Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
		(AY 2024-25						
Course Information									
Programme		B. Tech.							
Class, Semeste	er	B. Tech., SEM	-VII						
Course Code		6OE491							
Course Name		Engineering E	conomics						
Desired Requis	sites:								
		1							
Teaching	g Scheme		Examinatio	on Scheme	e (Marks)				
Lecture	3 Hrs/week MSE ISE ES						Total		
Tutorial	0 Hrs/week	30	20	5()		100		
			Credits: 3						
		С	ourse Objectives						
1 Provide students with a solid foundation in economic theories and concepts relevant to engineering decision-making, including time value of money, cost analysis, and economic feasibility.									
2	2 Equip students with the ability to apply economic analysis techniques such as net present value (NPV), internal rate of return (IRR), and sensitivity analysis to evaluate and compare engineering projects.								
3	Foster an under projects, emph	rstanding of the e asizing responsib	ethical implications bility towards stakeh	of financi olders an	al decision d societal	ns in ei impact	ngineering t.		
	Cou	urse Outcomes (O	CO) with Bloom's T	axonomy	Level				
At the end of t	he course, the stu	udents will be ab	le to,						
60					Bloom's	8	Bloom's		
CO		Course Outcome	e Statement/s		Taxonom Level	ıy	Taxonomy Descriptor		
C01	Students will of theories and pr such as supply economic indic	demonstrate an us inciples relevant and demand, ma cators.	nderstanding of eco to engineering econ rket structures, and	nomic nomics,	2		Understanding		
CO2	Students will articulate the importance of ethical considerations in engineering economic decision-making, including the implications of financial choices on stakeholders and society. 2 Understanding								
CO3	Students will a net present valu sensitivity anal make informed	pply economic a ue (NPV), interna ysis, to evaluate I financial decisio	nalysis techniques, s al rate of return (IRI engineering projects ons.	such as R), and s and	3		Applying		

CO4	Using case studies and simulations, students will analyze real-world engineering scenarios, identifying economic constraints and proposing viable solutions to maximize project profitability and sustainability.	3	Applying
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Module	Module Contents	Hours
Ι	 Introduction to Engineering Economics Overview of Engineering Economics: Definition, Importance, and Scope Time Value of Money: Principles of Compound Interest and Present Value Cash Flow Diagrams and Analysis Techniques Decision Making under Uncertainty: Risk and Uncertainty Analysis Economic Analysis Techniques: Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period 	7
II	 : Cost Estimation and Analysis Cost Concepts: Fixed Costs, Variable Costs, Total Costs Cost Estimation Methods: Analogous Estimating, Parametric Estimating, Bottom-Up Estimating Cost Behavior and Cost-Volume-Profit (CVP) Analysis Break-Even Analysis and Margin of Safety Life Cycle Cost Analysis (LCCA) and Total Cost of Ownership (TCO) 	6
III	 Engineering Project Evaluation Project Selection Criteria: Economic, Technical, and Environmental Factors Benefit-Cost Analysis (BCA) and Cost-Effectiveness Analysis (CEA) Sensitivity Analysis and Scenario Planning Decision Trees and Real Options Analysis Ethical Considerations in Engineering Economics 	7
IV	 : Financing and Investment Analysis Sources of Financing: Debt Financing vs. Equity Financing Capital Budgeting: Capital Rationing, Replacement Analysis Investment Criteria: Profitability Index (PI), Discounted Payback Period Leasing and Tax Considerations Public-Private Partnerships (PPPs) in Infrastructure Projects 	7
V	 Economic Analysis of Engineering Alternatives Comparing Alternatives: Equivalent Annual Cost (EAC) and BenefitCost Ratio (BCR) Replacement Analysis and Equipment Life Cycle Costing Depreciation Methods: Straight-Line Depreciation, Declining Balance Depreciation Taxation and Inflation Effects on Economic Analysis Environmental and Social Cost-Benefit Analysis 	6

VI	 Economic Decision Making in Engineering Practice Case Studies in Engineering Economics: Project Feasibility Studies Ethics in Economic Decision Making: Sustainability and Corporate Social Responsibility International Engineering Economics: Exchange Rates, Globalization, and Trade Policies Emerging Trends in Engineering Economics: Green Technologies, Circular Economy Professional Development and Career Opportunities in Engineering Economics 	6
	Textbooks	
1.	Engineering Economic Analysis" by Donald G. Newnan, Te and Jerome P. Lavelle	ed G. Eschenbach,

2.	 "Estimating in Building Construction" by Steven J. Peterson and Frank R. Dagostino
3.	Engineering Economic Analysis" by Donald G. Newnan, Ted G. Eschenbach, and Jerome P. Lavelle
4.	 "Investment Valuation: Tools and Techniques for Determining the Value of Any Asset" by Aswath Damodaran
5.	Engineering Economic Analysis" by Donald G. Newnan, Ted G. Eschenbach, and Jerome P. Lavelle
6.	"Engineering Economic Analysis" by Donald G. Newnan, Ted G. Eschenbach, and Jerome P. Lavelle
	Online Resources:
1	 Khan Academy: Finance and capital markets Investopedia: Introduction to Engineering Economics
2	 Construction Management: Cost Estimation Techniques American Society of Professional Estimators (ASPE): Cost Estimation Resources
3	 Project Management Institute (PMI): Project Selection Methods Society of Cost Estimating and Analysis (SCEA): Project Evaluation Techniques
4	 Harvard Business School: Financing and Investing International Monetary Fund (IMF): Infrastructure Financing
5	 The National Bureau of Economic Research (NBER): Cost-Benefit Analysis United Nations Environment Programme (UNEP): Environmental Economics

6.		 American Society of Civil Engineers (ASCE): Economic Decision Making in Engineering International Monetary Fund (IMF): Engineering Economics and Policy Analysis 												
Useful Links														
1 For optics https://nptel.ac.in/courses/122/107/122107035/														
2	For	For Quantum Physics https://nptel.ac.in/courses/122/106/122106034/												
CO-PO Mapping														
					Progra	.mme O	utcome	es (PO)					PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2								2						
CO3						2								
CO4						2								
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														
Assessment														
The assessme	nt is ba	ased on	MSE,	ISE an	d ESE.									

MSE shall be typically on modules 1 to 3.

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

ESE shall be on all modules with around 30 - 40% weightage on modules 1 to 3 and 60 - 70% weightage on modules 4 to 6.

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

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
				AY 2024-25							
			Cour	se Information							
Progr	amn	ne	B.Tech. (Informati	on Technology)							
Class,	, Sen	nester	Final Year B. Tech	n., Sem VII							
Cours	se Co	ode	6OE485								
Cours	se Na	ame	Open Elective - 3:	Data Visualization and	I Interpretation						
Desire	ed R	equisites:	Programming Fund	damentals							
		~ ~ ~									
Te	each	ing Scheme	105								
Lectu	re	3 Hrs/week	ISE	MSE	ESE	Total					
Tutor	rial	-	20	30	50	100					
		-		Credits	:3						
	1		Cou	rse Objectives							
		use R for analyti	cal programming.								
2		visualize data in	<u>R.</u>	• •		1 •					
3	То	discuss problem	solving approaches	using appropriate mac	hine learning tec.	hniques.					
A t tho	and	of the source the	atudanta will ha ahl) with Bloom's Taxor	nomy Level						
At the		of the course, the	e students will be abl	ie to,	Ploom's	Dloom's					
СО		Cou	rse Outcome Stater	nent/s	Taxonomy Level	Taxonomy Description					
C01	Cho	ose set of comple	ex mathematical forr	nulae using LATEX	III	Applying					
CO2	Exp	lain critical R pro	ogramming concepts		IV	Analyzing					
CO3	Ana	lyze data and ger	erate reports based	on the data.	IV	Analyzing					
CO4	Crea	ate bar charts, his	tograms, pie charts, d maps using R and	scatter plots, line related packages	VI	Creating					
	0	, proto, un		r		1					
Modu	ıle		Module	Contents		Hours					
I		e Module Contents Hours Introduction: Introduction to Data Science, Overview of the Data Science process, Introduction to Data Science technologies, Introduction to Machine 7 Learning, Regressions, Classification, Clustering, Recommendation recommendation 7									
II		Working with I Variables, Vec operators Image Factors in R.	Data: etors, Matrices, lists e data type, Image 1	s & Data frames , Lo representation, categor	ogical vectored ical data using	6					
III		Data/Image Vis Using graphs to plotting window visualization in t	sualization: visualize data, Basic , Advanced plotting using Image process	c plotting in R, Manipu using lattice library in ing tools.	llating the R. Image	7					

IV	Models in Machine Learning: Regression Models, Classification Models, Unsupervised Learning Models, Recommendation Models. Models considered: - Linear regression: lm() - Logistic regression: glm() - Poisson regression: glm() - Survival analysis: Surv(), coxph() - Linear mixed models: lme()	7						
V	Data Reporting using LaTex: LATEX Software installation, LATEX typesetting basics, LATEX math typesetting, Tables and matrices, Mathematics in Latex.	6						
VI	Case Studies – Titanic Survival analysis, face detection, Housing price prediction analysis, Customer segmentation analysis, Iris	6						
1	Text Books							
1 Dr. Mark Gardner, Beginning R:statistical Programming Languages, Wrox (Amazon), Mar								
2	Griffithas, Higham, Learning LATEX, Amazon, 2014							
	Deferences							
	References Resig Data Analysis Tutorial by Jacob Whitabill Department of Computer Sci	anco University of						
1	the Western Cape, 24/07/2009 [UWCDataAnalysisTutorial.pdf]	ence, University of						
2	NPTEL,edx,COURSERA (MOOC courses)							
	Useful Links							
1	Module I https://www.coursera.org/learn/what-is-datascience?specialization=introduction- datascience#syllabus	-						
2	2 Module II, III, IV and VI https://onlinecourses.nptel.ac.in/noc21_cs23/preview https://www.coursera.org/learn/r-programming/home/welcome							
3	Module V https://www.overleaf.com/learn/latex/Free_online_introduction_to_LaTeX_(par	t_1)						

CO-PO Mapping															
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3		1										2		
CO2		2													
CO3	2		1											1	
CO4															
The stren	gth of 1	mappii	ng is to	be wr	itten as	5 1: Lov	w, 2: N	ledium	n, 3: Hi	gh					

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

Assessment

The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3 ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

	Walchand College of Engineering, Sangli										
			(Government Aided A	<u>Autonomous Institute)</u>							
				024-25 formation							
Progr	ommo		B Tech (Comput	ar Science and Engi	neering)						
Class	Somostor		Final Vear B Tec	sh Sem VII	neering)						
Class,	e Code		60F471								
Cours											
Desire											
	u noquisi		<u> </u>								
	Teaching	Scheme		Examination Sch	eme (Marks)						
Lectur	re	3Hrs/week	MSE	ISE	ESE	Total					
Tutori	ial	-	30	20	50	100					
				Credits	: 3	÷					
			Course (Objectives							
1	Understa	nd foundational	concepts of cybers	ecurity.							
2	Identify c	common cyberse	ecurity threats and	vulnerabilities.							
3	Analyze	strategies for mi	tigating cybersecu	rity risks.							
4	Apply ba	sic cybersecurit	y principles to real	-world scenarios.	- · ·						
A (1) -		Course C	Dutcomes (CO) wit	th Bloom's Taxono	my Level						
At the	end of the	course, the stud	ents will be able to	,	Dla am 2a	Dia any?a					
CO		Bloom's Tayonomy	BI00III'S Toyonomy								
		Course	Sutcome Statemen	10/5	Level	Description					
CO1	OI Define key terms and concepts in cybersecurity.										
CO2	Recogniz	e common cvbe	er threats and vulne	rabilities.	II	Understanding					
CO3	Evaluate	cybersecurity st	rategies for risk mi	tigation.	III	Analyzing					
CO4	Demonst	rate the applicat	ion of cybersecurit	y principles.	IV	Applying					
		**									
Modu	le		Module Cor	ntents		Hours					
Ι	Introd Overv Cyber CIA Lands Ethica	luction to Cyber view of Cybe rsecurity, Found Friad: Confiden scape, Types of al Consideratio	security : rsecurity, Definiti ational Concepts, F tiality, Integrity, A Cyber Threats, Co ns, Cybersecurity	ion and Scope, I Principles of Informa Availability, Cyberse mmon Attack Vecto Laws and Regulat	Evolution of tion Security, curity Threat rs, Legal and ions, Ethical	4					
п	Issues in CybersecurityCyber Threats and Attack Vectors: Malware and Viruses, Types of Malware, Detection and Prevention Techniques, Social Engineering Attacks, Phishing, Pretexting, Baiting, Mitigation Strategies, Network Attacks, DDoS Attacks, Man-in-the- Middle Attacks, Network Defense Mechanisms, Web Security Threats, Common Web Vulnerabilities, Best Practices for Web Security, IoT and Mobile Security, Challenges in IoT and Mobile Devices, Strategies for										
III	Secur Acces Acces of Fin Codir Secur	ity Measures an ss Control Mech ss Control Mode rewalls, IDS/IP ng Principles, 7 ity, Endpoint Se	d Controls: anisms, Authentica Is, Firewalls and In S, Secure Software Cools for Secure S ecurity Challenges,	ation, Authorization, trusion Detection Sy e Development Prace oftware Developme Endpoint Protection	Accounting, ystems, Types etices, Secure ent, Endpoint Solutions	8					
IV	Crypt Funda Protoc Digita Mask	ography and Da amentals of Cr cols, Cryptogra al Signatures, D ing and Tokeniz	ta Protection : yptography, Encryp phic Applications, pata Protection Mer cation	ption Algorithms, C Public Key Infrastr chanisms, Data Enc	Cryptographic ucture (PKI), ryption, Data	б					

V	Netw Netw Com Mech Type	ork Sec ork S municat anisms s and P	curity : ecurity tion , Bluet rotocol	Fund Protoco ooth So s, VPN	lamenta ols, V ecurity	als, N Wireles , Virtua mentat	etwork s Sea al Priva ion and	Vulr curity, te Netv Mana	nerabilit Wi-F works (V gement	ies, S ï Se VPNs)	Secure curity , VPN		6	
VI	Secur Secur Comp Stand Ethic Hack	Security Policies and Compliance Security Policies Overview, Purpose and Scope of Security Policies, Components of Security Policies, Regulatory Compliance, Compliance Standards (e.g., GDPR, HIPAA), Compliance Implementation Strategies, Ethical Considerations, Responsible Disclosure, Privacy and Ethical Hacking												
						Torra	haalra							
Textbooks														
1	Uyb UDrin	Uppersecurity Essentials by William Stallings and Lawrie Brown.												
Z	Principles of Computer Security" by Conklin, white, williams, Davis, and Cothren.													
						Refe	rences							
1	"Nety	vork Se	curity	Essenti	als" by	Willia	m Stall	inos						
2	"Crvi	ntogran	hy and	Netwo	rk Seci	urity" h	v Willi	am Sta	allings					
		Jiograp	ily alla	110000		unity o	<u>y</u> ,, m	um ou	annigo.					
						Usefu	l Links	5						
1	Natic https:	nal In ://www	stitute .nist.go	of St ov/cybe	andard rframe	s and work	Techn	ology	(NIST)) Cyb	ersecu	rity	Framew	ork :
2	OWA	ASP (O	pen We	b Appl	ication	Securi	ty Proj	ect) W	ebsite :	https:/	//owasp	o.org/	/	
					0	CO-PO	Mappi	ing						
				Pr	ogram	me Ou	tcome	<u>s (PO)</u>					PS	0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	1	2	2									2	
CO2	1	1	2	2									2	
CO3	1	1	2	2									2	
CO4	1	1	2	2									2	
The streng	gth of r	napping	g is to b	e writt	en as 1	: Low,	2: Med	ium, 3	: High					

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

Assessment

The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY	2024-25					
			Course 2	Information					
Progra	amme	e	B.Tech. (Electron	nics Engineering)					
Class,	Seme	ester	Final Year B. Teo	ch., Sem VII					
Cours	e Cod	le	6OE457						
Cours	e Nar	ne	Open Elective III	-Medical Image Pi	ocessing				
Desire	d Ree	quisites:	Signal Processing	5					
				-					
	Teac	hing Scheme		Examination S	cheme (Marks)				
Lecture 3 Hrs/week MSE ISE ESE									
Tutori	ial	0 Hrs/week	30	20	50	100			
				Crea	lits: 3				
		I	1						
			Course	Objectives					
1	Tol	earn facts about med	ical imaging source	es and study variou	is formats.				
2	To s	tudy various segmen	tation and filtering	technique of medi	cal image.				
3	Tol	earn spatial transforn	nation of medical in	mage					
		Course	Outcomes (CO) w	vith Bloom's Taxo	nomy Level				
At the	end o	f the course, the stud	ents will be able to),	1				
COI	Den	nonstrate various im	age sources, there	e representation a	nd various formats	of			
	ımaş	ge.							
CO2	App	ly segmentation, filte	ering and transform	nation on medical in	mage.	IV			
CO3	Ana	lyze various facts of	image registration	and CT reconstruc	ted image.	IV			
	1					I			
Modu	le		Module	e Contents		Hours			
]	Basics of Medical In	nage Sources:						
Ι	I i	Radiology, the elect maging, computed	romagnetic spectro tomography, mag	um, basic x-ray p netic resonance to	hysics, attenuation omography, ultraso	and ound, 7			
	r F	nuclear medicine an protection and dosime	d molecular imag etry	ging, other imagin	g techniques, radia	ation			
]	Image Representation	on:						
	I	Pixels and voxels, gra	ay scale and color r	epresentation, imag	ge file formats, DIC	OM,			
	0	other formats, image	quality, and the si	gnal-to-noise ratio	, the intensity trans	form 7			
	1	unction and the, dyna	amic range, window	wing, histograms a	nd histogram operat	ions,			
	0	inthering and depth							
тт		mage segmentation	·	alaa intoo daation	4 a larval a sta ama a d	7			
	1 4	Sunctions multi atlas	fusion-based segre	akes, introduction	to level sets, speed				
	1	mage enhancement	·						
IV		contrast enhancement Fourier theory, anisot	t, denoising, debl ropic diffusion;	urring, edge detec	ction, derivativesan	ıd 6			

v	Image registration: correlation, least squares, transform based registration, joint entropy, mutual information, binning discontinuities, registration optimization, registration by clustering, ensemble registration, gaussian mixture models	6				
	Medical image reconstruction:					
VI	Theory of MRI reconstruction, MRI motion, compensation, algebraic CT	6				
	reconstruction, CT filtered back-projection.					
	Textbooks					
1	Prince J L and Links J M, Medical Imaging Signals and Systems, Pearson (2015).					
2	Suetens P, Fundamentals of Medical Imaging, Cambridge University Press (2009).					
	References					
	Birkfellner W, Applied Medical Image Processing: A Basic Course, CRC Press					
1	(2014).					
	Nishimura D, Principles of Magnetic Resonance Imaging, Stanford University					
2	Press (2010).					
	1					
Useful Links						
1	https://onlinecourses.nptel.ac.in/noc22_ee64/preview_					

CO-PO Mapping													
		Programme Outcomes (PO)									PS	50	
	1	1 2 3 4 5 6 7 8 9 10 11 12							1	2			
CO1	3												
CO2	3												
CO3				3									
CO4				3									
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
Each CO of the course must map to at least one PO.													

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

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

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

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

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)					
	AY 2024-25				
Course Information					
Programme	B. Tech. Electrical Engineering				
Class, Semester	Final Year B. Tech., Sem. VII				
Course Code	60E443				
Course Name	Open Elective-5: Renewable Energy				
Desired Requisites:	Basic Mechanical Engineering, Basic Electrical Engineering				

Teaching	Scheme	Examination Scheme (Marks)							
Lecture	3 Hrs/week	MSE	ISE	ESE	Total				
Tutorial	-	30	20	50	100				
		Credits: 3							

	Course Objectives					
1	Explain the types of renewable energy resources with sustainability.					
2	Explain the working of solar, wind, biomass, and geothermal energy systems.					
3	Apply various renewable energy sources like biogas, geothermal, and MHD					
4	Explain the need and operation of various energy storage technologies.					
	Course Outcomes (CO) with Bloom's Taxonomy Level					

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Describe the various renewable energy resources with Sustainability.	Π	Understanding
CO2	Describe the working of solar, wind, biomass, and geothermal energy systems.	Π	Understanding
CO3	Discuss the need and working of various energy storage, fuel cell, and battery management system technologies.	Π	Understanding
CO4	Demonstrate the Grid-connected PV and wind energy system.	III	Applying

Module	Module Contents	Hours
	Introduction to Renewable Energy Sources	
	Energy sources: classification of energy sources, introduction to renewable	
	energy, renewable energy trends, key factors affecting renewable energy	
Ι	supply, global and Indian scenario of renewable energy sources, policies of the	7
	government, sustainable development, challenges, advantages and	
	disadvantages of renewable energy sources, and their uses.	
	Case Study: PM Kusum Yojana and PM Suryoday Yojana 2024.	
	Solar Energy	
	solar earth geometry, solar radiations, and measurement, fundamentals of semi-	
Π	conductors, absorption of light, solar thermal power generation, heat transfer,	7
	solar thermal conversion: basics, solar concentrator, and tracking system, flat	,
	plate and concentrating collectors, single axis and two axes axis tracking	
	collectors, selective coatings.	

	Grid Connected PV System						
III	PV power generation, basic principle of power generation in PV cell, solar cell, and its parameters, module and array, the efficiency of PV cell, characteristics curves of PV cell, effects of different electrical parameters on I-V & P-V curves, configuration of PV power generation system - off-grid system & grid- connected PV system, design methodology, stand-alone PV system, grid- connected PV systems.	6					
	Wind Energy						
IV	Power available in wind, wind turbine power & torque characteristics, types of rotors, characteristics of wind rotor, components of wind turbine, local effects, wind shear, turbulence & acceleration effects, measurement of wind, wind speed statistics, wind power calculations and Betz limit, capacity factor, speed ratio characteristics, grid-connected wind energy system	7					
V	Biomass Energy and other renewable energy systems Overview of biomass as energy source, physicochemical and thermal characteristics of biomass as fuel, hydrogen generation methods, storage technologies, compression and chemical compounds, applications in energy storage and transportation, addressing safety, environmental impacts, and future trends in research and policy. geothermal energy different components, advantages, limitations.	6					
	Energy Storage and Fuel cell technologies						
VI	Introduction, need for storage for renewable energy sources, basic thermodynamic and electrochemical principles, classification, traditional energy storage system- battery, fuel cell, principle of operation, types, applications for power generation, battery management system.	6					
		2.4					
I	Boyle, Godfrey, " <i>Renewable Energy</i> ", (2nd edition), Oxford University Press, 20	<u>104.</u>					
2	Masters, Gilbert M., " <i>Renewable and efficient electric power systems</i> ", John 2013.	wiley & Sons,					
3	Solanki, Chetan Singh., "Solar Photovoltaics: fundamentals, technologies and PHI Learning Pvt. Ltd., 2015.	d applications",					
References							
1	G.S.Sawhney, "Non-Conventional Resources of Energy", PHI Publication Johnson Wind Energy Systems Tata Mc-Graw-Hill Book Company.	2012. Gary-L.					
2	2 S. P. Sukhatme, J. K. Nayak, "Solar Energy- Principles of Thermal Collection and Storage", (3rd edition), Tata McGraw-Hill Publication.						
	Useful Links						
	https://nptel.ac.in/noc/courses/noc21/SEM1/noc21-ch11/						
2	https://www.coursera.org/learn/exploring-renewable-energy						

CO-PO Mapping														
				I	Progra	mme C	outcom	es (PO)				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3													
CO3	3													
CO4	3													
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														
Each CO of the course must map to at least one PO.														

Assessment						
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be field visit, assignments etc. and is expected to map at least one higher order PO.						
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modules 4 to 6.						
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are needed. (ESE shall be a separate head of passing)						
Svilabus Dromonod Dy Ma A. N. Inconder						

Syllabus Prepared By	Mr. A. N. Inamdar
Syllabus Checked By	Dr. S. D. Patil

Walchand College of Engineering, Sangli							
(Government Aided Autonomous Institute)							
AY 2024-25							
Decomposition Decomposition Decomposition Decomposition							
Somos	tor	Einal Vear Sem V					
o Code		$\frac{1}{6}$ $\frac{1}$	/ 11				
o Nom	; 0	Additive Manufac	turing				
d Rog	uisitas:	Additive Manufac	luing				
eu Ney							
eachin	Scheme		Examination Sc	heme (Marks)			
re	3Hrs/week	MSE	ISE	ESE		Total	
ial	-	30	20	50		100	
ical	_	50				100	
oction	_	6Credits: 3					
iction		ver cuits: c					
		Соц	rse Obiectives				
To in	npart knowledg	e to the students on	3D printing technolo	ogies			
Tode	velop students	to select material r	process and application	on of 3D Printin	σ		
Tom	ake students av	vare of software too	ls, processes and tecl	niques of addit	ive man	ufacturing.	
	Cou	rse Outcomes (CO) with Bloom's Tax	onomy Level			
end of	the course, the	students will be abl	le to,	•			
Unde	rstand 3D print	ing process, data fo	rmats and software.		II	Understand	
Selec	t 3D printing te	echniques and mater	rials.		III	Apply	
Justif	y product quali	ty and applications	of 3D Printing in var	ious domains.	IV	Analyze	
Evalı	ate the quality	and feasibility of	additive manufacturi	ing prototypes	V	Evaluate	
and f	inished product	s.					
•						¥¥.	
		Modu	ile Contents			Hours	
	troduction to	3D Printing	· · · · · · · · · · · · · · · · · · ·	· • • • • • • •	/	7	
	verview, Hist	ory, Process, Cla	assifications, Advar	itages, Additiv	ve v/s	/	
		inuracturing process	505				
	AD Data form	nats Data translatio	on Data loss STL	format: CAD	model		
	eparation. Part	Orientation and su	pport generation. M	odel Slicing, So	oftware	7	
fe	atures		FF 8,	8,			
3	O Printing Tec	hniques					
St	ereo-lithograph	ny Apparatus (SLA	A), Fused Deposition	on Modeling (FDM),	7	
La	aminated Obje	ct Manufacturing (t Manufacturing (LOM), Selective Laser Sintering (SLS),				
S	LM, Binder Jet	technology					
	aterials for 3I) Printing	1 17 . 0	. , • a ·	r•••1		
	orymers and the	eir properties, Meta	us, various forms of	raw material-	Liquid,	6	
	aterials	der; rowder Prepai	auon and their desir	ed properties; S	upport		
	at Processing	and Product Qual	itv			6	
	amme Semes e Code e Nam ed Requ eaching re ial cal cal cal cal cal cal cal cal cal c	W amme Semester e Code re 3Hrs/week ial colspan="2">colspan="2"colspan	Walchand Colleg (Government A A A Cour amme B. Tech. (Mechan Semester Final Year, Sem V e Code 6 OE429 e Name Additive Manufac code 6 OE429 e Name Additive Manufac code 6 OE429 e Name Additive Manufac code GOE429 e Name Additive Manufac code GOE429 e aching Scheme re 3Hrs/week MSE iail - 30 colspan="2">Cou of impart knowledge to the students on To develop students to select material, p To make students aware of software too Course Outcomes (CO end of the course, the students will be abl Understand 3D printing process, data fo Select 3D printi	Walchand College of Engineering (Government Aided Autonomous Instit AY 2024-25 Course Information amme B. Tech. (Mechanical Engineering) Semester Final Year, Sem VII e Code 6/0E429 eaching Scheme Examination Schere Eaching Scheme Examination Schere adhe Kaguistes: Course Objectives To impart knowledge to the students on 3D printing technoloc To impart knowledge to the students on 3D printing technoloc To develop students to select material, process and application To impart knowledge to the students on 3D printing technoloc To develop students to select material, process and application Course Outcomes (CO) with Bloom's Tax end of the course, the students will be able to, Understand 3D printing process, data formats and software. Select 3D printing techniques and materials. Justify product quality and applications of 3D Printing in var Evaluate the quality and feasibility of additive manufacturia and finished products. Introduction to	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute) AY 2024-25 Course Information amme B. Tech. (Mechanical Engineering) Semester Final Year, Sem VII e Code 6 OE429 e Name Additive Manufacturing d Requisites: caching Scheme Examination Scheme (Marks) re 3Hrs/week MSE ISE ESE cal - course Objectives To impart knowledge to the students on 3D printing technologies To develop students to select material, process and application of 3D Printin To make students will be able to, Understand 3D printing process, data formats and software. Select 3D printing techniques and materials. Justify product quality and applications of 3D Printing in various domains. Evaluate the quality and feasibility of additive manufacturing protypes and finished products. Introduction to 3D Printing	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute) AY 2024-25 AV 2024-25 Course Information amme B. Tech. (Mechanical Engineering) Semester Final Year, Sem VII e Code ©OLE 429 e Name Additive Manufacturing ed Requisites: caching Scheme Examination Scheme (Marks) re 3Hrs/week MSE ESE cal - course Objectives To impart knowledge to the students on 3D printing technologies To develop students to select material, process and application of 3D Printing. To make students aware of software tools, processes and techniques of additive man Course Outcomes (CO) with Bloom's Taxonomy Level end of the course, the students will be able to, Understand 3D printing process, data formats and software. III Select 3D Printing mechanicus of 3D Printing in various domains. IV Vealuate the quality and applications of 3D Printing in various domains. <th< td=""></th<>	

	Requirement and Techniques Sunnort Removal Sanding Acetone treatment	
	polishing: Inspection and testing: Defects and their cause	
	Application Domains	
3.71	Application Domains	(
VI	Aerospace, Electronics, Health Care, Defense, Automotive, Construction, Food	6
	Processing, Machine Tools, Retail industry.	
	Text Books	
1	LiouW.Liou, Frank W.Liou, "Rapid Prototyping and Engineering applications: A too	ol box
1	for prototype development", CRC Press, 2007.	
2	Lan Gibson, David W. Rosen and Brent Stucker, "Additive Manufacturing Techno	ologies: Rapid
2	Prototyping to Direct Digital Manufacturing", Springer, 2010	0 1
-	CK Chua, Kah Fai Leong, "3D Printing and Rapid Prototyping- Principles and	Applications".
3	World Scientific, 2017.	11 ,
	References	
1	T. A. Grimm & Associates, "Users Guide to Rapid Prototyping", Society of	
1	Manufacturing Engineers (SME) ISBN 0872636976, 2014.	
_	Andreas Gebhardt, "Understanding Additive Manufacturing: Ranid Prototyning Rat	oid Tooling
2	Ranid Manufacturing" Hanser Publisher 2011	jia roomig,
3	C E Bocking AFW Rennie "Ranid & Virtual Prototyning & applications" Wiley l	Fastern 2011
	C. D. Docking, M. Wicking, Kapie & Virtuar Prototyping & applications, whey	2011, 2011.
	TT., (° 1 T ' 1	
1	Useful Links	
	NPTEL and MOOC links	

							Civil								
						CO-l	PO Ma	apping							
				F	Progra	mme C)utcom	nes (PO)					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2		2										
CO2			2		2							1			
CO3			2		2							1			
The streng	gth of n	napping	g is to l	be writt	en as 1	,2,3; W	/here,	1:Low,	2:Med	ium, 3:	High				

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High

						Ε	lectror	nics							
						CO-]	PO Ma	apping							
				F	Progra	mme C) utcom	nes (PC))					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2		2										
CO2			2		2							1			
CO3			2		2							1			
The streng	gth of n	napping	g is to l	oe writt	en as 1	,2,3; W	/here, 1	1:Low,	2:Med	ium, 3:	High				

						ŀ	Electric	al							
						CO-]	PO Ma	pping							
				F	Program	mme C) utcom	es (PO)					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2		2										
CO2			2		2							1			

CO3			2		2							1		
The streng	rth of n	napping	o is to b	e writt	en as 1	.2.3: W	/here. 1	:Low.	2:Medi	ium. 3:	High			

						Com	puter S	Science	•						
						CO-]	PO Ma	opping							
				F	Progra	mme C	Jutcon	nes (PC))					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2		2										
CO2			2		2							1			
CO3			2		2							1			
The streng	gth of n	napping	g is to l	be writt	en as 1	,2,3; W	Vhere,	l:Low,	2:Med	ium, 3:	High				

Information Technology

						CO-]	PO Ma	pping							
				I	Progra	mme C) utcom	es (PO))					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2		2										
CO2			2		2							1			
CO3			2		2							1			
The streng	gth of n	napping	g is to l	be writt	en as 1	,2,3; W	/here,	l:Low,	2:Med	ium, 3:	High				

Assessment (for Theory Course)

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 Taxon	omy Level (Mar	ks) For Theory	v Course
B	Bloom's Taxonomy Level	T1	T2	ESE	Total
1	Remember				
2	Understand	7	8	20	35
3	Apply	8	7	17	32
4	Analyze	5	5	23	33
5	Evaluate				
6	Create				
	Total	20	20	60	100

		Wa	Ichand Colles (Government A	ge of Enginee	ering, Sangli		
			A	Y 2024-25	,		
			Cour	se Information			
Progra	amme		B. Tech. (Othe	r than Civil Eng	gineering)		
Class,	Semest	er	Final Year B. 7	Fech., Sem. VII			
Cours	e Code		6OE416				
Cours	e Name		Open Elective	3: Environment	al Management Syst	tems	
Desire	ed Requ	isites:	-				
			1				
	Feachin	g Scheme		Examinati	on Scheme (Marks)		
Lectu	re	03 Hrs/week	MSE	ISE	ESE	Total	l
Tutor	ial	-	30	20	50	100	
Practi	cal	-					
Intera	ction	-	Credits: 03				
Carro	• OL:-	ti -rog					
		uves	of apploaical con				
	To pro	vide knowledge	of Environmental	Ethics and Envir	commontal Lagislation		
2	To pro	vide necessary k	nowledge of diffe	rent certification			
	To pro	vide necessary k	knowledge of t	nanagerial tools	required in the fiel	d of enviro	onmental
4	manag	ement.	knowledge of 1	nunugeriur toois	required in the ner	a or envire	Jiiiieiitui
Cours	e Outco	mes (CO)					
CO			Descrip	otion		Blooms Ta	axonomy Level
C01	Explai	<i>n</i> ecological asp	ects and effects du	ue to various type	es of pollution	Understand	II
CO2	Percei	ve environmenta	l ethics and legisla	ation.		Understand	II
CO3	Choos	e appropriate me	thodology for EIA	A and auditing an	d assess the impacts.	Apply	III
CO4	Explai	n benefits and pr	ocesses of differe	nt certifications.		Understand	Π
CO5	<i>Impler</i> faciliti	nent EMS and es.	Environmental 1	Management Pla	n for infrastructural	Apply	IV
	-						
Modu	le		Mo	dule Contents			Hours
I	Ecc Ecc Pop Pol due con	biogical Aspects biogical aspects bulation Dynami lution, Water Po to Nuclear Po trol.	and types of Pol : Salient feature cs, Ecological in llution due to sev wer Plants, Radi	es of major E mbalance, Preser vage, industrial et oactive Waste, T	cosystems, Energy rvation of Biodiversi ffluents and leachate, Thermal pollution, ca	Transfer, ty. Land Pollution uses and	7
П	Env Env for atti Env env Env	vironmental Ethi environmental Ethi environmental tudes, Sustainabl vironmental Legi ironmental act 1	hics and Legislati cs: Ethics in socie degradation, Eth e development. slation: Water (pr 986, The Noise I omics.	ety, Environmenta ical theories and revention and con Pollution (Regula	al consequences, Resp d codes of Ethics, (atrol of pollution) act 1 atron and Control) Rul	onsibility Changing 974, The es, 2000.	7
III	En Def Bas Un	vironmental Im initions and Co seline studies. M certainties in EIA	pact Assessment ncept, Scope, Ob ethodologies of E A, Status of EIAs i	(EIA) ojectives, Types EIA, Prediction of in India.	of impacts, Elements f impacts and its meth	of EIA, nodology,	6

	Envi	ronme	ntal A	uditin	g									
IV	Defi	nitions	and c	oncept	s, Sco	ope and	1 Obje	ctives,	Туре	s of a	udit, A	Accounts	s audit,	6
1 V	Envi	ronmer	ntal au	dit sta	atemer	nt, Qua	lities	of env	vironm	ent au	ditor.	Enviror	nmental	0
	Impa	ct State	ement	(EIS).										
	ISO	Standa	ards											
	ISO	and IS	O 140	00 Sei	ries: Ir	ntroduc	tion, A	Areas c	covered	l in th	e serie	s of sta	indards,	
	Nece	ssity o	f ISO o	certific	ation.									
V	Envi	ronmer	ntal ma	nagem	ent sy	stem: H	Evoluti	on, Ne	ed, Ele	ements	, Bene	fits, ISC	0 14001	6
	requi	rement	ts, Ste	eps in	ISO	1400	1 cert	ificatio	on, IS	O 140	001 a	nd sust	tainable	
	deve	lopmer	it, Inte	gratior	n with	other s	ystems	s (ISO	9000,	TQM,	Six Si	igma), H	Benefits	
	of in	egratio	on.											
	Envi	ronme	ntal N	Ianage	ement	Plan								
VI	Defi	nition,	Import	ance, I	Develo	pment,	, Struct	uring,	Monit	oring,	Cost as	spects. S	Strategy	6
	for si	ting of	Indust	tries, E	co-La	belling	, Life-0	Cycle A	Assess	ment.				
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Text Boo	KS Cont	or I V	V En	ironm	ontol I	mnoot	1 00000	mont	Macro	LI:11	2nd 1	Idition	1007	
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3	Facil	ities Id	hn W	ilev \mathcal{X}	Sons	1 st Edi	tion 1	10act 7 001	1990991		n was	ie meai		Disposai
	1 acri	11105, 50	JIII ((ncy œ	50115,	15t Lui	111011, 1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
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1	"Env	ironme	$\frac{1}{1}$	uditing	g", Put	olished	by CP	CB, G	$\frac{1}{1}$	India		ation, No	ew Delhi	
2	Mhas	skar, A	.K., Er	ivironi	nental	Audit	, Med	a Envi	ro Put	olicatio	$\frac{1}{200}$)2.		
3	K. W	hitelay	v and I	Butterv	vorth,	ISO 14	001: E	nviron	menta	I Syste	m Han	dbook,	1997.	
Useful Li	nks													
1	https	://www	youtu.	be.cor	n/watc	h?v=w	'EqrM	CdNjX	4					
2	https	://www	youtu.	be.cor	n/watc	h?v=h	fLGI73	N_iA						
3	https	://www	youtu.	be.cor	n/watc	ch?v=N	IpR6Y	iSiHrs						
CO-PO N	Iappi	ıg												
				P	rogra	mme O	outcom	es (PC))				PS	PO
COs	1	2	3	4	5	6	7	8	9	10	11	12	1	2
C01	3						2						1	
CO2	3						2						1	
C03	<u> </u>						2						1	
C04	<u> </u>						2						1	
The streng	$\frac{3}{\text{th of } 1}$	nonnin	α· 1·	Low '). Mec	lium 3	· High						1	
Assessme	nt	паррп	.g 1.	L0w, 2	2. 10100	iiuiii, 3	. mgn							
\circ The a	assessm	ent is b	ased or	MSE.	ISE, a	nd ESE.								
o MSE	shall b	e typica	ally on	module	s 1 to 3	3.								
o ISE s	hall be	taken t	hrough	out the	semest	ter in the	e form	of a tea	cher's a	assessm	ent. Th	e mode	of assessn	nent can be
field	visits, a	assignm	ents, et	c., and	is expe	ected to	map at	least or	ne high	er-orde	r PO.			
• ESE	shall t	be on a	ll modu	ıles wi	th arou	ind 25-	30% w	eightag	e on n	nodules	1 to 3	3 and 70)-75% we	ightage on
modu	ules 4 to	0 6. a thaar	1.00175	N. Mi	400/	orko ir	MCE	ICE	SE)	nooda	l on d l	lin 100/	montrain	ESE are
need	ed. (ES	a meory E shall	be a set	oarate h	+0‰ II lead of	naiks III passino	(1 113E +	ISE+E	se) are	needec	i, allu N	1111. 40%	maiks in	Lon are
	(LD		- • a 50j	a are 1		r	·/							

Prepared	by
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DAC/BoS Secretary

		Walc	hand College (Government Aided	of Engineering	g, Sangli	
			ΔΥ	2023-24	,	
			Course	Information		
Due au			D Tech Applied			
Progr	amme		B. Tech. Applied	i Mechanics		
Class,	Semester		Final Year B. Te	ch, Sem VII		
Cours	se Code		6OE401			
Cours	se Name		Structural Health	Monitoring		
Desire	ed Requisi	tes:				
	Teaching	Scheme		Examination S	cheme (Marks)	
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total
Tutor	ial		30	20	50	100
				Cred	lits· 3	
			Course	Objectives		
	To avor	ing the use of la		monitoring systems	to koon aivil infran	
1	10 exam	surveillance on	w-cost, long term i	monitoring systems	to keep civil infrasi	nucture under
2	To devel	on sustainable n	suffig structural in	hegility.	s for structures	
3		s the civil infrast	tructure using struc	tural health monito	ring systems after d	isaster
	10 03505	Course	Outcomes (CO) w	vith Bloom's Taxo	nomy Level	1545101.
At the	end of the	course, the stud	ents will be able to).		
CO1	Demons	trate the knowle	edge of SHM for v	arious components	of structures.	Applying
CO2	Evaluate	e various technic	ues for SHM of st	ructures		Evaluating
CO3	Design v	arious SHM tec	hniques for variou	s structures.		Creating
			4			
Modu	ıle		Module C	Contents		Hours
Modu	ile Intro	duction to Stru	Module C actural Health Mo	Contents onitoring (SHM)		Hours
Modu	ile Intro Defir	duction to Stru hition & motivat	Module C Ictural Health Mo ion for SHM, SH	Contents Ditoring (SHM) IM - a way for sr	nart materials and	Hours
Modu	ile Intro Defir struct	duction to Stru attion & motivations, SHM and	Module C Ictural Health Mo tion for SHM, SH bio mimetic - ana	Contents Ditoring (SHM) IM - a way for sr llog between the ne	nart materials and ervous system of a	Hours
Modu	Ile Intro Defir struct man a	duction to Stru nition & motivat tures, SHM and and a structure w	Module C actural Health Mo tion for SHM, SH bio mimetic - ana with SHM, SHM as	Contents Distoring (SHM) IM - a way for sr log between the no a part of system ma	nart materials and ervous system of a magement, Passive	Hours 7
Modu	Ile Intro Defir struct man a and	duction to Stru uition & motivat cures, SHM and and a structure w Active SHM, N	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N	Contents Ditoring (SHM) IM - a way for sr log between the no a part of system ma IDECS, basic com	nart materials and ervous system of a inagement, Passive iponents of SHM,	Hours 7
Modu	Ile Intro Defir struct man a and a mater	duction to Stru attion & motivation sures, SHM and and a structure w Active SHM, N rials for sensor d	Module C actural Health Mod tion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign.	Contents Donitoring (SHM) IM - a way for sr log between the ne a part of system ma IDECS, basic com	nart materials and ervous system of a anagement, Passive aponents of SHM,	Hours 7
Modu	Ile Intro Defir struct man a and a mater Appl	Eduction to Stru ition & motivate cures, SHM and and a structure we Active SHM, Ne rials for sensor de ication of SHM	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign.	Contents Ditoring (SHM) IM - a way for sr log between the ne a part of system ma IDECS, basic com	nart materials and ervous system of a magement, Passive aponents of SHM,	Hours 7
Modu I II	Ile Intro Defir struct man a and a mater Appl Intro	duction to Stru attion & motivation and a structure we Active SHM, Netials for sensor de ication of SHM duction to capace	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign. systems itive methods, capa tions for external	Contents phitoring (SHM) IM - a way for sr log between the ne a part of system ma IDECS, basic com acitive probe for co	nart materials and ervous system of a inagement, Passive iponents of SHM, ver concrete, SHM	Hours 7 7
Modu I II	Ile Intro Defir struct man a and a mater Appl Intro of a histor	duction to Stru attion & motivation and a structure we Active SHM, N rials for sensor d ication of SHM duction to capac- bridge, application fical buildings	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana with SHM, SHM as IDE, SHM and N lesign. systems itive methods, capa tions for external	Contents Distoring (SHM) IM - a way for sr log between the no a part of system ma NDECS, basic com acitive probe for co l post tensioned c	nart materials and ervous system of a magement, Passive ponents of SHM, ver concrete, SHM cables, monitoring	Hours 7 7
Modu I II	Ile Intro Defir struct man a and a mater Appl Intro of a histor	oduction to Stru- nition & motivate sures, SHM and and a structure we Active SHM, Ne- tials for sensor de ication of SHM duction to capace bridge, applicate cical buildings.	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign. systems itive methods, capa tions for external sting of Concrete	Contents phitoring (SHM) IM - a way for sr log between the ne a part of system ma NDECS, basic com acitive probe for co l post tensioned co Structures	nart materials and ervous system of a inagement, Passive iponents of SHM, ver concrete, SHM cables, monitoring	Hours 7 7
I I II	Ile Intro Defin struct man a and a mater Appl Intro of a histor	oduction to Stru- nition & motivation cures, SHM and and a structure we Active SHM, No- rials for sensor de ication of SHM duction to capace bridge, application cical buildings. Destructive Test duction to ND'	Module C ictural Health Mo ion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign. systems itive methods, capa itions for external sting of Concrete B T - Situations and	Contents phitoring (SHM) IM - a way for sr log between the ne a part of system ma NDECS, basic com acitive probe for co 1 post tensioned co Structures d contexts, where	nart materials and ervous system of a inagement, Passive iponents of SHM, ver concrete, SHM cables, monitoring NDT is needed,	Hours 7 7
Modu I II	Ile Intro Defin struct man a and a mater Appl Intro of a histor Non Classi	duction to Stru attion & motivation and a structure we Active SHM, Noticals for sensor de ication of SHM duction to capace bridge, application cical buildings. Destructive Test duction to ND fication of ND	Module C ictural Health Mo icion for SHM, SH bio mimetic - ana vith SHM, SHM as IDE, SHM and N lesign. systems itive methods, capa itions for external sting of Concrete S T - Situations and procedures, vis	Contents phitoring (SHM) IM - a way for sr log between the ne a part of system ma NDECS, basic com acitive probe for co l post tensioned co Structures d contexts, where sual Inspection, h	nart materials and ervous system of a inagement, Passive ipponents of SHM, ver concrete, SHM cables, monitoring NDT is needed, ialf-Cell electrical	Hours 7 7 7
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Course Contents for BTech Programme, Department of Applied Mechanics, AY2023-24

	Importance of re-analysis, execution of rehabilitation strategy, Case studies.									
VI	Damage Detection of Composite Structures Introduction to composites and their applications in structural Industry. Learning from failures. Various kinds of damage detection techniques. Repair & rehabilitation & retrofitting of composite structures, damage assessment of composites structures, Case studies.	6								
	Textbooks									
1	Daniel Balageas, Claus - Peter FritzenamI Alfredo Guemes, Str monitoring, Published by ISTE Ltd., U.K. 2006	ructural Health								
2	Guide Book on Non-destructive Testing of Concrete Structures, Training course series No.17, International Atomic Energy Agency, Vienna, 2002.									
	References									
1	Hand book on "Repair and Rehabilitation of RCC Buildings ", Published by I CPWD, Govt. of India, 2002.	Director General,								
2	Hand Book on Seismic Retrofitting of Buildings, Published by CPWD & India Congress in Association with IIT, Madras, Narosa Publishing House, 2008.	n Building								
	Useful Links									
1										
2										
3										

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3			3										2
CO2	2			2										2
CO3	2			2										2
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														
Each CO of the course must map to at least one PO.														

Assessment

The assessment is based on MSE, ISE, and ESE.

MSE shall be typically on modules 1 to 3.

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

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

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

Walchand College of Engineering, Sangli													
(Government Aided Autonomous Institute)													
Course Information													
Progra	Programme B.Tech. All Branches												
Class.	Semester		Final Year B. Tec	ch., Sem VII									
Course	e Code		60E492										
Cours	Course Name Human Relations at Work												
Desire	d Requisites:												
	-		1										
	Teaching S	cheme		Examination	Scheme (Marks)							
Lectur	·e	03 Hrs/week	MSE	ISE	2	Total							
Tutori	al	00 Hrs/week	30	20	50		100						
	Credits: 03												
			Cours	e Objectives		<u> </u>							
These	objectives ain	n to equip studer	its with the knowle	dge and skills nece	ssary to nav	vigate interper	sonal						
relation	$\frac{1}{T}$	namics effective	ly within the work	place.			ite estation shin						
1	10 enable the	e students with a	in understanding at	out the very impor	tance of hu	man relations,	, its relationship						
	To provide r	alovant knowled	loo to address hum	on with people at w	by oxposu	ra ta parsonal	growth and						
2	challenges at	t work	ige to address numa	an relations at work	by exposu	re to personar	growin and						
	To infuse the	e ability to positi	vely consider othe	r's views and to wo	rk effective	ly with others	in team and to						
3	support a shared purpose or goal												
4	Explore the i	importance of tr	ust and ethical beha	viour in building s	uccessful w	ork relationsh	ips.						
	Recognize at	nd appreciate div	versity in the work	place, and learn to b	everage it f	for increased c	reativity and						
5	5 productivity.												
		Course	e Outcomes (CO)	with Bloom's Taxo	nomy Lev	el							
Upon s	successful con	npletion of this c	course, students wi	ll be able to									
CO	Course Out	como Statemon	Bloom's Taxonomy	Bloom's Taxonomy									
		come Statemen	U 3			Level	Descriptor						
CO1	Sense a com	prehensive unde	erstanding of the pr	inciples of human r	elations.	II	Understanding						
CO2	Recall differ	rent forms of co	mmunication (vert	oal, non-verbal, wr	itten) and	I	Remembering						
	their importa	ance in workplac	e interactions.		-1	-							
CO3	roles of men	and women in t	ts, value workload,	understanding the	changing	III	Applying						
	Demonstrate	e ethical behavi	iour, treat other t	eam members res	pectfully,								
CO4	uphold perso	onal values, fost	er team work and u	inderstand its signif	ficance in	III	Applying						
	decision-mal	king and various	societal contexts.										
Modul	ما		Module (⁷ ontents			Hours						
Withu	Human l	Relations and P	ersonal Growth				Hours						
	Understa	Understanding Human Relations, Managing Yourself and Human Relations. Attitude.											
I	Self-Este	Self-Esteem, Self-Confidence, Self-Motivation, Emotional Intelligence. Happiness.											
	Values ar	Values and Ethics,											
	Challeng	ges in Human R	elations										
	Dealing e	Dealing effectively with People, Communication in the Workplace, Specialized tactics											
П	for getti	7											
	Competer												
	Lite Plan	Ior Effective Hu	uman Kelations.										
тт	Teamwo Definition	rk n Importance e	nd Repetits of tas	mwork promoting	effective	teamwork of	-						
	workplac	e Becoming an	effective leader M	otivating Others		wannwork al							
IV	Personal	Strategies for i	mnroving Humar	Relations									
T A		su augus ior i					–						

Course Contents Final. Year. B. Tech, 2024-25

	Staying Physically Healthy: Yoga, Pranayama and Exercise, Improving Interpersonal									
	Relations, Achieving Emotional Balance in a chaotic world, Finding Positive Energy.									
	Individual Career Management									
	Staying psychologically healthy, Managing Stress and Personal Problems, Meditation,									
V	Developing Career Thrust, Getting Ahead in Your Career, Learning and Developing	7								
	Individual Strategies, Environmental Awareness, Career Goals, Strategies, Appraisal,									
	Individual Career Management									
	Measures for Successful Human Relations									
	Developing Good Work Habits. Responding and managing to work related stress,									
VI	Valuing work load, The changing roles of men and women, Sexual harassment of	7								
	women at workplace, Laws and penalties concerning the harassment of women in the									
	workplace. Respect to employees (men, women and transgender).									
Taythooks										
	Dubrien A I (2018) Human Relations for Career and Personal Success: Concepts	Applications and								
1	Skills, 11 th edition. Upper Saddle River, NJ: Pearson.	appreations and								
2	Barry Reece and Monique Reece (2016). Effective Human Relations: A Guide to People at Work, 13th									
2	edition, Cengage Learning.									
3	Lowell H. Lamberton and Leslie Minor-Evans (2020). Human Relations: Strategies for Success, 6 th									
	edition, McGraw-Hill Education.									
	References									
1	Greenberg, J. S. (2017). Comprehensive stress management 14th edition. New York: McG	Graw Hill.								
2	Udai, Y. (2015). Yogasan aur Pranayam. New Delhi: N.S. Publications.									
2	Brian Luke Seaward, (2017). Managing Stress: Principles and Strategies for Health and Well-Being, 9th									
	edition, Jones & Bartlett Learning.									
	TT 6 1 T + 1									
1	Userui Links									
2	https://www.apa.org/topics/boolthy.workplaces									
	https://www.apa.org/topics/itcaliny-workplaces									
	https://www.ininutoois.com/carpixt/teani-inaliagement									
4	mups.//www.verywemminu.com/now-to-dear-with-sitess-at-work-5143275									

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1									2					
CO2										3				
CO3									3		2			
CO4								3	3					
The stre	The strength of manning is to be written as 1: Low 2: Madium 2: High													

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

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