week	T1	T2	ESE	Total			
Tutor	ial	-	20	20	60	100			
Practi	ical	-							
Intera	action	-	Credits: 2						
			Course	Objectives					
1	Introduce the sense	e students the r	ecessary knowledge g Geology among civ	and concepts in the	field of geology a	and to develop			
-	Introduce the technique of recognizing, classifying and describing various geological event and								
2 phenomena.									
3 Enable students to understand geological problem before undertaking any civil engineering project.									
Course Outcomes (CO)									
CO1	Describ petrolog	e the geological gy, structural geo	phenomena especial ology.	ly in the field of phy	vsical geology, m	ineralogy,			
CO2	Describ	e and explain th	e surface and subsurf	face methods of prel	iminary geologic	al investigations.			
CO3	Use the enginee	knowledge of g	eology to recognize a	and identify geologi	cal phenomena a	nd apply in civil			
	0	6							
Modu	ıle		Module Co	ontents		Hours			
Ι	Intr Main Earth focu Inter earth	oduction and B n and allied brar h Science in Civ s, isoseismal an- nsity and Magni nquake, Seismic	Basic Seismology Inches of Earth Science Vil Engineering, Earth d coseismal lines, Sei tude, Locating the ep belts of India and W	es and their scope, I quakes, types, effec ismograph and seisn icenter and depth of orld.	mportance of tts, epicenter, nic waves, focus of	4			
П	Phys Agen work of er Grou perm aqui grou	sical Geology ats modifying E a of Wind, River cosion, erosional and Water- Orig meability, Aquifer tard and aquifer ndwater in Deco	arth surface, weather r and Glacier with res l features, deposition in of groundwater, Z ers and types of aquif , water table, groundw can trap region.	ing, types of weather spect to mode transp and depositional feat ones of groundwates fers, Rocks as aquifut water exploration, or	ering, Geological oort, processes atures. r, porosity and age, aquiclude, ccurrence of	5			

III	Mineralogy & Petrology Definition of a mineral, Common rock forming mineral groups, Ore minerals. Igneous Rocks- formation, classification, structures, textures and forms of igneous rocks, common igneous rocks and their civil engineering relevance. Sedimentary Rocks- formation, classification, structures, textures of sedimentary rocks, common secondary rocks and their civil engineering relevance. Metamorphic Rocks- Agents of metamorphism, Types of metamorphism, Products of metamorphism, Structures and textures of metamorphic rocks, Metamorphic aureole and facies, zones of metamorphism, common metamorphic rocks.	5
IV	Structural Geology Outcrop, Dip, true dip and apparent dip, Strike, outlier and inlier, Folds- Parameters and types. Faults- Parameters and types, Joints- definition and types of joints, Unconformities- Definitions and types. Civil Engineering significance of geological structures.	4
V	Geological Investigations Introduction to Surface methods and subsurface methods of geological investigations. Core logging: Core drilling, advantages and limitations, core logging, core recovery, Rock Quality Designation, describing lithology, correlation and interpretations of core log data. Geophysical Methods- Electrical Resistivity Method, Seismic, Magnetic and Gravity methods with their principle, instrument and some common interpretations.	5
VI	Applications of Geology in Civil Engineering Rocks as source of construction material, building stones etc., Geological considerations and investigation stages in selection of dam-site, Dams on various lithological conditions, some case histories. Geological conditions for Capacity, water tightness of the reservoir, siltation. Tunnels- purpose, effects of tunneling, over break, geological considerations for successful tunneling, some case histories. Geological considerations for roads and bridges. Landslides- types, causes and prevention.	5
		1
	Text Books	
1	K. M. Bangar., "Principles of Engineering Geology", Standard Publishers Distr Nai Sarak, Delhi	ibutors 1705-B
2	N. Chenna Kesavulu, "Textbook of Engineering Geology", Macmillian India L Road Daryanganj, New Delhi.	td. 2/10 Ansari
3	Parbin Singh, "Engineering and General Geology", S. K. Katariya and Sons, D Edition.	elhi.,1984, 1 st
	References	-
1	Subinoy Gangopadhy, "Engineering Geology", Oxford University Press, New Edition.	Delhi, 2017, 5 th
2	A. Holmes, "Principles of Physical Geology", ELBS Chapman and Hall, Lond	on.
3	Dr. D. V. Reddy "Engineering Geology for Civil Engineering", Oxford and IB Co. Pvt. Ltd., New Delhi, 1995, 1 st Edition.	H Publishing
	Useful Links	
1		
2		
3		
4		

CO-PO Mapping														
		Programme Outcomes (PO)									PS	50		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												1	2
CO2	2				2				1	2			2	2
CO3	2		1	1					1	2			2	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 r	nap to	at leas	t one P	Ю.							

Assessment

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	Τ2	ESE	Total						
Remember										
Understand										
Apply										
Analyze										
Evaluate										
Create										
Total	20	20	60	100						

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)												
			AY 2	021-22	·							
			Course Ir	formation								
Progr	amme		B. Tech. (Civil Eng	ineering)								
Class,	Semester	•	Second Year B. Tec	h., Sem III								
Cours	e Code		4CV205									
Cours	e Name		Engineering Survey	ing								
Desire	ed Requis	ites:	Nil									
r	Feaching	Scheme	Examination Scheme (Marks)									
Lectu	re	3 Hrs/week	T1	T2	Total							
Tutor	ial	-	20	20	60	100						
Practi	cal	-										
Intera	ction	-	Credits: 3									
			Course (Objectives								
1	To impa	rt basic princip	les of conventional su	rveying through cla	ass instructions.							
2	To deve	lop a basic und	erstanding of computa	ations made in topo	graphic mapping	g, and land						
	To deve	lop an ability to	analyze land profiles	s in logical manner	and will be able	to apply well						
3	understo	od principles in	n planning and design	of engineering stru	ctures on the Ea	rth's surface.						
	Course Outcomes (CO)											
CO1 Apply their knowledge to evaluate alternate surveying techniques suitable for scope of the project and site situation.												
CO2	Identify	Surveying equi	pment, work in team,	collect and analyze	e the topographi	cal data with due						
<u> </u>	Derceive	ation to system	atic errors, random er	rors and blunders								
	Tercerve	inodern survey	ing equipment and te	chinques								
Modu	le		Module Co	ntents		Hours						
Ι	Intro A. S Conc Civil B. Ty Trila C. Pr Relia	bduction to Lat tudy of conven cepts, objective engineering fie ypes of measure teration recision in Surv ability of measu	nd Survey Systems tional land survey sys based classification o elds. ements and range of in ey measurements, pro rements, Probability i	tems, Brief review f Surveying, Phases nstrumentation, Tra bable errors in mea	of basic s of surveying ir versing & surements,	6						
Ш	Dire A. M corre B. M corre C. Co meas and c Con A. C B. Lo C. Th	ctions lethods and eque ections fethods and eque ections constructions, ad suring equipment corrections ventional Surv hain & Compas evelling & Cont heodolite Trave	ipment for horizontal ipment for vertical dia ljustments & uses of r nt, Methods for angle eying Methodologies as Survey touring; Essentiality o rsing ; Trigonometric	distance measurement stance measurement najor and minor cor and direction measure of Precise Levelling levelling	ent, errors and t, errors and nventional angle urement, errors	6						
	E. Pl	ane Table Surv	ey									

IV	EDM Instrumentation Basics of EDM, Types of EDM, Electromagnetic spectrum, wavelength regions and their applications, solar radiation, radiation laws, advantages and disadvantages, advances in technology, Fundamental parameters for calculation, correction factors and constants; Setting up, leveling, initial general settings, back sighting, station codes, overview of system functions and applications; and data retrieval and processing	8						
V	Project Surveying Detailed surveys, Horizontal Control, Vertical Control, Methods for Location, Survey for Route, Bridge, Dam, Reservoir and Tunnel	7						
VI	Modern Techniques of Surveying and Mapping Modern techniques and procedures for Aerial, Remote Sensing, GIS, GPS, LIDAR, 3D Scanner, Data interpretation and analysis, Elements of visual interpretation, and digital image processing	6						
	lext Books							
1	B. C. Punmia and Jain, "Surveying", Vol. 1, 2 & 3, Laxmi Publications, 17 th e New Delhi.	dition, 2015,						
2	N. N. Basak, "Surveying and Levelling", Tata Mcgraw Hill Education Pvt. Ltd 2017, New Delhi.	l, 2 nd Edition,						
3	K. R. Arora "Surveying", Vol. 1 & 2, Standard Book House, 16 th edition, 2013	8, Kota.						
	References							
1	Duggal S. K, "Surveying", Tata Mcgraw Hill Education Pvt Ltd, 4 th edition, 2	017, Delhi.						
2	Bannister and Raymond, "Surveying", ELBS, Longman Group Ltd., England.							
3	R. E. Davis, F. Foote and J. Kelly, "Surveying; Theory and Practice", McGraw Company, New York.	⁷ Hill Book						

	Useful Links													
CO-PO Mapping														
Programme Outcomes (PO)										PS	50			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3												1	1
CO2		2			1				2				1	1

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.

3

CO3

Assessment

1

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	T2	ESE	Total						
Remember										
Understand										
Apply										
Analyze										
Evaluate										
Create										
Total	20	20	60	100						

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
			AY 20	021-22	/					
	Course Information									
Progra	amme		B. Tech. (Civil Eng	ineering)						
Class,	Semester	•	Second Year B. Tec	h., Sem III						
Cours	e Code		4AM201							
Cours	e Name		Solid Mechanics							
Desire	ed Requis	ites:	Engineering Mecha	nics						
			8							
	Feaching	Scheme	Examination Scheme (Marks)							
Lectur	re	3 Hrs/week	T1	T2	ESE	Total				
Tutori	ial	-	20	20	60	100				
Practi	cal	-		1	1 1					
Intera	ction	-	Credits: 3							
		1	I							
			Course (Objectives						
1	To impa	rt the basic con	cepts of stress and str	ain in elastic body.						
2	To illust	rate internal eff	ects and deformation	s caused by the var	ious applied loads					
3	To provide the knowledge of stability analysis, shear and bending stress distribution for the									
	analysis and design aspects of structural engineering.									
Course Outcomes (CO)										
$\frac{\text{CO1}}{\text{CO2}}$	Explain Solvo pr	state of stress-s	train and internal for	terror	5.					
C02	Analyze	different stress	es in structural memb	lorces.						
	/ maryze	different stress								
Modu	le		Module Co	ntents		Hours				
I	Stres Mech latera ratio Stres facto	ses and strains nanical properti- al, shear and vo and their relations s-strain curves to r of safety, Uni-	s es of Materials -Elast lumetric strains, Stres onship, Material cons for Brittle and Ductile -axial and multi-axial	icity, Plasticity and ses, Elastic constant titutive law, St. Ver e materials, Allowa loading.	Creep ,Linear, nts, Poisson's nant's Principle. ble Stresses and	6				
II	Com Stree thern Equa and i	posite sections sses, strains and nal effects, Axia tions, Strain en mpact load, Mc	under axial loading deformations in hom al force diagram, Equ ergy due to gradually odulus of Resilience.	nogenous and comp ilibrium and Comp and suddenly appl	oosite bars and atibility ied axial loads	6				
III	Prine State princ stress	cipal Stresses a of stress on pla ipal planes and ses in beams, st	and Planes ines, Normal and She principal stresses, M ress trajectory. Variou	ar stresses on any c ohr's Circle Metho us theories of elasti	bblique plane, d, Principal c failures.	7				
IV	Shea Conc inten comp Bend cross unsy	r and bending sept of shear for sity of loading, bound beams un ling and shear s section, Bendir mmetrical cross	of beams ce and bending mom- Plotting S.F.D. and E ider various types of I tresses: Euler's beam ng and shear stress di sections.	ent, Relation betwe 3.M.D.for determin loads and supports. theory, Moment of stribution across sy	een SF, BM and ate simple and f resistance of mmetrical and	8				

	Torsion of Circular Shafts						
V	Theory of torsion, solid and hollow circular shafts, transmission of power through circular shafts. Shaft subjected to bending and torsion, equivalent	6					
	shear equivalent bending effect of end thrust	0					
	Stability Analysis						
	Short column, Slenderness ratio, Euler's theory, Critical loads, Rankine's,						
VI	Jordon's formula and Secant formula. Column subjected to combined axial	6					
	load and bending moment, core of a section, Stability of chimneys, dams and						
	retaining walls.						
	Text Books						
1	¹ Hibbeler R. C., "Mechanics of Materials", Pearson Education, 10 th Edition, 2016.						
2	Popov E. B., "Mechanics of Materials", Pearson Education, 2 nd Edition, 2015.						
3	Gere and Timoshenko, "Mechanics of Materials", CBS publishers, 2 nd Edition	n, 2004.					
	References						
1	Beer and Johnston, "Mechanics of Material", Tata McGraw Hill publication, 7 2014.	th Edition,					
2	2 Andrew Pytel and Jaan Kiusalaas, "Mechanics of Materials", Cengage Learning, USA, 2 nd Edition, 2011.						
3	Timoshenko. S. & Young. D. H, "Strength of Material", McGraw Hill Book C Publication, 4 th Edition, 2006.	ompany					

Useful Links

CO-PO Mapping														
	Programme Outcomes (PO)										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													2
CO2	3	3												2
CO3	2	3												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 r	nap to	at leas	t one F	Ю.							

Assessment

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	Τ2	ESE	Total						
Remember										
Understand										
Apply										
Analyze										
Evaluate										
Create										
Total	20	20	60	100						

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
			AY 202	0-21							
	Course Information										
Progra	mme		B.Tech. (Civil Engin	eering)							
Class, S	Semester		Second Year B. Tech	n., Sem III							
Course	e Code		4CV252								
Course	e Name		Fluid Mechanics Lat	ooratory							
Desired	d Requisit	tes:	Engineering Physics	. Fluid Mechanics							
			<u> </u>	,							
ſ	Feaching	Scheme	Examination Scheme (Marks)								
Lectur	e	-	LA1	LA2	Lab ESE	Total					
Tutoria	al	-	30	30	40	100					
Practic	al	2 hrs/week									
Interac	ction	-	Credits: 1								
I	m :	1 . 1	Course Ob	jectives							
1	To provid using mea	le students hand asuring devices.	s-on practice for meas	surement of viscosi	ty, pressure and d	ischarge by					
2	To develo	op the skill requ	ired for applying know	vledge to analysis of	of flow in pipe.						
3	To develo	op the skill requ	ired for applying know	vledge to estimate	the losses in pipe f	flow.					
Course Outcomes (CO)											
CO1	determine	e a viscosity of o	bil and metacentric hei	ight of ship model,	measure the press	sure using					
CO2	develop t	he flow pattern	by using electrical ana	logy method.							
CO3	demonstr	ate the different	type of flow through	Reynolds number,							
	discharge	and losses in p	ipe flow.								
			List of Experiments	s / Lab Activities							
List of	Experime	ents:	List of Experiment.								
1. Deter	rmination	of viscosity of	oil by using Redwood	viscometer							
2. Deter	rmination	of metacentric 1	height of ship model								
3. Meas	surement o	of pressure by u	sing pressure measurin	ng devices							
4. Deve	elopment of	of Flow net by u	sing electrical analogy	y method							
6. Verit	fication of	momentum equ	lation by using impact	of jet on circular d	lisc						
7. Meas	surement of	of discharge by	using sharp edged circ	cular orifice and Ve	nturimeter						
8. Study	y of differ	ent types of flow	w by using Reynolds e	experiment							
9. Meas	surement a	and calculation	of minor losses are du	e to entrance, exit,	expansion of flow	, contraction					
of flow	, elbow, b	ent and valve	for the nine flow by	using differential L	[tube manometer						
10. 1010	asurement		r tor the pipe now by t	using unreferitiar C	-tube manometer.	•					
			Text Be	ooks							
4	Ranga	araju K. G., "Flo	ow in Open Channels"	, Tata McGraw Hil	l Publication Co.	Ltd., New					
1	Delhi	, 1 st Edition, 19	93.								
2	Aswa	G. L., "Experim	nental Fluid Mechanic	es", Vol. I & II, Nei	n Chand & Bros.,	Roorkee, 1 st					
	Editio	on, 1983.									
3	Likhi, Editio	, S.K., "Hydraul n, 1995.	ics: Laboratory Mann	ual", New Age Inte	ernational Publishe	ers, 1 St					
	2.4100	, ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Refere	nces							

1	Modi P. M. and Seth S. M., "Hydraulics and Fluid Mechanics", Standard Book House, 9th
1	Edition, 2013.
2	Manual of Integrated District Planning, Planning Commission, New Delhi
3	Subramanya K., "Theory and Applications of Fluid Mechanics" Tata McGraw Hill Publishing
5	Co., Ltd., 7 th Edition 2000
4	N T CL (C) I III I I' N T A M C H'II D II'I I St
	Ven Te Chow, "Open channel Hydraulics", Tata McGraw Hill Publishing, 1 Edition, 2000.
	Useful Links
1	
2	
3	
4	

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1				1									1	1	
CO2				2									2	2	
CO3				2									2	2	
The streng	The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High														
	C /1				. 1										

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

Lab Performance

Lab ESE

Assessment												
There are four components of lab assessment, LA1, LA2, and Lab ESE.												
IMP: Lab ES	E is a separate head of	passing. Lab ESI	E is treated as End Semester Exam and is bas	ed on all								
experiments/l	ab activities.											
Assessment	Based on	Conducted by	Typical Schedule	Marks								
ТАТ	Lab activities,	Lab Course	During Week 1 to Week 6	20								
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50								
LA2	Lab activities,	Lab Course	During Week 7 to Week 12	20								
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50								

Lab ESEand documentationfacultyMarks Submission at the end of Week 18Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

During Week 13 to Week 18

40

Lab Course

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total							
Remember											
Understand											
Apply											
Analyze											
Evaluate											
Create											
Total	30	30	40	100							

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 202	0-21						
Course Information										
Progr	Programme B.Tech. (Civil Engineering)									
Class, Semester Second Year B. Tech., Sem III										
Cours	se Code		4CV253							
Cours	se Name		Building Materials &	construction Labor	ratory					
Desire	ed Requisi	tes:	Exposure to theory c	ourse in Building M	aterials and Co	nstruction				
	Teaching	Scheme]	Examination Schen	ne (Marks)					
Lectu	re	-	LA1	LA2	Lab ESE	Total				
Tutor	ial	-	30	30	40	100				
Practi	ical	2 hrs/week								
Intera	iction	-	Credits: 1							
	1		Course Ob	jectives						
1	To involv construct	ve students in ha ion materials.	ands on laboratory acti	vities to evaluate the	properties of b	basic				
2	To engag learnings	e students in vis and also get an	sits to ongoing constru exposure to new deve	ction sites to appreci lopments in the cons	iate/relate the c struction indust	lassroom ry.				
3	To update market su	e students about	the perennial changin	g costs and quality of	of building mate	erials through				
			Course Outco	omes (CO)						
CO1	Evaluate materials	and compare the by demonstration	e quality parameters, t on of experiments to ju	he strengths and wea ustify acceptance or a	aknesses of bas rejection for ap	ic building plication.				
	Perceive	by physical obs	ervation the complexit	ties and skills involv	ed in actual con	nstruction				
CO2	process so drawings	o that they can c and can apply i	demonstrate the variou n similar situations in	s building componen future.	nts in terms of	building				
CO3	Different reproduce	iate and compar e unit cost throu	e the quality of variou gh market surveys.	s building materials	of different bra	ands and				
			<u> </u>							
			List of Experiments	s / Lab Activities						

List of Experiments:

1. Quality Assessment of Masonry units- Students will explore the various building units utilized for masonry works and conduct experiments on various properties viz. size, density, water absorption, IRA, and compressive strength as per the IS codal provisions and submit a report.

2. Analysis of Aggregates- Students will collect samples of fine/coarse aggregates and conduct experiments on various properties viz. sieve analysis, fineness modulus, bulking of sand and represent the results graphically and submit a report.

3. Visit to Foundation Site-Students will visit a building site where the building foundation work is in progress. They are expected to observe the foundation type, construction details, Plinth details and submit site photographs and draw neat sketches. The report should also contain notes on various other types of foundations and their applications.

4. Market Survey- Students will visit material supplier agencies for physical observation of materials and get the details of source of procurement, storage methods, application, price in the market, of at least 25 items related to building construction and submit a report within one week after the visit.

5. Visit to Masonry Construction Site- Students will visit a building site with masonry work in progress. They are required to observe the method of wall construction, proportion and mixing of mortar, placing of bricks, joint thickness, checking verticality using plumb and water level. They should note the rate of wall construction and the bricks required for unit volume and submit a report along with the images /photographs of sites visited within one week after the visit.

6. Visit to Study Water Supply and Drainage System in a Building- Students will visit a site to observe the facilities namely UGWT, OHWT, water supply system, provisions of traps, septic tank and soak pit and sketch the various accessories in a report to be submitted in a week.

7. Study of Staircases- Students will visit and study at least five types of staircases within/outside the campus and report the functional details viz. floor to floor height, riser, tread, waist slab dimensions with appropriate sketch and photographs

8. Observations on Concreting /Plastering/Flooring Tiles- Students will visit a site during ongoing plastering, pointing or painting works and gather information about the type of external and internal paints. They are also expected to visit a paint store/shop and gather information about various shades and prices of different paints.

	Text Books								
1	M L Gambhir; Neha Jamwal, Building and Construction Materials: Testing and Quality								
1	Control, Tata McGraw-Hill Education, 2014								
2	Mantri Institute"s "The A to Z of Practical Building Construction and its Management" Mantri								
2	Institute of Devp. and Research. Pune, Published by Satya Prakashan, 2011								
	References								
1	Shetty M. S., "Concrete Technology", S. Chand & Company Ltd. New Delhi, 7 th Edition, 2013.								
2	IS 3495, IS 1077, IS 2386, IS 383, Bureau of Indian Standards, New Delhi.								
2	Material Testing-lab-manual.pdf: http://site.iugaza.edu.ps/mymousa/files/MaterialTesting-								
3	lab- manual.pdf								
	Useful Links								
1									

CO-PO Mapping														
		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				1									1	1
CO2				2									2	2
CO3				2									2	2
The streng	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 r	nap to	at leas	t one P	Ю.							

Assessment

There are four components of lab assessment, LA1, LA2, and Lab ESE. IMP: Lab ESE is a separate head of passing. Lab ESE is treated as End Semester Exam and is based on all experiments/lab activities.

experiments/1	uo uoti vittos.														
Assessment	Based on	Conducted by	Typical Schedule	Marks											
ТАТ	Lab activities,	Lab Course	During Week 1 to Week 6	20											
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50											
1 4 2	Lab activities,	Lab Course	During Week 7 to Week 12	20											
LAZ	attendance, journal	Faculty	Marks Submission at the end of Week 12	50											
Lab ESE	Lab Performance	Lab Course	During Week 13 to Week 18	40											
Lab ESE	and documentation	faculty	Marks Submission at the end of Week 18	40											

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total							
Remember											
Understand											
Apply											
Analyze											
Evaluate											
Create											
Total	30	30	40	100							

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
			AY 202	20-21							
			Course Info	ormation							
Progr	amme		B.Tech. (Civil Engi	neering)							
Class	Semeste	r	Second Year B. Tec	Second Year B. Tech., Sem III							
Cours	e Code	•									
Cours	o Namo		HC V 2.54								
Docirc	d Doqui	sitos.	Nil								
Desire	a Kequi	sites:									
	Teaching	g Scheme	Examination Scheme (Marks)								
Lectu	re	-	LA1	LA2	Lab ESE	Total					
Tutor	ial	-	30	30	40	100					
Practi	cal	2 hrs/week			I I						
Intera	ction	-	Credits: 1								
			Course Of	piectives							
1	Introdu	ce students the pr	operties of Minerals a	nd Rocks and enable	them to identif	v them					
	Introduc	them technique	e of drawing the cross	sections from given s	geological outc	rop maps of					
2	various	types, solving str	uctural geology probl	ems.	5	I OF C					
3	Enable	students to under	stand geological probl	em with the help of s	ubsurface inves	stigation data.					
4	Introdu	ce students the str	atigraphic formations	of India with more en	mphasis on Ma	harashtra with					
	the geol	ogical maps.									
001	11	1 . 1	Course Outc	omes (CO)							
COI	Constru	and describe the	given mineral and roo	outeron man and solv	a any structura	l geology					
CO2	problem	and interpret the	e same for civil engine	ering decision makin	g.	i geology					
CO3	Summa	rize the core logg	ing from the recovere	d core data and interp	oret the subsurfa	ace conditions					
05	by corre	elating the same.									
				/							
			List of Experiment	s / Lab Activities							
List of	f Experin	nents:	C ·								
1.1 der	cribing th	and description	of megascopic proper	ties of minerals.	ne Amphibale	and Mica					
2. Des	of miner	ils initialis speci	inicii itolii Silica, Feld	ispai, Oliville, Fyloxe	ane, Ampinoole						
3. Des	cribe the	minerals' specim	en from Garnet, Carbo	onate, Sulphate, Zeoli	ite, Other silica	tes and Ore					
minera	al groups	1	,		,						
4. Petr	ographic	identification of	Igneous Rock Specim	en.							
5. Petr	ographic	identification of	Metamorphic Rock Sp	pecimen.							
6. Petr	ographic	identification of	Sedimentary Rock Sp	ecimen.							
7. Geo	logical O	uterop Map with	Inclined Series								
9. Geo	logical O	uterop Map with	Two series and one U	Inconformity							
10. Ge	cological	Outcrop Map wit	h Dykes and Sill.	, no oni oni origination							
11. Ge	ological	Outcrop Map wit	h Vertical Fault.								
12. Str	ructural C	eology-Dip and	Strike Problems.								
13. Co	ore loggin	g from available	core sample data, prep	paration of report, inte	erpretation and	correlation.					
				-							
		(Denser (D)	Text B	OOKS	uhlish an D' ('	hustana 1705 D					
1	K. N Nai	1. Bangar.,"Princ Sarak, Delhi	ipies of Engineering (Jeology", Standard P	ublishers Distri	butors 1/05-B					
2	N. C Roa	³ henna Kesavulu, d Daryanganj, Ne	"Textbook of Engine w Delhi	ering Geology", Mac	millian India L	td. 2/10 Ansari					

3	Parbin Singh, "Engineering and General Geology", S. K. Katariya and Sons, Delhi, 1984, 1 st Edition.
	References
1	M. S. Krishnan, "Geology of India and Burma", CBS Publishers & Distributors
2	A. Holmes, "Principles of Physical Geology", ELBS Chapman and Hall, London.
3	Dr. D. V. Reddy "Engineering Geology for Civil Engineering", Oxford and IBH Publishing
5	Co. Pvt. Ltd., New Delhi, 1995, 1 st Edition.
	Useful Links

1														
CO-PO Mapping														
	Programme Outcomes (PO) PSO												50	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1								1	1			1	2
CO2	1	2		1					1	1			1	1
CO3	1	2		1					1	1			1	1
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 r	nap to	at leas	t one P	Ю.							

		Asses	sment	
There are fou	r components of lab as	ssessment, LA1, I	LA2, and Lab ESE.	
IMP: Lab ES	E is a separate head of	passing. Lab ESI	E is treated as End Semester Exam and is bas	ed on all
experiments/	ab activities.			
Assessment	Based on	Conducted by	Typical Schedule	Marks
ТА1	Lab activities,	Lab Course	During Week 1 to Week 6	20
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50
ТАЭ	Lab activities,	Lab Course	During Week 7 to Week 12	20
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50
LIDOD	Lab Performance	Lab Course	During Week 13 to Week 18	

Marks Submission at the end of Week 18 Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

faculty

40

Lab ESE

and documentation

Assessme	nt Plan based on]	Bloom's Taxonom	y Level	
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember				
Understand				
Apply				
Analyze				
Evaluate				
Create				
Total	30	30	40	100

		Walc	hand College of I (Government Aided Au	Engineering, S tonomous Institute)	angli	
			AY 202	0-21		
			Course Info	ormation		
Progra	amme		B.Tech. (Civil Engin	eering)		
Class,	Semeste	er	Second Year B. Tech	n., Sem III		
Cours	e Code		4CV255			
Cours	e Name		Surveying Laborator	у		
Desire	ed Requi	sites:	Engineering Surveyi	ng		
	Teachin	g Scheme		Examination Sche	me (Marks)	
Lectu	re	-	LA1	LA2	Lab ESE	Total
Tutori	ial	-	30	30	40	100
Practi	cal	2 hrs/week				
Intera	ction	-	Credits: 1			
			I			
			Course Ob	jectives		
1	To stud	y basic surveying	techniques through field	eld exercises.		
2	To dev	elop and retain a t	basic understanding of ment in the field with (site selection, local	tional survey, hori	izontal and
	vertical	control establish	ment in the neta with t		In fand Surveys.	
			Course Outco	omes (CO)		
CO1	Implen	ent appropriate su	urveying methodology			
$\frac{CO2}{CO2}$	Study t	opographic featur	e			
03	verity	suitability of site	condition for major en	gineering project		
			List of Experiments	/ Lab Activities		
List of	f Experi	ments:				
Part I	: Field E	Exercises (inside f	the campus)			
2. Plan	ne Table	Survey				
3. Lev	elling:	Survey				
a. Stud	ly of Du	npy, Auto, and til	ting level			
b. Leve	elling ex	ercises				
4. The	odolite &	Trigonometric le	evelling:			
a. Ang b. Stuc	le meast	ro optic theodolit	e c. Line out of Structu	ires		
5. Tacl	heometry	/:				
a. Dete	erminatio	on of constants of	Tacheometer			
b. Stad	lia tacheo	ometry for length,	gradient, and area det	ermination		
Part I	I: Field	Projects (outside	the campus)			
6. Roa	d Survey	ring (Alignment, I	Earthwork calculations	etc.)		
7. Blo	ck and R	adial Contouring	(Interpolation calculati	ons, Drawings etc.)	
			Text Ro	ooks		
1	B. C Nev	C. Punmia and Jai v Delhi.	n "Surveying", Vol.1,	2 & 3, Laxmi Publi	cations, 17 th edit	ion, 2015,
2	N. 1 201	N. Basak, "Survey 7, New Delhi.	ving and Levelling", Ta	ata Mcgraw Hill Ed	lucation Pvt Ltd, 2	2 nd edition ,
3	K. I	R. Arora "Survevi	ng", Vol.1 & 2. Standa	ard Book House. 16	th edition, 2018.	Kota.
	1 11 1		Referen	nces		

1	Duggal S. K, "Surveying", Tata Mcgraw Hill Education Pvt Ltd, 4 th edition, 2017, Delhi.
2	Bannister and Raymond, "Surveying", ELBS, Longman Group Ltd., England.
3	R.E. Davis, F. Foote and J. Kelly, "Surveying; Theory and Practice", McGraw Hill Book
	Company, New York.
	Useful Links
1	
2	
3	
4	

						CO-P	O Map	oping						
				P	rograi	mme C	Outcon	nes (PC))				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1								2				1	
CO2				2					2				1	
CO3				2					2				1	
The stren	gth of 1	nappir	ng is to	be wr	itten as	\$ 1,2,3;	Where	e, 1:Lo	w, 2:N	ledium	, 3:Hig	gh		
Each CO	of the	course	must r	nap to	at leas	t one P	Ю.							

		Asses	sment	
There are fou	r components of lab as	ssessment, LA1, I	LA2, and Lab ESE.	
IMP: Lab ES	E is a separate head of	passing. Lab ESI	E is treated as End Semester Exam and is bas	ed on all
experiments/l	ab activities.			
Assessment	Based on	Conducted by	Typical Schedule	Marks
ТАТ	Lab activities,	Lab Course	During Week 1 to Week 6	20
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50
T A 2	Lab activities,	Lab Course	During Week 7 to Week 12	20
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50
Lab ESE	Lab Performance	Lab Course	During Week 13 to Week 18	40
	and documentation	faculty	Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessme	nt Plan based on	Bloom's Taxonom	y Level	
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember				
Understand				
Apply				
Analyze				
Evaluate				
Create				
Total	30	30	40	100

		Walc	hand College of	Engineering, Sa	ngli		
			(Government Aided Au	utonomous Institute)			
			AY 202	21-22			
			Course Inf	ormation			
Progr	amme		B. Tech. (Civil Eng	ineering)			
Class,	Semester		Second Year B. Tec	ch., Semester IV			
Cours	se Code		4HS201				
Cours	se Name		Development of So	cieties			
Desire	sired Requisites: Nil						
	Teaching	Scheme		Examination Schem	e (Marks)		
Lectu	re	2 Hrs./week	T1	T2	ESE	Total	
Tutor	ial	-	20	20	60	100	
Practi	ical	-					
Intera	action	-		Credits: 2			
	T . 1		Course O	bjectives		C '1'	
1	Introduc	e students to th	he field of social dev	velopment with a str	ong emphasis on	families	
	and communities using the Development Goals and Human Rights frameworks.						
2	Provide	students with a	an understanding of	the key concepts an	d issues related to	o societal	
	develop	ment such as p	overty, inequality, a	nd exclusion.			
3	Encoura	ge students to	explore alternative	paths of societal dev	elopment that pro	motes the	
	well-bei	ng of individua	als, families, and co	mmunities in India o	or around the wor	ld.	
			Course Outc	omes (CO)			
COL	Explain	"Societal deve	lopment" and the ro	ole of India's Develo	pment Goals in s	haping	
	social de	evelopment in	the globalized world	1.			
CO2	Examine	e critically the	role of human rights	s in constraining or a	advancing develo	pment of	
	societies	5.					
	Describe	e the key social	l development issue	s confronting indivi	duals, families, a	nd	
CO3	commun	ities in conten	porary societies and	d explore the role of	social advertiser	nent and	
	educatio	n in promoting	g Societal developm	ent in India.			
Modu	ıle		Module C	ontents		Hours	
	Conc	ept and definit	ions of development				
	Mean	ing and Conce	ept of development,	development in Ind	ia in Pre British,		
I	Britis	h and Post E	British period, Idea	of development in	current context,	4	
	Chara	acteristics of D	evelopment, Perspec	tives on Developmer	nt, Dimensions of		
	Deve	lopment, Model	s of Development.				

II	Social development Social development: Meaning and definitions, Relationship between human being and society, Concept behind the origin of Family, Clan and Society, Children's rights, education and social development, Women's rights, gender equality and social development, Features of Social Development, Social Development in the United Nation's Agenda, Social Development in India, Factors facilitating Social Development, Factors hindering Social Development, Comparative study on different models of social structures and their evolution.	5
III	Economic development Meaning and concept, Capitalism, Socialism, Marxism. Barter, Jajmani. Materials economy: The story of stuff project. Characteristics of economic development, Why countries desire economic development? Key drivers of economic development, Circle of Economic Development, Phases of economic development, Barriers to economic development, Buddhist Economics, Gandhian idea of Development, Swarajya and decentralization.	7
IV	Political development Concept, History and ideas of political system Different models of governing systems and their comparative study.	3
v	Human development The Concept of Human Development, Human Development in the United Nation's Agenda, Human development Approach vs. the Conventional Development Approach, Indicators of human development, Economic development and human development, Barriers to human development	5
VI	Sustainable developmentMeaning and definition, Origin of the concept, World Conventions on SustainableDevelopment, Objectives of sustainable Development, Requirements ofsustainable Development, Dimensions of Sustainable Development, Key Issues inSustainable Development, Challenges to Sustainable Development	6
1	Bakshi. P. M, "The Constitution of India" Universal Law Publishing Co., De (2009).	lhi
2	Sankhdher, M.M. "The Welfare State", Deep and Deep publications, Delhi (2	2003)
3	Ved Prakash. K. Biswal, "Perspectives on Education and Development", Ship Publication, 2008	ora
1	References	-
	David Diachaud and James Midgley "Social Protection Economic growth	nd Social
2	change", Edward Elgar publications, 2013.	and Social
3	Szymon Chodak, "Societal Development: Five Approaches with Conclus Comparative Analysis", Oxford University Press, 1974.	ions from

CO-PO Mapping

				P	rograi	mme C)utcon	nes (PO	C)				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1						2	2							
CO2						2	2							
CO3						2	2							

Assessment

Assessme	nt Plan based on B	loom's Taxonomy Lev	vel	
Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember				
Understand				
Apply				
Analyze				
Evaluate				
Create				
Total				

AY 2021-22 Course Information Programme B. Tech. (Civil Engineering) Class, Semester Second Year B. Tech., Semester IV Course Code 4HS203 Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - - - - Course Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
Course Information Programme B. Tech. (Civil Engineering) Class, Semester Second Year B. Tech., Semester IV Course Code 4HS203 Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - Course Objectives Course Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. Infuse an understanding of the concepts on scientific basis in the functional area of Engineering and technology. Infuse an understanding of the concepts on scientific basis in the functional area of Engineering and technology.	
Programme B. Tech. (Civil Engineering) Class, Semester Second Year B. Tech., Semester IV Course Code 4HS203 Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - - - - Interaction - Course Objectives - 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. -	
Class, Semester Second Year B. Tech., Semester IV Course Code 4HS203 Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - - - - Interaction - Credits: 3 - 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. -	
Course Code 4HS203 Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - Credits: 3 Curse Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. Infuse an understanding of the various environmental concepts on scientific basis in the	
Course Name Environmental Science Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - Credits: 3 Science Science Interaction - Course Objectives Scientific basis in the functional area of Engineering and technology.	
Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Lecture 2 Hrs./week T1 T2 ESE Total Tutorial 1 Hrs./week 20 20 60 100 Practical - Credits: 3 Interaction - Course Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
Teaching SchemeExamination Scheme (Marks)Lecture2 Hrs./weekT1T2ESETotalTutorial1 Hrs./week202060100Practical-Credits: 3Course ObjectivesInteraction-Course Objectives1Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
Teaching SchemeExamination Scheme (Marks)Lecture2 Hrs./weekT1T2ESETotalTutorial1 Hrs./week202060100Practical-Credits: 3Interaction-Course ObjectivesInfuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
$\begin{tabular}{ c c c c c } \hline Lecture & 2 \ Hrs./week & T1 & T2 & ESE & Total \\ \hline Tutorial & 1 \ Hrs./week & 20 & 20 & 60 & 100 \\ \hline Practical & - & & & \\ \hline Interaction & - & & & & \\ \hline Interaction & - & & & & \\ \hline & & & & & \\ \hline & & & & & \\ \hline & & & &$	
$\begin{tabular}{ c c c c c } \hline Tutorial & 1 \mbox{ Hrs./week} & 20 & 20 & 60 & 100 \\ \hline \end{tabular} \hline $	
Practical - Interaction - Credits: 3 Image: state of the	
Interaction - Credits: 3 Course Objectives Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
Course Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
Course Objectives 1 Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
1Infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology.	
functional area of Engineering and technology.	
Provide a foundation to critically assess the approaches to pollution control, environmental	
2 and resource management, sustainable development, cleaner technologies, Environmental	
Legislation based on an understanding of the fundamental, environmental dimensions.	
3 Inculcate the modern concept of green industry and the impact of excess human population,	
globalization, and climate change on the environment.	
Course Outcomes (CO)	
COI Describe key concepts of Environmental science and their relationship to engineering	
CO2 Explain ethical and legal responsibility of an engineer and his role in effective	
implementation of sustainable activities through EIA and EMS in the corporate sector.	
CO3 Predict impact of contemporary issues (Population Explosion, Climate change,	
Environmental pollution) on the environment	
Module Module Contents Hour	rs
Environment, Ecology and Biodiversity	
definition score chiestives and importance. Components of the Environment	
Atmosphere, Undresphere, Litheophere and Disephere	
Atmosphere, Hydrosphere, Etmosphere and Biosphere.	
function Trophic levels Food chains food webs Foological pyramids Foological	
runction, riopine levels, rood chains, rood webs, Ecological pyrainius, Ecological	
SUCCESSION BIOVEOCHEMICAL CVCIES	
Biological Diversity: Introduction Value of biodiversity: consumptive use	

П	 Human Population, Energy and Natural Resources Human Population Growth and Environment: Population Dynamics, Age structures, Energy Scenario: Future projections of Energy Demand, Utilization of various Energy Sources, Conventional Energy Sources and Non- Conventional Energy Sources, Urban problems related to energy. Natural Resources: Food, Water, Forest, Geological, Equitable Use of Resources for Sustainable life style. Case studies. 	5
Ш	Climate Change, Environmental Quality and Pollution Control Climate change: Global warming, Ozone depletion, Acid Rain. Environmental Impact: Impact of Modern agriculture on the Environment, Impact of Mining on the Environment, Impact of Large dams on the Environment, Environmental pollution: Air, Water, Soil, Noise, Marine, classification of pollutants, their causes, effects and control measures. Case studies.	5
IV	Solid, Hazardous Waste and Disaster Management Solid and Hazardous waste management: Introduction, categories, causes, effects and management of municipal solid waste, Hazardous waste Disaster Management: Introduction, types of disasters, Disaster mitigation. Case studies.	4
V	 Social Issues, Environmental Management and Legislation Environmental ethics: Introduction, Ethical responsibility, issues and possible solutions. Environmental Management: Introduction to Environmental Impact Assessment, Environmental Management System: ISO 14001Standard, Environmental Auditing, National and International Environmental protection Agencies pertaining to Environmental Protection. Environmental Legislation: Environmental protection act 1986, Water (prevention and control of pollution) Act 1974, Air (prevention and control of pollution) Act 1972, and Forest Conservation Act 1980. Municipal Solid Wastes (Management and Handling) Rules, 2000. 	4
VI	Cleaner technology Restoration Ecology, Role of Information Technology in Environment science, Green buildings, Green products, Consumerism and Waste Products, Minimization of Hazardous Products, Reuse of Waste, By-products, Rainwater Harvesting, Translocation of trees. Some Success Stories. Case studies	3
	Toxt Dools	
1	Mrinalini Pande, "Disaster Management", Wiley Publications New Delhi, Finedition, 2014	rst
2	N.K Uberoi, "Environmental Studies", Excel Books Publications New Delhi, edition, 2005.	first
3	R.Rajagopalan, "Environmental Studies from crisis to cure" Oxford universit second edition, 2011	y press,
	References	

1	William. Cunningham and Barbara Woodworth Saigo, "Environmental Science: A Global					
1	Concern", WCB/McGraw Hill publication, 5th Edition, 1999.					
2	Peter. H. Raven, Linda. R. Berg, George. B. Johnson, "Environment", McGraw Hill					
2	publication, 2nd -Edition, 1998.					
2	Catherine Allan & George H. Stanley (Editors), "Adaptive Environmental Management",					
5	Springer Publications. 2009					
Useful Links						
	Nil					

	CO-PO Mapping													
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1						2	2							
CO2							3	2						
CO3							2							

Assessment

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember											
Understand											
Apply											
Analyze											
Evaluate											
Create											
Total											

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 202	21-22						
			Course Inf	ormation						
Progr	Programme B. Tech. (Civil Engineering)									
Class,	Class, Semester Second Year B. Tech., Semester IV									
Cours	se Co	ode	4CV221							
Course Name Hydraulics and Hydraulics Machinery										
Desire	ed R	equisites:	Fluid Mechanics							
	Tea	ching Scheme		Examination Schem	e (Marks)					
Lectu	re	3 Hrs./week	T1	Τ2	ESE	Total				
Tutor	ial	-	20	20	60	100				
Practi	ical	-			· · ·					
Intera	actio	n -		Credits: 3						
			Course O	bjectives						
1	To	provide student kno	wledge on basic concep	pts of open channel fl	ow.					
2	2 To develop students skills and apply the knowledge for analysis of hydraulic jumps, uniform									
	and	d gradually-varying	flows.							
3	То	provide student the	knowledge of centrifug	gal pump and Pelton w	heel turbine for its	selection.				
~~~			Course Outc	comes (CO)						
CO1	Ex	plain and distingu	sh basic concept of o	pen channel flow						
CO2	Ap	oply and analyze th	e basic equations of c	open channel flow for	or surface profiles	and				
	en	ergy dissipation sy	stem.							
CO3	Ar	alyze the perform	ance and working of p	pump and turbine						
				-						
Modu	ıle		Module C	ontents		Hours				
		Introduction to op	en channel Flow							
I		Scope and importa	nce Types of open ch	annel, Types of flow	s in open channel,	7				
		Geometric elemen	ts, velocity distribution	on, Energy and mo	horac					
		applied to open cha	nnel now, weasuremen	it of velocity and disc	narge					
		Uniform flow Ur	iform flow characteri	etice priematic char	nel Chazy's and					
П		Manning's Form	ilae Manning's roi	ughness coefficient	Uniform flow	7				
11		computations Normal depth Conveyance Section factor Hydraulia exponent								
		Hydraulically most	efficient sections.	ficient sections						
		Specific Energy an	d Specific Force							
		Energy -Depth rela	tionship in open channel	el flow, Specific ener	gy - definition and	_				
III		diagram, Critical	flow, Sub-critical and	l supercritical flow,	Specific force -	6				
		definition and diag	am, Unit discharge and	l discharge diagram.	-					

	Gradually Varied flow							
IV	Definition and types of non-uniform flow, Gradually Varied Flow (GVF) and Rapidly Varied Flow (RVF), Basic assumptions of GVF; Governing Differential Equation of GVFAlternative forms; Classification of channel bed-slopes; Zones of GVF profiles; Various GVF profiles, their general characteristics and examples of their occurrence; Control section., Gradually varied flow computations.							
	Rapidly varied flow							
V	Phenomenon of Hydraulic jump; Location and examples of occurrence of hydraulic jump; Assumptions in the theory of hydraulic jump; Application of momentum equation to hydraulic jump in rectangular channel; Conjugate depths and relation between conjugate depths. Various terms related to hydraulic jump; Classification of hydraulic jump; Practical uses of hydraulic jump. Energy dissipation in hydraulic jump; graphical method of determination of energy dissipation.	6						
VI	<b>Pump and Turbine</b> Pelton wheel turbine: type, working and principle of Pelton wheel turbine. Centrifugal pump: type, component parts and working of pump.	6						
	Text Books							
1	Rangaraju K. G., "Flow in Open Channels", Tata McGraw Hill Publication C New Delhi, 1st Edition, 1993.	Co. Ltd.,						
2	Modi P. M. and Seth S. M., "Hydraulics and Fluid Mechanics", Standard Boo 9 th Edition, 2013.	ok House,						
3	Ven Te Chow, "Open channel Hydraulics", Tata McGraw Hill Publishing, 1s 2000	t Edition,						
	References							
1	Subramanya K., "Flow in Open Channels", Tata McGraw-Hill Education, 7th Editi-	on, 2009						
2	Chanson "The Hydraulics of Open Channel Flow an Introduction", Wiley, 1st Edition	on, 2004.						
3	A. K. Jain, "Fluid Mechanics", Khanna Publishers, 11th Edition, 2013.							

CO-PO Mapping														
		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1												1	1
CO2		2											2	2
CO3			3										3	3

Assessment The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	Τ2	ESE	Total						
Remember										
Understand										
Apply										
Analyze										
Evaluate										
Create										
Total										

		Walc	hand College of	Engineering, Sa	ngli				
			(Government Aided A	utonomous Institute)	_				
			AY 20	21-22					
			Course Inf	ormation					
Progr	Programme         B. Tech. (Civil Engineering)								
Class,	Class, Semester Second Year B. Tech., Semester IV								
Cours	se Code	1	4CV222						
Cours	Course Name Building Planning and Design								
<b>Desired Requisites:</b> Exposure to Building Materials and Construction									
	Teach	ng Scheme		Examination Schem	e (Marks)				
Lectu	re	3 Hrs./week	T1	T2	ESE	Total			
Tutor	ial	-	20	20	60	100			
Practi	ical	-							
Intera	iction	-		Credits: 3	•				
	1		Course O	bjectives					
1	Conc	epts in Building Pla	nning and functional	design.					
2	Integ	ation of aesthetical	concepts and influen	ce of climate in build	ing design.				
3	The a	rt of expressing but	ildings in terms of dra	wings.					
			Course Outo	comes (CO)					
	Perce	vive the requirement	ents of residential/pu	ablic building in terr	ns of structural, f	unctional			
CO1	aspec	ts and apply the p	principles of planning	ng, bye laws/regulati	ons during planni	ng process			
	of bu	ildings.							
CO2	Pract	ice the planning i	deologies in buildin	gs, in relevance to b	uilding services,				
	clima	tology, acoustics	and fire resistance.						
CO3	Desi	gn buildings by co	mposing functional	and aesthetical asp	ects and illustrate	building			
	grapl	ically in terms of	engineering drawir	ngs.					
Modu	ıle		Module C	Contents		Hours			
	Si	te, Building and B	uilding Drawings						
	C	ategories of buildin	gs as per NBC, Types	s of Residential buildi	ngs, Site selection,				
I	Fa	ctors influencing	selection of site, gu	idelines for planning	g and drawing of	5			
	bi	ildings, Positions	of various building	g components, types	of drawings and				
	re	levant scales.							
	P	rinciples of Buildin	ng Planning						
	C	onceptual understa	nding of Aspect, pr	ospect, Privacy, Furi	nture, Roominess,	_			
11	G	Grouping, Circulation, Sanitation, Lighting, Ventilation, Flexibility, Elegance,							
	Di   h	initation, Economy	and their interrelationship in the integrated planning of						
	DI	mungs.							
	B	highting Bye laws	malot size Duild	a fuente as areas	and available				
ш		open spaces, star	ani piot size, Buildi	buildings Provision	n for light &	7			
		entilation Means	for access Drainage	& sanitation FSI	Fungihle FSI	, ,			
	S	aleable areas, Trai	nsfer of developmer	nt rights, RERA.					

	Planning of Building Services and Finishes						
	Requirements in different types of buildings, Integrated approach to planning in						
IV	aspects like 7 aesthetics, building services viz. Plumbing for water supply and	7					
	sanitation, Electrification, landscape. Types of Finishes for Wall, Floor, Roof,						
	Ceilings. Types of Paints and their applications, Defects in finishes.						
	Climatology and Building design						
V	Elements of climate, Climatic zones, Comfort indices, Direction and its	7					
v	characteristics, orientation of buildings, factors affecting orientation, Orientation	1					
	criteria in various zones, Natural and Artificial means of achieving comfort.						
	Acoustics and Fire resistance in buildings						
VI	Applications, Sound ratings, conditions of good acoustics, Sound behavior						
	in enclosures, Common acoustical defects, Echo & reverberation,						
	acoustical design of auditoriums.	7					
	Fire safety & role of designer, causes, fire loads & occupancies, Fire						
	resistance of common building materials, general fire safety						
	recommendations, Fire escapes, Alarms & extinguishing equipment.						
	Text Books						
1	Kumarswamy and Kameshwar Rao., "Building Planning and Design," Charo	tar					
1	Publications, 8 th Edition, 2010						
2	V. B. Sikka, Civil Engineering Drawing, S. K. Kataria and Sons, 7th Edition,	2015					
	References						
1	Pierce S Rowland, Planning: The Architect's Handbook "E. & OE", Iliffe Books Lt	d. London,					
1	1963, 8th Edition.						
2	John Hancock Callender, Joseph De Chiara, "Time Saver Standards for Building	ng Types",					
2	McGraw-Hill, New York, 1983.						
3	National Building Code of India 2016 (NBC 2016) Volume 1 and 2, Bureau						
5	Standards, New Delhi, 2016.						

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1		3											1		
CO2			3				2						1		
CO3			3										2		

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	Τ2	ESE	Total						
Remember										
Understand										
Apply										
Analyze										
Evaluate										
Create										
Total										

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 20	21-22						
			Course In	formation						
Progr	amn	ne	B. Tech. (Civil Eng	zineering)						
Class,	Sen	nester	Second Year B. Te	ch., Semester IV						
Cours	se Co	ode	4CV223							
Cours	se Na	ame	Water Resource En	gineering						
Desire	ed R	equisites:		<u> </u>						
	Tea	ching Scheme		<b>Examination Scheme</b>	e (Marks)					
Lectu	re	2 Hrs./week	T1	T2	ESE	Total				
Tutor	ial	1 Hrs./week	20	20	60	100				
Practi	ical	-		·						
Intera	octio	n -		Credits: 3						
			Course O	bjectives						
1	To	impart basic know	ledge of fundamenta	al concepts of Engine	ering Hydrolog	/.				
2		impart fundament	als of Irrigation Engi	ineering and watershe	ed management	and their				
	Iei		Course Out	comes (CO)						
	Ex	nlain basic concen	ts of hydrologic cycl	e aquifers irrigation	systems water	hed				
CO1	ma	anagement.		e, aquitors, inigation	systems, water	iicu				
con	De	escribe prevailing in	rigation water mana	gement practices, typ	es of minor irrig	gation,				
	go	vernment laws and	water policy.							
CO3	Ar	nalyze precipitation	data and solve prob	lems related to hydro	graph, aquifers,	irrigation,				
	Wa	ater requirement an	d crop yield.							
<u>CO4</u>	De	esign canal structur	es and rainwater har	vesting system.						
Modu	ıle		Module (	Contents		Hours				
		Engineering Hydr	ology : Introduction							
		Hydrological cycle	and application of hyd	rology.						
т		Precipitation: Type	s of Precipitation, mea	surement, analysis of	Precipitation data	, _				
1		mass rainfall curves	s, intensity-duration cu	rves, and concept of de	epth area duration	1 3				
		analysis, frequency	analysis.							
	Evaporation, transpiration, evapotranspiration and infiltration.									
		Runoff								
		Rainfall-runoff re	lationships, Flow	Duration Curve, Fl	ow-mass Curve					
		applications,								
II		Hydrograph analys	sis: Factors affecting	runoff, Unit hydrog	raph theory and	1 5				
		applications.		innetion 1 ( 1	flood					
		Stream flow meas	surement. Floods Est	imation and control,	flood frequency					
		analysis, Introduction	on to flood routing.							

	Ground water hydrology	
	Occurrence, Aquifers, hydraulic conductivity, transmissivity, Aquifer yield.	
III	Well irrigation: Well hydraulics, Tube wells- Types, Methods for drilling, Well	5
	Development. Open wells- Classification, Yield, Advantages and Disadvantages	
	of well irrigation Ground water recharge methods and its efficiency.	
	Water Requirement and Reservoir Planning	
	Water requirement of crops, Soil Water-Plant Relationship, Methods of Field	
	Water Application, Effects of excess water for irrigation, cropping pattern,	
	Irrigation Water management and distribution, warabandi, rotational application,	_
IV	Introduction to prevalent Government laws and water policy.	5
	Irrigation: Necessity, Survey and data collection for irrigation project, Reservoir	
	planning and sediment control Types of Irrigation Schemes, performance	
	assessment of irrigation scheme	
	Canal Irrigation	
	Canal and Canal structures Canal lining Diversion head works- Weir and	
	Barrages	
v	Cross-Drainage works- Aqueduct, Siphon aqueduct, Super passage, Canal siphon,	5
	Canal Maintenance. Canal revenue assessment methods, canal water losses and its	
	preventive measures.	
	Minor irrigation & Watershed Management	
	Minor Irrigation-	
	Check dam, Nala bund, Bandhara Irrigation- Construction and Working,	
	Advantages and Disadvantages, Layout and components, Percolation tank- Need,	
VI	Selection of site, Construction, Lift irrigation schemes- Layout, Components and	5
	functions.	
	Watershed management, Water Scarcity scenario, Soil conservation measures,	
	Methods and design of Rainwater harvesting systems, effective utilization of	
	water for various purposes	
	Tart Dooks	
	I EXI DOOKS	hanna
1	publisher Delhi 15th edition (2010)	IIaIIIIa
2	M. I. Deodhar, "Elementary Engineering Hydrology" Pearson Education, 1st Editi	(2009)
	S K Garg "Water resources Engg Vol II Irrigation Engineering &	hydraulic
3	Structures" Khanna publisher Delhi 24th edition (2011)	nyululle
	References	
1	H. M. Raghunath,"Hydrology: principles, analysis, design", New Ace International	ational (P)
	Limited, Publishers, 2nd edition.	
2	B. C. Punmia, Pande Brij Basi Lal, Arun Kumar Jain, Ashok Kumar Jain, "Irri	gation and
	Water Power Engineering", Laxmi Publications, 16th edition (2009).	
3	Asawa G. L., "Irrigation and Water Resources Engineering", New Age Ir	ternational
	Publishers, 1st edition (2005).	

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	1													2	
CO2	1													2	
CO3			3										2	2	
CO3			3										2	2	

Assessment

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Т2	ESE	Total							
Remember											
Understand											
Apply											
Analyze											
Evaluate											
Create											
Total											

	Walchand College of Engineering, Sangli									
			(Government Aided A	utonomous Institute)						
			AY 20	21-22						
			Course Inf	formation						
Progra	amme		B. Tech. (Civil Eng	ineering)						
Class,	Semester		Second Year B. Teo	ch., Semester IV						
Cours	e Code		4AM221							
Cours	e Name		Structural Analysis							
Desired Requisites:										
	Teaching	Scheme		Examination Schem	e (Marks)					
Lectu	re	3 Hrs./week	T1	T2	ESE	Total				
Tutor	ial		20	20	60	100				
Practi	cal	-								
Intera	ction	-		Credits: 3						
			Course O	bjectives						
1	To illus	trate concept of	static and kinemat	ic indeterminacy of	structures.					
2	To prov	ide the knowled es.	dge of various meth	nods to evaluate defo	rmations of vario	us				
3	To impa	art the knowled	ge for analyzing de	terminate and indete	rminate structures	by using				
5	various	methods.								
			Course Outo	comes (CO)						
CO1	Perceive	e behavior of st	atically determinate	e and indeterminate s	structures.					
CO2	Apply v	arious techniqu es.	es of structural me	chanics to solve dete	erminate and indet	erminate				
CO3	Analyze	field structure	s using various ann	roaches in structural	mechanics					
	1 mary 20		s using various upp							
Modu	ıle		Module (	ontents		Hours				
lillud	Slope	e and Deflection	is of beams	ontents		Hours				
	Type	s of structures,	Equilibrium and co	mpatibility conditions	, determinate and					
I	indet	erminate structu	res, Static and kinem	atic degree of indetern	ninacy.	7				
	Defle	ection of Beam	s: - Computation	of Slope and Defled	ctions in Beams-					
	Maca	aulay's method –	Moment area metho	d - Conjugate beam m	ethod.					
	Ener	gy Principles								
	Strai	n energy due to	axial force, shear	force, bending mome	ent and torque.					
п	Strai	n energy and co	omplimentary energ	gy, Castigliano's Stra	in Energy	7				
	theorems. Unit load method. Computation of deflections in determinate									
	struc	tures such as b	eams, bends, arches	s, trusses Betti's and	Maxwell's					
	recip	orocal theorems	•							
	Strai	in Energy Meth	od							
Ш	Anal	ysis of indetern	ninate structures suc	ch as two hinged po	rtal frames, Two	6				
	hinge	ed arches and	indeterminate trusse	s, Effect of lack of	fit, Temperature	-				
	stress	ses.								

	Influence Line Diagrams	
IV	Muller-Breslau's principle and its application to statically determinate simple and	6
1 V	compound beams. Influence line diagrams for support reaction, shear force and	0
	bending moment, ILD for member forces in statically determinate trusses.	
	Analysis of Indeterminate Structures	
	Slope Deflection Method: Slope deflection equations, Sinking of supports,	
V	Application to beams and frames with and without sway, concept of Symmetry	7
•	and anti-symmetry.	
	Moment Distribution Method: Relative and absolute stiffness, Distribution factors,	
	Sinking of supports, Applications to beams, frames with and without sway.	
	Introduction to matrix methods for structural analysis	
	Flexibility Method- Flexibility coefficients, Compatibility equations, Applications	
VI	to propped cantilevers, fixed beams, continuous beams, (Degree of S.I. $\leq 2$ )	6
	Stiffness Method- Stiffness coefficients, Equilibrium equation, Applications to	
	beams and frames, (Degree of K.I. $\leq 2$ )	
	Text Books	
1	Devdas Menon, "Structural Analysis", Alpha Science Intl, Ltd., 2nd Edition,	2008.
2	Pandit & Gupta, "Structural Analysis - Matrix Approach", Tata McGraw-Hil	1
2	Publishing Company Ltd., New Delhi, 4th Edition, 2004.	
2	Bhavikatti S. S., "Matrix Methods of Structural Analysis", I. K. International	
5	Publishing house Pvt. Ltd., 1st Edition, 2003.	
	·	
	References	
1	Hibbeler R. C., "Mechanics of Materials", Pearson Education, 10th Edition, 2016.	
2	Weaver and Gere J. M., "Matrix Analysis of Framed Structures", CBS Publications	and
2	Distributors, 2nd Edition, 2004.	
3	Wang C. K., "Indeterminate Structural Analysis", Tata McGraw-Hill Publishing Co	mpany
	Ltd., New Delhi, 1st Edition, 1983.	
1		

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2	1												2	
CO2	3	3												3	
CO3	3	3											1	2	

Assessment The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember											
Understand											
Apply											
Analyze											
Evaluate											
Create											
Total											

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 202	21-22						
			Course Inf	ormation						
Progr	amme		B.Tech. (Civil Engi	neering)						
Class,	Semester		Second Year B. Tec	ch., Sem IV						
Cours	e Code		4CV271							
Cours	e Name		Hydraulics Laborate	ory						
Desire	d Requisi	tes:	Fluid Mechanics an	d Hydraulics						
	Teaching	Scheme		<b>Examination Sche</b>	eme (Marks)					
Lectu	re	-	LA1	LA2	Lab ESE	Total				
Tutor	ial	-	30	30	40	100				
Practi	cal	2								
Intera	ction	-		Credits	:1					
	1		Course O	bjectives						
1	Explore t	he fundamental	principles of fluid me	echanics through ex	perimentation					
2	Demonst To provid	rate and analyze	key hydraulic pheno	mena using hands-	on physical devic	es				
3		Le students know	vieuge about the wor	king of centringar j	built and renon	wheel turbine.				
			Course Outc	omes (CO)						
CO1	O1 Compute velocity and manning's constant for the open channel flow and apply knowledge for analysis uniform and non-uniform flow.									
CO2	Demonst analysis	rate the flow me	easuring devices for and non-uniform flow	the open channel fl w	ow and apply th	e knowledge for				
CO3	Analyze	the performance	and working of cent	rifugal pump and Po	elton wheel turbi	ne.				
			T							
<b>T</b> • 4 4	•		List of Experiment	s / Lab Activities						
List of	Experime	ents:								
1.	Measure	ement of veloci	ty for open channel	flow by using pit	ot tube and cur	rent meter				
2.	Determi	nation of Man	ning's and Chezy's	constant for open	channel flow b	y using				
	uniform	flow formulae		-						
3.	Study of	f nape profile o	over a sharp crested	weir by providing	; with and with	out ventilation				
	below th	ne lower nape.								
4.	Measure	ement of open of	channel flow by usi	ng Triangular Not	ch and Rectang	gular Notch				
5.	Weir	ement of open of	channel flow by usi	ng Broad Crested	weir and Rour	a Crested				
6	Measure	ement of open (	channel flow by usi	ng Venturi flume						
<b>7</b> .	Develop	Specific Ener	gy and Specific For	ce diagrams of Hy	vdraulic Jump i	n the open				
	channel	flow.	gy and specific for	ee alugiums of Hy	, unuune sump i	ii tile open				
8.	Develop	the different t	ype of Hydraulic Ju	mps in open chan	nel flow and es	timation of				
	loss of e	energy.	••••							
9.	Study of	f characteristics	s of Centrifugal Pur	np under constant	speed.					
10	. Study of	f characteristics	s of Pelton Wheel T	urbine under cons	stant speed.					
			Text B	ooks						

1	Rangaraju K. G., "Flow in Open Channels", Tata McGraw Hill Publication Co. Ltd., New
1	Delhi, 1st Edition, 1993.
2	Aswa G. L. "Experimental Fluid Mechanics", Vol. I&II, Nem Chand & Bros., Roorkee, 1st
2	Edition, 1983.
2	Likhi, S. K., "Hydraulics: Laboratory Manual", New Age International Publishers, 1st Edition,
5	1995.
	References
1	P. M. Modi and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, 9th
1	Edition, 2013.
2	Subramanya K., "Theory and Applications of Fluid Mechanics" Tata McGraw Hill Publishing
2	Co., Ltd., 7th Edition 2000.
3	VenTe Chow, "Open channel Hydraulics", Tata McGraw Hill Publishing, 1st Edition, 2000.

	CO-PO Mapping														
		Programme Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1									1	1	
CO2				2									2	2	
CO3				3									2	2	
The stren	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 r	nap to	at leas	t one P	Ю.								

	Assessment											
There are three components of lab assessment, LA1, LA2 and Lab ESE.												
IMP: Lab ES	E is a separate head of	passing. LAI, LA	A2 together is treated as In-Semester Evaluat	ion.								
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks								
LA1	Lab activities,	Lab Course	During Week 1 to Week 6	20								
	attendance, journal	Faculty	Marks Submission at the end of Week 6	50								
T A C	Lab activities,	Lab Course	During Week 7 to Week 12	20								
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50								
Lab ESE	Lab activities,	Lab Course	During Week 15 to Week 18	40								
	attendance, journal	Faculty	Marks Submission at the end of Week 18	40								
Week 1 indica	ates starting week of a	semester. The typ	bical schedule of lab assessments is shown,									

considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessment Plan based on Bloom's Taxonomy Level												
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total								
Remember												
Understand												
Apply												

Analyze		
Evaluate		
Create		
Total		

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
			AY 20	21-22							
Course Information											
Programme B.Tech. (Civil Engineering)											
Class,	Semester		Second Year B. Teo	ch., Sem IV							
Cours	e Code		4CV272								
Cours	e Name		Building Planning a	and Design- Mini P	roject						
Desire	ed Requisi	tes:	Exposure to course	in Basic Materials	and Construction						
			1								
	Teaching	Scheme		<b>Examination Sch</b>	eme (Marks)						
Lectu	re	-	LA1	LA2	Lab ESE	Total					
Tutor	ial	-	30	30	40	100					
Practi	ical	2			·						
Intera	ction	-		Credits	:1						
		•	·								
			Course O	bjectives							
1	To impa concepts	rt the class, the of principal of r	approach to functior	ally plan and desig	n a typical buildi	ng by applying					
•	To impa	rt the class, neo	cessary knowledge to	apply the various b	building services	viz. plumbing,					
2	electrifica	ation and furnitu	re within the buildin	gs.	C						
3	To impa	rt the class, aw	areness of aesthetics	and architectural or	mamentation in b	uildings					
	through e	engineering drav	vings.								
	Comproh	and the require	Course Outo	comes (CO)	torms of struct	ural functional					
CO1	architect	ural aspects and	apply the principles	of planning bye l	aws during plan	ning process and					
001	designing	g buildings.	apply the principles	or praining, eye r	and during plan	ing process and					
CO2	Perceive	and apply diff	ferent building servi	ces namely, water	· supply, drainag	ge facilities and					
	electrific	ation services.									
CO3	Commun conventio	ncate and intera-	ct as a team to apply to tools.	the drawing techniq	lues and compose	e buildings using					
			List of Experiment	ts / Lab Activities							

List of Experime
------------------

#### **Activities / Assignments**

Forming groups of 4-5 students in each batch and allocating a type of building as a project work. An overall picture of the various planning phases will be explained to the students. Each group will be presenting each phase about the development in planning for the given problem during the practical hours.

### 1. Exercise 1

For the given type of building, groups will visit at least 3 such existing buildings and a presentation on the following is expected,

Size & nature of plot, Soil conditions and gradient, Structural system, Requirements of the building, Drawings to be submitted, scales to be adopted.

## 2. Exercise 2

For the given type of building, presentation on the following, Circulation diagram, Grouping of various rooms, a tentative plan of the building based on principles of planning privacy, ventilation, light, sizes for comfort, openings.

#### 3. Exercise 3

For the given type of building, presentation on the following, Planning revisions based on orientation of buildings, climate, Minimizing internal heat gain, Design of staircase.

## 4. Exercise 4

For the given type of building, presentation on the following, Planning revisions based on Plumbing for water supply and drainage, Design of the system, Electrification, Location of Switchboards, min. no. of points, safety devices, earthing details

# 5. Exercise 5

The various phases and improvements in of planning process will be a continuous activity and should lead to a final ideal plan for which detailed drawings are to be submitted

**Muncipal drawings-** Plan, section and front elevation, site plan, area calculations and statement.

Construction details of foundation, Doors, windows, Lintel & Chajja, Lofts, Parapet, beam layout for sunken slabs of bath & w/c

Plans showing furniture and electrification details

Plan showing water supply and plumbing layout, terrace slope and drainage, table of materials used.

# 6. Exercise 6

Students will have to draw the municipal drawing of their finalized building using AutoCAD and attach its print along with the previous sheets as submission work.

#### 7. Exercise 7

Students will have to draw the two point perspective of their finalized building.

Text Books													
1	N. Kumarswamy and A. Kameshwar Rao., "Building Planning and Design," Chraotar Publishing House Pvy. Ltd., 8th edition, 2010.												
2	V. B. Sikka, A Course in Civil Engineering Drawing, S. K. Kataria and Sons, 7th Edition, 2015.												

3	National Building Code of India 2005 and SP-7. Bureau of Indian Stds. 2nd Edition.
	References
1	Pierce S Rowland, Planning: The Architect's Handbook "E. & OE", Iliffe Books Ltd. London
2	Callender, Time saver's standard's of Architectural design data, Tata Mc Graw Hill Pub.
3	Shah, Kale & Patki, "Building drawing with Integrated approach", Tata Mc Graw Hill Pub.
4	S. C. Agarwal, "Architecture and Town Planning".

	CO-PO Mapping														
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1		2	3										2		
CO2			2				3						2		
CO3	2				2				1	1			2		
The stren	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 r	nap to	at leas	t one P	Ю.								

Assessment												
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.												
AssessmentBased onConducted byTypical Schedule (for 26-week Sem)												
та 1	Lab activities,	Lab Course	During Week 1 to Week 6	20								
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50								
T A 2	Lab activities,	Lab Course	During Week 7 to Week 12	20								
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50								
I oh ESE	Lab activities,	Lab Course	During Week 15 to Week 18	40								
Lab ESE	attendance, journal	Faculty	Marks Submission at the end of Week 18	40								
<b>W</b> 7. 1. 1 1. 1.	- <u>t</u>		· · · 1 · · 1 · 1 · 1 · · · · · · · · ·									

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessment Plan based on Bloom's Taxonomy Level												
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total								
Remember												
Understand												
Apply												
Analyze												
Evaluate												
Create												
Total												

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY 202	21-22	,					
			Course Infe	ormation						
Progr	Programme B.Tech. (Civil Engineering)									
Class.	Semester	,	Second Year B. Tec	h Sem IV						
Cours	e Code		4CV274							
Course Name Advanced Surveying Laboratory										
Desire	d Requisi	tos.	Engineering Survey	ing (4CV205) and	Fngineering surve	ving				
Desire	tu Kequisi	ites.	Laboratory (ACV25)	(40.7203) and $(3)$	Lingineering surve	Jying				
				5)						
	Teaching	Scheme		Examination Sch	neme (Marks)					
Lectu	re	-	LA1	LA2	Lab ESE	Total				
Tutor	ial	-	30	30	40	100				
Practi	cal	2								
Intera	ction	-		Credit	s: 1					
		1	1							
			Course Ol	ojectives						
1	To study	advanced surve	ying techniques throu	gh field exercises	•					
2	To devel	op and retain a b	basic understanding of	f employing specia	al functions of adva	anced survey				
	instrume	nts for land Surv	veys	(20)						
	T1		Course Outc	omes (CO)		1				
CO1	reduction	nt appropriate s	surveying functions a	ivallable with dig	ital level, digital t	theodolite, auto				
CO2	Study to	nographic featur								
CO3	Verify s	uitability of spec	ial functions for majo	r engineering proj	ect					
			List of Experiment	s / Lab Activities						
List of	f Experim	ents:								
	Part I: l	Field Exercises	(inside the campus)							
		1. Levelling	(D: :, 11 1							
		a. Study	of Digital level							
		D. Level	l data processing							
		2. Digital Theod	lolite							
		a. Angle	measurement and tra	versing						
		b. Trigo	nometric levelling	C						
		3. Auto reduction	on Tacheometry							
		Auto rec	luction tacheometry for	or length, gradient	, and area determir	nation				
	•	4. Study of Tota	al Station	formations						
		a. Exerc	lses dased on various	lunctions						
	Part II:	Field Projects (	(outside the campus)							
	1 ui t 11.	Customized field	exercises for project	surveys like align	ment. contouring.	earthwork				
		computations, di	rawing preparation etc	e. with relevant ad	vanced instrument	and software				
		D ' 11	Text B	ooks	D 11' 4' 171	1 2012				
1	B. C New	. Punmia and Ja Delhi.	aın "Surveying", Vol	.1, 2 & 3, Laxmi	Publications, 17th	n edition, 2015,				

2	N. N. Basak, "Surveying and Levelling", Tata Mcgraw Hill Education Pvt Ltd, 2nd edition, 2017, New Delhi.								
3	K.R. Arora "Surveying", Vol.1 & 2, Standard Book House, 16th edition, 2018, Kota.								
References									
1	Duggal S. K, "Surveying", Tata Mcgraw Hill Education Pvt Ltd, 4th edition, 2017, Delhi.								
2	Bannister and Raymond, "Surveying", ELBS, Longman Group Ltd., England.								
2	R.E. Davis, F. Foote and J. Kelly, "Surveying; Theory and Practice", McGraw Hill Book								
3	Company, New York.								

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1				3				2				1		
CO2				2					2				1		
CO3				2					2				1		
	1 0	•	• .	1	•	1 0 0	33.71	1 T		. 1.	<u> </u>	1			

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.

Assessment								
There are three components of lab assessment, LA1, LA2 and Lab ESE.								
IMP: Lab ES	E is a separate head of	passing. LA1, LA	A2 together is treated as In-Semester Evaluat	ion.				
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks				
ТАТ	Lab activities, Lab Course During Week 1		During Week 1 to Week 6	20				
	attendance, journal	Faculty	Marks Submission at the end of Week 6	30				
1.4.2	Lab activities,	Lab Course	During Week 7 to Week 12	20				
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50				
Lab ESE	Lab activities, Lab Course		During Week 15 to Week 18	40				
	attendance, journal	Faculty	Marks Submission at the end of Week 18	40				
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown,								

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total					
Remember									
Understand									
Apply									
Analyze									
Evaluate									
Create									
Total									

Walchand College of Engineering, Sangli							
(Government Aided Autonomous Institute)							
AY 2021-22							
Course Information           Programma         B Tach (Civil Engineering)							
Progra	r rogramme     B. Lech. (UVII Engineering)       Class Semester     Second Veer P. Tech. Sem W						
Class,	Class, Semester     Second rear D. recht, Sem IV       Course Code     4AM271						
Course Code     4AMI2/1       Course Name     Material Testing Lab							
Doging	e Name	tos	Solid Mochanics	0			
Desire	u Kequisi	les.	Solid Mechanics				
	Teaching	Scheme		Examination Sche	me (Marks)		
Lectur	re	-	LA1	LA2	Lab ESE	Total	
Tutori	ial	-	30	30	40	100	
Practi	cal	2	l.				
Intera	ction	-		Credits:	1		
			Course Ob	ojectives			
1	To demo	nstrate laborator	y experiments for test	ting of various build	ling materials.		
2	To condu	ict experiments t	o evaluate various pro	operties of material	s for quality con	trol.	
3	To provid	de the knowledge	e of permissible value	es of material prope	rties as per coda	l requirements.	
	Fxnlain	the methodolog	v of conducting ext	omes (CO) periments on cons	truction materia	ls as per codal	
CO1	provision	18.	y of conducting exp	perments on cons	didenon materia	is as per coudi	
CO2	Evaluate	the properties of	f construction materia	ls by conducting la	boratory tests.		
CO3	Analyze	and interpret pro	perties of constructio	n materials for acce	eptance criteria.		
<b>T</b> • 4 4	•		List of Experiment	s / Lab Activities			
List of Experiments:							
			2. Compress	sion test on Mild steel &	el & Cast iron.	erorini bars.	
			3. Shear test	on Mild Steel.	ci & cust iron.		
			4. Hardness	test on different ma	aterials.		
			5. Bending t	est on Timber.			
			6. Compress	sion test on Timber			
			7. Impact Te	est for Different Me	etals.		
			8. Bending t	est on flooring tiles	5.		
9. Water Absorption test on bricks.							
10. Bend and Re-bend Test							
11. Bending Test on Plywood.							
			Text B	ooks			
1	Hibbe	eler R. C., "Mecl	nanics of Materials",	Pearson Education,	10th Edition, 20	)16.	
2	Роро	v E. B., "Mechar	nics of Materials", Pe	arson Education, 21	nd Edition, 2015	·	
3	Gere	and Timoshenko	o, "Mechanics of Mate	erials", CBS publis	hers, 2nd Editior	ı, 2004.	
References							

1	Beer and Johnston, "Mechanics of Material", Tata McGraw Hill publication, 7th Edition,
	2014.
2	Andrew Pytel and Jaan Kiusalaas, "Mechanics of Materials", Cengage Learning, USA, 2nd
	Edition, 2011.
2	Timoshenko. S. & Young. D. H, "Strength of Material", McGraw Hill Book Company
3	Publication, 4th Edition, 2006.

CO-PO Mapping															
		Programme Outcomes (PO) PSO													
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1										1	
CO2				2					2				1	2	
CO3				3		1			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.															

Assessment								
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.								
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks				
т. а. 1	Lab activities,	Lab Course	During Week 1 to Week 6	20				
	attendance, journal	Faculty	Marks Submission at the end of Week 6	50				
L A 2	Lab activities,	Lab Course	During Week 7 to Week 12	20				
	attendance, journal	Faculty	Marks Submission at the end of Week 12	50				
Lab ESE	Lab activities, Lab		During Week 15 to Week 18	40				
	attendance, journal	Faculty	Marks Submission at the end of Week 18	40				

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.

Assessment Plan based on Bloom's Taxonomy Level								
<b>Bloom's Taxonomy Level</b>	LA1	LA2	Lab ESE	Total				
Remember								
Understand								
Apply								
Analyze								
Evaluate								
Create								
Total								