Walchand College of Engineering (Government Aided Autonomous Institute)

Vishrambag, Sangli-416415



Course Content for S. Y. M. Tech. Mechanical (Heat Power Engineering)

Semester - III and IV

2023-24

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Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
	AY 2023-24							
			Course	e Information				
Progra	amme		M. Tech. (Heat P	ower Engineering)				
Class,	Semeste	er	Second Year M.	Tech., Sem III				
Cours	e Code		6HP645					
Cours	e Name		Dissertation Phas	e I				
Desire	d Requi	sites:	Concept knowled	lge of research meth	nodology,	project m	anag	ement,
			mechanical engin	leering				
,	Teaching	g Scheme		Examination S	Scheme (I	Marks)		
Practi	cal	6 Hrs/ Week	LA1	LA2	Lab F	ESE		Total
Intera	ction	-	100	00	00)		100
				Crea	lits: 03			
	1		Cours	se Objectives				
1	To dev	elop the student t	o apply the knowle	edge gained to iden	tify probl	ems for r	esear	ch and provide
	the solu	itions by self-stuc	ly and interaction v	with stakeholders.				
2	Acquire	e knowledge to ta	ckle real world pro	blems of societal co	oncerns			
3	Impart	flexibility to the s	student to have inci	reased control over	h1s/ her le	arning		
4	Teache	rs would serve as	mentor/facilitator	of inquiry and refle	ction rath	er than as	an 1r	nstructor
5	Enhanc	e a students' lear	ning through increa	ased interaction wit	h peers an	id colleag	ues.	
At the	and of th	Course the stur	e Outcomes (CO)	with Bloom's Tax	onomy Le	evel		
At the		ie course, the stud		0,		Bloom	's	Bloom's
СО		Cou	rse Outcome Statement/s			Taxono	my	Taxonomy
						Level	l	Description
CO1	Search	the existing litera	ture and identification	tion of research pro	blem	IV		Analyzing
CO2	Design	and develop the	solution for comple	ex engineering prob	lem	V		Evaluating
CO3	Create	the new knowled	ge in the specialize	ed field		VI		Creating
				-				
			Cou	rse Content	· ·			
Students are expected to carry out independent research work on the chosen topic. In this semester it is expected								
that the student has carried out substantial research work including exhaustive literature survey, formulation								
of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and								
analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results								
expected that the student has completed most of the experimental/computation works and analyzed the results								
students are required to submit the dissertation work in the form of report as per the institute rule								
statents de required to submit die dissertation work in the form of report as per the institute fute								
				extbooks				
1	As	per the research to	opic					

Course Contents for M. Tech. Programme, Department of Mechanical Engineering, AY2023-24

	References			
1	National and International Journals			
Useful Links				
1	https://nptel.ac.in/courses/121/106/121106007/			
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt			
3	https://nptel.ac.in/courses/110/104/110104073/			
4	https://nptel.ac.in/courses/110/107/110107081/			

CO-PO Mapping							
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
CO1	1			1		2	
CO2	1		1		2	1	
CO3		2				1	
The stren	The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High						

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

Assessment								
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.							
IMP: Lab ESE i	s a separate head o	of passing.(min 40 %), LA1+	-LA2 should be min 40%					
Assessment	Based on	Conducted by	Typical Schedule	Marks				
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
XX7 1 1 1 1 1	1	C . T 1		<u> </u>				

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

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)				
	AY 2023-24			
Course Information				
Programme	M. Tech. (Heat Power Engineering)			
Class, Semester	Second Year M. Tech., Sem III			
Course Code	6HP646			
Course Name	Dissertation Phase II			
Desired Requisites:	Concept knowledge of research methodology, project management,			
	mechanical engineering			

Teachin	g Scheme		Examination	Scheme (Marks)		
Practical	6 Hrs/ Week	LA1	LA2	Lab ESE	Total	
Interaction	-	00	100	00	100	
		Credits: 03				

	Course Objectives					
1	To develop the student to apply the knowledge gained to identify problems for research and provide					
I	the solutions by self-study and interaction with stakeholders.					
2	Acquire knowledge to tackle real world problems of societal concerns					
3	Impart flexibility to the student to have increased control over his/ her le	earning				
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor					
5	Enhance a students' learning through increased interaction with peers and colleagues.					
	Course Outcomes (CO) with Bloom's Taxonomy Level					
At the	end of the course, the students will be able to,					
		Bloom's	Bloom's			
CO	Course Outcome Statement/s	Taxonomy	Taxonomy			
		Level	Description			
CO1	Search the existing literature and identification of research problem	IV	Analyzing			
CO2	Design and develop the solution for complex engineering problemVEvaluating					
CO3	Create the new knowledge in the specialized field VI Creating					

Course Content

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects this semester. The students are required to submit the dissertation work in the form of report as per the institute rule

	Textbooks					
1	As per the research topic					

References					
1	National and International Journals				
Useful Links					
1	https://nptel.ac.in/courses/121/106/121106007/				
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt				
3	https://nptel.ac.in/courses/110/104/110104073/				
4	https://nptel.ac.in/courses/110/107/110107081/				

	CO-PO Mapping							
		Programme Outcomes (PO)						
	1	2	3	4	5	6		
CO1	1			1		2		
CO2	1		1		2	1		
CO3	CO3 2 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 n	nust map to at leas	st one PO.					

Assessment								
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.							
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%	1				
Assessment	Based on	Conducted by	Typical Schedule	Marks				
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
Week 1 indicat	es starting week	of a semester. Lab activiti	es/Lab performance shall include p	erforming				

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)				
	AY 2023-24			
Course Information				
Programme	M. Tech. (Heat Power Engineering)			
Class, Semester	Second Year M. Tech., Sem III			
Course Code	6HP647			
Course Name	Dissertation Phase III			
Desired Requisites:	Concept knowledge of research methodology, project management,			
	mechanical engineering			

Teaching Scheme		Examination Scheme (Marks)				
Practical	8 Hrs/ Week	LA1	LA2	Lab ESE	Total	
Interaction	-	00	00	100	100	
		Credits: 04				

	Course Objectives					
1	To develop the student to apply the knowledge gained to identify problems for research and provide					
I	the solutions by self-study and interaction with stakeholders.					
2	Acquire knowledge to tackle real world problems of societal concerns					
3	Impart flexibility to the student to have increased control over his/ her le	earning				
4	Teachers would serve as mentor/facilitator of inquiry and reflection rath	er than as an i	nstructor			
5	Enhance a students' learning through increased interaction with peers and	nd colleagues.				
	Course Outcomes (CO) with Bloom's Taxonomy L	evel				
At the	end of the course, the students will be able to,					
		Bloom's	Bloom's			
CO	Course Outcome Statement/s	Taxonomy	Taxonomy			
	Level Description					
CO1	Search the existing literature and identification of research problem	IV	Analyzing			
CO2	Design and develop the solution for complex engineering problem	V	Evaluating			
CO3	Create the new knowledge in the specialized field	VI	Creating			

Course Content

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects this semester. The students are required to submit the dissertation work in the form of report as per the institute rule

	Textbooks
1	As per the research topic

References					
1	National and International Journals				
	· · · ·				
Useful Links					
1	https://nptel.ac.in/courses/121/106/121106007/				
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt				
3	https://nptel.ac.in/courses/110/104/110104073/				
4	https://nptel.ac.in/courses/110/107/110107081/				

CO-PO Mapping								
		Programme Outcomes (PO)						
	1	2	3	4	5	6		
CO1	1			1		2		
CO2	1		1		2	1		
CO3		2				1		
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High								
Each CO	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 i	s a separate head	of passing.(min 40 %), LA1-	+LA2 should be min 40%					
Assessment	Assessment Based on Conducted by Typical Schedule Marks							
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
Week 1 indicat	es starting week	of a semester. Lab activiti	es/Lab performance shall include p	erforming				

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)					
		AY	2023-24		
		Course l	Information		
Program	me	M. Tech. (Heat P	ower Engineering)		
Class, Se	mester	Second Year M.	Гесh., Sem III		
Course C	ode	6HP611			
Course N	ame	Design of Solar a	nd Wind System		
Desired H	Requisites:	Energy Engineeri	ng		
Tea	aching Scheme		Examination Schen	e (Marks)	
Lecture	3 Hrs/week	MSE	ISE	ESE	Total
Tutorial	0 Hrs/week	30	20	50	100
			Credits: .	, ,	
		Course	Objectives		
1	Acquire knowledge	to tackle real wor	d problems of societ	l concerns.	
2	Impart flexibility to	the student to have	ve increased control o	ver his/ her le	arning.
3	Teachers would ser instructor.	ve as mentor/facil	itator of inquiry and r	eflection rathe	er than as an
4	Enhance student's	earning through in	ncreased interaction w	ith peers and	colleagues.
	Course	Outcomes (CO) w	ith Bloom's Taxonomy	Level	
At the end	d of the course, the stud	dents will be able to	,		
СО	Cor	urse Outcome Stat	ement/s	Bloom's Taxonom Level	y Bloom's Description
CO1	Search the existing problem	literature and id	entification of researc	h III	Apply
CO2	Design and develo problems.	p the solution fo	or complex engineerin	g IV	Analyze
CO3	Create the new know	ledge in the special	ized field	V	Evaluate
Module	e Module Contents Hours				
I	Energy scenario, Man and energy, World's production of commercial energy sources, India's production and reserves, Energy alternatives, The solar energy option4				
II	Thermal applications, Water heating, Space heating, Space cooling and refrigeration, Power generation, Distillation, Drying and Cooking, Concentrating collector, Central receiver system4				
III	Liquid flat plate factor, Selective su concrete collector, heater with fins,	collector, Perform irfaces, Evacuated Solar air collecto	ance analysis, Collec tube collector, BNL or, types, performance	tion efficienc Polymer an analysis, A	y d ir 4

IV	Thermal energy storages, Sensible and latent heat storage, Solar ponds, Performance analysis, operational problems, Other solar pond concepts, Photovoltaic conversion, Performance characteristics, Commercial solar cell, cost and applications, prospects of PV cell for India					
V	Wind energy fundamentals and applications, Merits, Limitations, Nature and origin of wind, Wind turbine theory, Power of wind turbine for given5incoming wind velocity Vi, Wind to electric energy conversion system5					
VI	Classification and development of wind machines, Multi bladed type, Propeller type, wind machines, Wind data performance calculation, Concluding remarks, prospects of wind energy for India	5				
	Textbooks					
1	S.Rao Dr.B.B.Parulekar, "Energy Technology – Nonconventional, R	enewable &				
1	Conventional", Khanna Publishers					
2	2 S.P. Sukhatme and J K Nayak, "Solar Energy"McGraw Hill Education					
3	B. S. Mangal, "Solar Power Engineering", Tata McGraw Hill, New Delhi	1990				
1	Spera D. A. 1994 "Wind Turbine Technology, Fundamentals of concept in win					
4	turbine Engg." ASME ebook					
	References					
1	Culp, Archie W, "Principles of Energy Conversion", McGraw Hill Book Compar	ıy				
2	Rabl. A. 1985, "Active solar collectors and their applications" Oxford University	press				
3	John A Duffie, W. A. Beckman, "Solar Engineering of Thermal Pro	cesses", John				
	Wiley and Sons INC					
4	Gary L. Johnson, "Wind Energy Systems", Prentice Hall New Jersey					
5	Sathyajith, Mathew, "Wind Energy Fundamentals, Resource Analysis and Economics", springer verlag Berlin					
6	Kloeffler R.G, Sitz E.L (1946), "Electric Energy from Winds" Kansas Sta Engg., ManhattanKans	te College of				
	Useful Links					
1	https://nptel.ac.in/courses/103/103/103103206/					

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

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.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)					
			AY	2023-24		
			Course l	Information		
Progr	amn	ne	M. Tech. (Heat P	ower Engineering)		
Class,	Sen	nester	Second Year M.	Tech., Sem III		
Cours	e Co	ode	6HP612			
Cours	e Na	ame	Advanced Mather	matical Methods in Engi	leering	
Desire	ed R	equisites:	Engineering Math	hematics		
		-	0 0			
	Tea	ching Scheme		Examination Scheme	e (Marks)	
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total
Tutor	ial	0 Hrs/week	30	20	50	100
				Credits: 3	I	
		I				
			Course	Objectives		
1	To	introduce to solution	n methods of OD	E		
2	Tc	introduce to solutio	n methods to PDI	E		
3	Tc	introduce to simple	regression and co	orrelations		
		Course	Outcomes (CO) w	ith Bloom's Taxonomy	Level	
At the	end	of the course, the stud	ents will be able to	,		1 .
		C			Bloom's	Bloom's
0		Cours	e Outcome Staten	nent/s	I axonomy	Laxonomy Description
	Ar	only statistical technic	ues to analyze m	ultivariate functions and		Description
COI	sir	nple regression and co	rrelation			Applying
CO2	Ar	nalyze engineering pro	blems by using the	e knowledge of ordinary	IV	Analysing
	an	d partial differential eq	uations.		1 V	Anarysing
CO3	So	lve Differential equation	ons using different	techniques		Evaluate
	•			a		TT
Modu	ile	T (1 (Module	Contents		Hours
		Introduction Probability Theory	to and Sampling Di	Probability	Theory	
I		along with example	s. Standard discre	ete and continuous dist	ributions like	5
		Binomial, Poisson, ar	id Normal, Expone	ential etc.	incutions inc	
		Testing	of	Statistical	Hypothesis	
II		Testing a statistical	hypothesis, tests	on single sample and	two samples	4
		concerning means and	d Variances. ANO	VA: One – way		
		Ordinary First order	Differe	ential	Equations	
III		Order linear differe	s (Linear, Separa	ulle Exacl, Homogeneo	omogeneous):	4
		Solution methods suc	as undetermined coefficients and variation of parameters			

	Partial Differential Equations and Concepts in Solution to Boundary Value			
	Problems			
IV	First order partial differential equations; Second order linear partial	5		
	differential equations; Canonical forms; Fourier series, Second order			
	equation (Parabolic, Elliptic and Hyperbolic) in rectangular			
	Solution techniques for PDE's			
V	Solution techniques such as separation of variables, eigenfunction	1		
	expansions, integral transforms (Fourier and Laplace transforms);			
	D'Alembert's solution for the Wave equation			
	Simple Regression and Correlation			
X / X	The simplest deterministic mathematical relationship between two			
VI	variables x and y, A Linear Probabilistic Mode, Estimating model	4		
	parameters, inferences about slope parameters, correlations.			
	1	1		
	Textbooks			
1	Ronald E, Walpole, Sharon L. Myers, Keying Ye, Probability and	Statistics for		
1	Engineers and Scientists (8th Edition), Pearson Prentice Hall, 07			
2	J. B. Doshi, Differential Equations for Scientists and Engineers, Narosa	, New Delhi,		
2	10			
	References			
1	Douglas C. Montgomery, Design and Analysis of Experiments (7thEo	dition), Wiley		
	Student Edition, 09.			
2	S. P. Gupta, Statistical Methods, S. Chand & Sons, 37th revised edition, 08			
3	William W. Hines, Douglas C. Montgomery, David M. Goldsman, Pr	robability and		
	Statistics for Engineering, (4th Edition), Willey Student edition, 06. 4 Advanced Engineering Mathematics (0th Edition), Envin Knowszig, Wiley India (12)			
4	Auvanceu Engnicering Maulemaues (9th Eution), Erwin Kreyszig, wiley india	(13)		
	Usoful Links			
1	https://nptel.ac.in/courses/111/104/111104031/			
2	https://nptel.ac.in/courses/111/105/111105093/			
_				

	CO-PO Mapping							
			Programme Out	tcomes (PO)				
	1	1 2 3 4 5 6						
CO1								
CO2								
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 n	nust map to at least	one PO.					

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.

Walchand College of Engineering, Sangli								
	(Government Aided Autonomous Institute)							
				2025-24				
Ducana			Course I	niormation				
Close 6	mme Somostor		M. Tech. (Heat P	Fach Sam III				
Class, S	Genester		Second Year M.	recn., Sem III				
Course	Code		0HP013	I Calif Chain Mana	4			
Course			Food Preservation	h and Cold Chain Mana	gement			
Desired	Requisit	tes:	Refrigeration and	air conditioning				
	Toophing	Sahama		Examination Schor	na (Marka)			
I a a farme			MCE		re (warks)	Tatal		
Tutorio	;	3 His/week			ESE	100		
	11	0 IIIS/ week	50	Crodite:	<u> </u>	100		
				Cieuns.	,			
			Course	Ohiectives				
1	Tound	erstand the im	ortance microorg	anisms in food prese	vation			
2	To intro	oduce the basic	s of various food	processing and prese	vation techno	logies		
3	To know	w the need and	importance of pr	reservation in dairy ar	d fisherv indu	istrv.		
	To anal	vze the compo	sitional and techr	ological aspects of m	ilk and fish a	nd other food		
4	product	S I		0 1				
5 To apply study of food preservation for preservation of various food products					cts.			
		Course	Outcomes (CO) w	ith Bloom's Taxonom	V Level			
At the e	and of the	course, the stud	ents will be able to	,				
СО		Cour	se Outcome Stater	nent/s	Bloom's Taxonomy Level	Bloom's 7 Taxonomy Description		
CO1	To und preserva preserva	lerstand the introduction. To introduction technologies	mportance of m the basics of var es	icroorganisms in foc ious food processing an	d d III	Applying		
CO2	To apply products	y study of food I s and cold chain	preservation for pre management	servation of various foc	d IV	Analysing		
CO3	To analy fish and	yze the composi other food proc	tional and technolo lucts during preserv	gical aspects of milk an vation	d V	Evaluate		
Modul	e E II		Module C	Contents		Hours		
1	Food Princip bacter Classi nutrier Classi of she	microbiology ples of Food ia, yeast and n fication of mic nt and oxygen fication of food lf life, perishabl	Preservation, michold, Importance of roorganisms based requirements, typi based on pH, Food e foods, semi peris	croorganisms associat f bacteria, yeast and r l on temperature, pH, cal growth curve of r l infection, food intoxic hable foods, shelve stat	ed with food nolds in foods water activity nicroorganisms ation, definitio le foods.	4 s , , 1		

	Food Preservation by Low temperature	
	Freezing and Refrigeration :	
II	Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect on food. Freezing methods -direct and indirect, still air sharp freezer, blast freezer, fluidized freezer, plate freezer, spiral freezer and cryogenic freezing.	4
	Food Preservation by high temperature	
III	Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching.	4
IV	Food Preservation by Moisture control Drying and Dehydration - Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry. Drying methods and equipment, air convection dryer, tray dryer, tunnel dryer, continuous belt dryer, fluidized bed dryer, spray dryer, drum dryer, vacuum dryer, freeze drying ,foam mat drying. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.	5
v	Food Preservation by Irradiation and chemicals Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry, concept of cold sterilization. Recent Trends Pulsed electric fields, High pressure technology, Ohmic heating, Microwave heating, Hurdle technology.	5
VI	Cold chain and Cold Chain Management Freezing: requirements of refrigerated storage - controlled low temperature, air circulation and humidity, changes in food during refrigerated storage, progressive freezing, changes during freezing – concentration effect and ice crystal damage, freezer burn. Maintenance of controlled environment during transportation and sales outlets.	4
	Torothe sha	
1	I EXIDOOKS	
2	Ramaswamy H and Marcott M, Food Processing Principles and Appl Press,2006	ications CRC
	References	
1	B. Srilakshmi, Food science, New Age Publishers,2002	
2	Meyer, Food Chemistry, New Age,2004	
3	Bawa. A.S, O.P Chauhanetal. Food Science. New India Publishing agency, 2013	
4	Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, 2004	New Delhi,

5	Desrosier NW and Desrosier JN, The Technology of Food Preservation, CBS						
	Publication, New Delhi, 1998						
6	Paine FA and Paine HY, Handbook of Food Packaging, Thomson Press India Pvt Ltd,						
	New Delhi- 1992						
7	Toledo Romeo T, Fundamentals of Food Process Engineering, Aspen Publishers, 1999						
Useful Links							
1	https://nptel.ac.in/courses/126/105/126105011/						
2	https://nptel.ac.in/courses/126/103/126103017/						

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

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.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)							
	AY 2023-24						
		Course	Information				
Program	me	M. Tech. (Heat F	Power Engineering)				
Class, Sei	nester	Second Year M.	Tech., Sem III				
Course C	ode	6IC602					
Course N	ame	Constitution of I	ndia				
Desired R	Requisites:						
Tea	aching Scheme		Examination Sch	eme (Marks)			
Lecture	3 Hrs/we	ek MSE	ISE	ESE	Total		
Tutorial	-	30	20	50	100		
			Credit	5:3			
		Course	Objectives				
1	To review and cre	ate awareness on vario	ous provisions in the o	constitution of Ind	lia.		
	Cou	rse Outcomes (CO) w	vith Bloom's Taxono	my Level			
At the end	l of the course, the	students will be able to	о,				
СО	Course Outcome Statement/s			Bloom's Taxonomy Level	Bloom's Taxonomy Description		
C01	Explain the premi	ises informing the twi	n themes of liberty a	nd u	Understanding		
	freedom from a ci	vil rights perspective.		11	Chiefstanding		
CO2	Address the grow	th of Indian opinion re	egarding modern Indi	an			
	intellectuals cons	titutional role and en	ntitlement to civil a	nd II	Understanding		
	economic rights a	s well as the emergen	ce of nationhood in t	he	6		
~~~	early years of Ind	an nationalism	0.1				
CO3	Address the role of	of socialism in India a	fter the commenceme	ent			
	of the Bolshevik F	Revolution in 1917 and	1 its impact on the init		Understanding		
	drafting of the Inc	lian Constitution					
Madula		Madula	Jaméanéa		II		
Module	History of Mol	ving of the Indian	Constitution Droft	ing Committee	Hours		
I	(Composition & V	Working)	Constitution Drait	ing Committee,	4		
т	Philosophy of th	e Indian Constitution	ı:		4		
	Preamble, Salient	Feature			4		
	Contours of Con	stitutional Rights:					
	Fundamental Rig	ts; Right to Equalit	ty; Right to Freedor	n; Right against			
III	Exploitation; Rig	ht to Freedom of Relig	gion; Cultural and Ed	ucational Rights;	5		
	Right to Constitut	tional Remedies; Direc	ctive Principles of Sta	te Policy;			
	Fundamental Dut						

	Organs of Governance:	
IV	Parliament, Composition, Qualifications and Disqualifications, Powers and	5
	Functions, Executive, President, Governor, Council of Ministers Judiciary,	5
	Appointment and Transfer of Judges, Qualifications, Powers and Functions	
	Local Administration:	
	District"s Administration head: Role and Importance, Municipalities:	
	Introduction, Mayor and role of Elected Representative, CEO of Municipal	
V	Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials	5
	and their roles, CEO ZilaPachayat: Position and role. Block level:	
	Organizational Hierarchy (Different departments), Village level: Role of	
	Elected and Appointed officials, Importance of grass root democracy	
	Election Commission:	
VI	Election Commission: Role and Functioning. Chief Election Commissioner	5
	and Election Commissioners. State Election Commission: Role and	5
	Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.	
	Textbooks	
1	Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition	, 2015.
2	M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014	
3	D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015	
	References	
1	The Constitution of India, 1950 (Bare Act), Government Publication	
1	Useful Links	
	nups://en.wikipedia.org/wiki/Constituent_Assembly_of_india	
2	nttps://nptei.ac.in/courses/129/106/129106003/	
3	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-Iw02/	
4	https://eci.gov.in/about/about-eci/the-functions-electoral-system-of-india-r2/	

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

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.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)						
				AY 2023-24			
			Cou	urse Information			
Progra	amme		M. Tech. (Mech	anical Heat Power	Engineering)		
Class.	Semester		Second Year M.	Tech., Sem IV			
Cours	e Code		6HP691	,			
Cours	e Name		Dissertation Pha	nse - IV			
Desire	d Requisi	tes:	2100010001100				
	a noquisi						
Теа	ching Sch	eme (Hrs)		Examinati	on Scheme (Ma	rks)	
Practi	cal	10	LA1	LA2	ESE		Total
Intera	ction	-	100	0	0		100
					Credits: 5		
				· · · · · · · · · · · · · · · · · · ·			
			Co	ourse Objectives			
	To devel	on the student	to apply the know	vledge gained to ide	entify problem fo	r research pro	wide the
1	solutions	by self-study	and interaction wi	ith stake holders	entity problem it	n researen pro	vide the
2	Acquire	knowledge to t	ackle real world p	problems of societa	l concerns		
3	Impart fl	exibility to the	student to have in	ncreased control ov	ver his/ her learni	ng.	
4	Teachers	would serve a	s mentor/facilitate	or of inquiry and re	flection rather th	ian as an instru	ıctor
5	Enhance	student's learn	ning through incre	eased interaction wi	th peers and coll	eagues.	
Course Outcomes (CO) with Bloom's Taxonomy Level							
		Cuu	ise Outcomes (C	(U) with Bloom's	raxonomy Leve	<b>, L</b>	
At the	end of the	course, studer	its will be able to,	(O) with Bloom's			
At the	end of the	course, studer	ts will be able to,	Statement/a		Bloom's	Bloom's
At the CO	end of the	course, studer	ts will be able to,	Statement/s		Bloom's Taxonomy	Bloom's Taxonomy Description
At the CO	end of the	course, studer C	ts will be able to,	Statement/s	problem	Bloom's Taxonomy Level	Bloom's Taxonomy Description Analysing
At the CO CO1 CO2	end of the Search the Design a	course, studer C ne existing liter nd develop the	ts will be able to,	Statement/s cation of research j	problem	Bloom's Taxonomy Level IV V	Bloom's Taxonomy Description Analysing Evaluating
At the CO CO1 CO2 CO3	end of the Search th Design a Create th	course, studer Course, studer Course existing liter nd develop the ne new knowled	ts will be able to, course Outcome s rature and identifice solution for com dge in the speciali	Statement/s cation of research j plex engineering prized field	problem roblem	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating
At the CO CO1 CO2 CO3	end of the Search th Design a Create th	course, studer C ne existing liter nd develop the ne new knowled	ts will be able to, Course Outcome S rature and identific solution for com dge in the speciali	Statement/s cation of research j plex engineering pr ized field	problem roblem	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating
At the CO CO1 CO2 CO3	end of the Search th Design a Create th	course, studer C ne existing liter nd develop the ne new knowled	ts will be able to, course Outcome s rature and identifice solution for com dge in the speciali	Statement/s cation of research p plex engineering pu ized field	problem roblem	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating
At the CO CO1 CO2 CO3	end of the Search th Design a Create th	course, studer C ne existing liter nd develop the ne new knowled ected to carry o	ts will be able to, course Outcome S rature and identific solution for com dge in the specialion C out independent re	Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the	problem roblem e chosen topic. Ir	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected
At the CO CO1 CO2 CO3 Studer that th	end of the Search th Design a Create th ats are expo	course, studer C ne existing liter nd develop the ne new knowled ected to carry of nas carried out	ts will be able to, course Outcome S rature and identifies solution for com- dge in the specialion C put independent re- substantial resear	Statement/s Statement/s cation of research p plex engineering pr ized field course Contents esearch work on the rch work including	problem roblem e chosen topic. Ir exhaustive litera	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of
At the CO CO1 CO2 CO3 Studer that th the res	end of the Search th Design a Create th ts are expe e student h earch prob	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out olem, developm	ts will be able to, course Outcome S rature and identifies solution for com dge in the specialion C out independent re substantial resear- ment/fabrication of	Statement/s Statement/s cation of research p plex engineering pr ized field course Contents esearch work on the rch work including f experimental set-	e chosen topic. Ir exhaustive litera up (if any/require	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of , and analysis
At the CO CO1 CO2 CO3 Studer that th the ress of initi	end of the Search th Design a Create th tts are expe e student h earch prob al results t	course, studer C ne existing liter nd develop the ne new knowled ected to carry of nas carried out plem, developm hus obtained. I	ts will be able to, course Outcome S rature and identific solution for com dge in the speciali C out independent re substantial resear- nent/fabrication of n fourth semester,	Statement/s Statement/s cation of research p plex engineering pr ized field ourse Contents esearch work on the rch work including f experimental set-to , the students contin	problem roblem e chosen topic. Ir exhaustive litera up (if any/require ue their disserta	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that
At the CO CO1 CO2 CO3 Studer that th the ress of initi the stu	end of the Search th Design a Create th ats are expe e student h earch prob al results t dent has c	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out plem, developm hus obtained. I ompleted most	ts will be able to, course Outcome S rature and identifice solution for com- dge in the specialion C put independent re- substantial resear- nent/fabrication of n fourth semester, t of the experiment	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set , the students contin ntal/computation w	e chosen topic. Ir exhaustive litera up (if any/require orks and analyze	Bloom's Taxonomy Level IV V VI	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as
At the CO CO1 CO2 CO3 Studen that th the res of initi the stu propos	end of the Search th Design a Create th ts are expe e student h earch prob al results t dent has c sed in the s	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out blem, developn hus obtained. I ompleted most ynopsis. The w	ts will be able to, course Outcome S rature and identifie e solution for com dge in the specialian C put independent re- substantial resear- nent/fabrication of n fourth semester, t of the experiment york should be com-	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set-in the students contin ntal/computation w npleted in all respect	e chosen topic. Ir exhaustive litera up (if any/require orks and analyze cts in this semest	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as ts are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subi	end of the Search th Design a Create th The student h earch prob al results t dent has c sed in the sy mit the diss	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out plem, developm hus obtained. I ompleted most ynopsis. The w sertation work	ts will be able to, course Outcome S rature and identifice solution for com- dge in the specialian C pout independent re- substantial resear- nent/fabrication of n fourth semester, t of the experiment york should be com- in the form of rep	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set the students contin ntal/computation w npleted in all respect port as per the instit	e chosen topic. Ir e chosen topic. Ir exhaustive litera up (if any/require oue their dissertation orks and analyze cts in this semestion ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as ts are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subi	end of the Search th Design a Create th ts are expe e student h earch prob al results t dent has c sed in the s mit the diss	course, studer Course, studer Course, studer Course, studer Course, studer Course, studer Course, studer develop the ected to carry of has carried out olem, developm hus obtained. I completed most ynopsis. The w sertation work	ts will be able to, course Outcome S rature and identifies e solution for com- dge in the specialian C put independent re- substantial resear- ment/fabrication of n fourth semester, t of the experiment ork should be com- in the form of rep	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set-u- , the students contir ntal/computation w npleted in all respec- port as per the instit	e chosen topic. Ir e chosen topic. Ir exhaustive litera up (if any/require nue their disserta orks and analyze cts in this semest ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as as are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subi	end of the Search th Design a Create th al Create th estudent h earch prob al results t dent has c ad in the sy mit the dise	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out olem, developm hus obtained. I ompleted most ynopsis. The w sertation work	topic	Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set- t, the students contir ntal/computation w npleted in all respect port as per the instit Text Books	e chosen topic. Ir exhaustive litera up (if any/require orks and analyze ts in this semest ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as ts are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subi	end of the Search th Design a Create th Its are expe e student h earch prob al results t dent has c sed in the sy mit the diss	course, studer Course, studer Course, studer Course, studer Course, studer Course, studer and develop the ne new knowled ected to carry of has carried out of the new knowled ected to carry of has carried out of the new knowled ected to carry of has carried out of the new knowled course, studer new knowled enter the research	topic	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set , the students contir ntal/computation w npleted in all respec- port as per the instit Text Books	e chosen topic. Ir e chosen topic. Ir exhaustive litera up (if any/require orks and analyze cts in this semest ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected formulation of and analysis expected that so obtained as is are required
At the CO CO1 CO2 CO3 Studen that th the res of initi the stu propos to subi	end of the Search th Design a Create th a Create th earch prob al results t dent has c sed in the sy mit the diss	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out blem, developn hus obtained. I ompleted most ynopsis. The w sertation work	topic	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set-u- , the students contir ntal/computation w npleted in all respec- port as per the instit Text Books References	e chosen topic. Ir e chosen topic. Ir exhaustive litera up (if any/require orks and analyze cts in this semesti ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected ormulation of and analysis expected that so obtained as ts are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subr 1 1	end of the Search th Design a Create th al Create th e student h earch prob al results t dent has c sed in the sy mit the diss	course, studer C ne existing liter nd develop the ne new knowled ected to carry of has carried out plem, developm hus obtained. I ompleted most ynopsis. The w sertation work	topic	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set	problem roblem e chosen topic. Ir exhaustive litera up (if any/require nue their dissertation orks and analyze cts in this semesti- ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected formulation of and analysis expected that so obtained as as are required
At the CO CO1 CO2 CO3 Studer that th the res of initi the stu propos to subi 1	end of the Search th Design a Create th Its are expe e student h earch prob al results t dent has c sed in the s mit the diss	course, studer Course, studer Course, studer Course, studer Course, studer Course, studer Course, studer and develop the enew knowled ected to carry of has carried out olem, develop hus obtained. I completed most ynopsis. The w sertation work er the research	topic	Statement/s Statement/s Cation of research p plex engineering pr ized field Course Contents esearch work on the rch work including f experimental set-u , the students contir ntal/computation w npleted in all respect port as per the instit Text Books References	e chosen topic. Ir e chosen topic. Ir exhaustive litera up (if any/require orks and analyze cts in this semest ute rule.	Bloom's Taxonomy Level IV V VI a this semester ature survey, f ed) and testing tion work. It is ed the results s er. The student	Bloom's Taxonomy Description Analysing Evaluating Creating it is expected formulation of and analysis expected that so obtained as ts are required

	Useful Links					
1	https://nptel.ac.in/courses/110/104/110104073/					

CO-PO Mapping							
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
CO1	1			1		2	
CO2			1		2		
CO3		2				2	
The strength	of mapping is to	be written as 1,2	2,3; Where, 1:Lo	w, 2:Medium, 3:	High	1	
Each CO of the	he course must n	nap to at least or	ne PO.				

	Assessment						
There are thre	There are three components of lab assessment, LA1, LA2 and Lab ESE.						
IMP: Lab ESE	E is a separate head of p	assing. LA1, LA2	together is treated as In-Semester Evaluation.				
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks			
та 1	Lab activities,	Lab Course	During Week 1 to Week 6	30			
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6				
T A C	Lab activities,	Lab Course	During Week 7 to Week 12	30			
LAZ	attendance, journal	Faculty	Marks Submission at the end of Week 12	50			
Lob 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	tes starting week of a s	emester. The typic	al schedule of lab assessments is shown, consid	dering 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 p	er the nature and requir	rement of the lab c	ourse. The experimental lab shall have typicall	y 8-10			

experiments.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
	AY 2023-24								
			Course Infor	mation					
Progra	amme		M. Tech. (Mechanical H	eat Power Engineering	<u>(</u> )				
Class,	Semester		Second Year M. Tech., S	Sem IV	<u> </u>				
Cours	e Code		6HP692						
Cours	e Name		Dissertation Phase - V						
Desire	d Requisi	ites:							
Tea	ching Sch	eme (Hrs)	Ex	amination Scheme (N	[arks)				
Practi	cal	10	LA1	LA2	ES	E	Total		
Intera	ction	-	0	100		)	100		
Interu				Credits: 5		·	100		
			Course Obie	ectives					
	To devel	on the student	to apply the knowledge g	ained to identify proble	em for rese	arch provi	de the		
1	solutions	s by self-study	and interaction with stake	holders	in for reset	aren provi	de the		
2	Acquire	knowledge to	tackle real world problems	s of societal concerns					
3	Impart fl	exibility to the	student to have increased	control over his/ her le	earning.				
4	Teachers	s would serve a	as mentor/facilitator of inq	uiry and reflection rath	er than as	an instruct	tor		
5	Enhance	student's learn	ning through increased inte	eraction with peers and	l colleagues	s.			
1	1 6 1	Cours	e Outcomes (CO) with B	loom's Taxonomy Le	vel				
At the	end of the	e course, studer	its will be able to,			Dlass			
CO		Course Outco	me Statement/s	Bloom's Taxonom	v Level	Blool Taxon			
			me Statement/S		y Level	Descri	otion		
CO1	Search th	he existing lite	rature and identification	IV		Analy	sing		
COI	of resear	ch problem				•			
CO2	Design a	and develop th	ne solution for complex	V		Evalua	ating		
	engineer	ing problem		× / Y					
CO3	Create the	he new know	ledge in the specialized	VI		Creat	ıng		
	IIeiu								
			Course Con	itents					
	Students	are expected t	to carry out independent re	esearch work on the ch	losen tonic	In this se	emester		
	it is exr	pected that the	e student has carried out	substantial research	work inclu	iding exh	austive		
	literature	e survey, formu	lation of the research prob	olem, development/fab	rication of	experiment	ital set-		
	up (if an	y/required) and	d testing, and analysis of i	nitial results thus obtai	ned. In fou	irth semes	ter, the		
	students	continue their	dissertation work. It is ex	pected that the student	t has comp	leted mos	t of the		
	experime	ental/computat	ion works and analyzed th	ne results so obtained a	is proposed	in the sy	nopsis.		
	the disco	K should be co	ompleted in all respects in the form of report as per	this semester. The stud	lents are re	equired to	submit		
	une uisse	atation work h	i me torm of report as per	me montute rule.					
			Text Roo	ks					
1	As ne	er the research	topic						
	1 1 5 PC	si die resouren							

Course Contents for M. Tech. Programme, Department of Mechanical Engineering, AY2023-24

	References
1	National and International Journals
	Useful Links
1	https://nptel.ac.in/courses/110/104/110104073/

CO-PO Mapping							
	Programme Outcomes (PO)						
	1	2	3	4	5	6	
CO1				1			
CO2	1		1		2	2	
CO3		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 map to at least one PO.

Assessment							
There are three	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			
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			
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 activities,	Lab Course	During Week 15 to Week 18	40			
	attendance, journal	Faculty	Marks Submission at the end of Week 18	40			
Lab ESE	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.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
AY 2023-24								
			Course ]	Information				
Progra	amme		M. Tech. (Mecha	nical Heat Power Engine	ering)			
Class.	Semester		Second Year M.	Fech., Sem IV	<i>C</i> ,			
Cours	e Code		6HP693	,				
Cours	e Name		Dissertation Phas	e - VI				
Desire	d Roquisi	toc.	Dissertation Thas					
Desire	u Kequisi	165.						
	<b>b</b> - <b>b</b>	· · · · · · ( <b>II</b> -· - )		E	- ( <b>Ml</b> )			
	aching Scr	ieme (Hrs)	T 4 1	Examination Schem	e (Marks)			
Practi	cal	12	LAI	LA2	ESE	Total		
Intera	ction	-	0	0	100	100		
				Credits: 6				
			Course	Objectives				
1	To devel	op the student to	o apply the knowle	dge gained to identify pr	oblem for resear	rch provide the		
-	solutions	by self-study a	nd interaction with	stake holders				
2	Acquire	knowledge to ta	ckle real world pro	blems of societal concer	ns			
3	Impart fl	exibility to the s	student to have incr	eased control over his/ h	er learning.			
4	Teachers	would serve as	mentor/facilitator	of inquiry and reflection	rather than as a	n instructor		
5	Enhance	student's learni	ng through increas	ed interaction with peers	and colleagues.	,		
		Course	Outcomes (CO) w	ith Bloom's Taxonomy	Level			
At the	end of the	course, student	s will be able to,					
	Bloom's Bloom's					Bloom's		
CO		Course	· Outrom Ctotom		CO Course Outcome Statement/s Taxonomy T			
СО		Cours	e Outcome Staten	nent/s	Taxonomy	Taxonomy Description		
CO	Search th	Cours	e Outcome Staten	ion of research problem	Taxonomy Level	TaxonomyDescriptionAnalysing		
CO CO1	Search th	Cours	e Outcome Staten	ion of research problem	Taxonomy Level IV	TaxonomyDescriptionAnalysingEvaluating		
CO CO1 CO2	Search th Design a	Cours ne existing litera nd develop the	e Outcome Staten ture and identificat solution for comple	ion of research problem ex engineering problem	TaxonomyLevelIVVVI	TaxonomyDescriptionAnalysingEvaluatingCreating		
CO CO1 CO2 CO3	Search th Design a Create th	Cours ne existing litera nd develop the ne new knowled	e Outcome Staten ture and identificat solution for comple ge in the specialize	nent/s ion of research problem ex engineering problem d field	TaxonomyLevelIVVVI	TaxonomyDescriptionAnalysingEvaluatingCreating		
CO1 CO2 CO3	Search th Design a Create th	Cours ne existing litera nd develop the ne new knowled	e Outcome Staten ture and identificat solution for comple ge in the specialize	nent/s ion of research problem ex engineering problem d field	TaxonomyLevelIVVVI	Taxonomy       Description       Analysing       Evaluating       Creating		
CO CO1 CO2 CO3	Search th Design a Create th	Cours ne existing litera nd develop the ne new knowled	e Outcome Staten ture and identificat solution for comple ge in the specialize Course	nent/s ion of research problem ex engineering problem d field e Contents	Taxonomy   Level   IV   V   VI	Taxonomy       Description       Analysing       Evaluating       Creating		
CO1 CO2 CO3 Studen expect formul testing dissert and an respect per the	Search th Design a Create th Its are exp ed that the lation of th , and ana ation work halyzed the ts in this se	Cours ne existing litera nd develop the s ne new knowled ected to carry of student has can e research prob lysis of initial this expected to e results so obta emester. The stu- ule.	e Outcome Staten ture and identificat solution for comple ge in the specialize Course out independent res tried out substantia lem, development/ results thus obtai hat the student has ained as proposed idents are required	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation	Taxonomy       Level       IV       V       VI       en topic. In this       g exhaustive lit       tal set-up (if any       c, the students       perimental/com       rk should be com       n work in the form	Taxonomy       Description       Analysing       Evaluating       Creating       s semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		
CO1 CO2 CO3 Studen expect formul testing dissert and an respect per the	Search th Design a Create th Its are exp ed that the lation of th , and ana ation work halyzed the ts in this se institute r	Cours ne existing litera nd develop the ne new knowled ected to carry of student has can e research prob lysis of initial It is expected to results so obta emester. The stu- ule.	e Outcome Staten ture and identificat solution for comple ge in the specialize Course out independent res tried out substantia lem, development// results thus obtai hat the student has ained as proposed idents are required	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation	Taxonomy       Level       IV       V       VI       en topic. In this       g exhaustive lit       tal set-up (if any       c, the students       perimental/com       rk should be com       n work in the form	Taxonomy       Description       Analysing       Evaluating       Creating       s semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		
CO1 CO2 CO3 Studen expect formul testing dissert and an respect per the	Search th Design a Create th ats are exp ed that the lation of th ation work alyzed the ts in this se	Cours ne existing litera nd develop the ne new knowled ected to carry of student has can re research prob lysis of initial this expected to results so obta emester. The stu- ule.	e Outcome Staten iture and identificat solution for comple- ge in the specialize Course out independent res tried out substantia lem, development/ results thus obtai hat the student has ained as proposed idents are required	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation t Books	Taxonomy       Level       IV       V       VI	Taxonomy       Description       Analysing       Evaluating       Creating       S semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		
CO1 CO2 CO3 Studen expect formul testing dissert and an respect per the	Search th Design a Create th at create th that the ation of th ation work alyzed the ts in this se institute r	Cours ne existing litera nd develop the a nd develop the a ne new knowled ected to carry of student has car e research prob lysis of initial this expected to e results so obta emester. The stu- ule.	e Outcome Staten ture and identificat solution for comple ge in the specialize Course out independent results thus obtai hat the student has ained as proposed idents are required Tex opic	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation t Books	Taxonomy       Level       IV       V       VI       en topic. In this       g exhaustive lit       tal set-up (if any       c, the students       perimental/com       rk should be com       n work in the form	Taxonomy       Description       Analysing       Evaluating       Creating       s semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		
CO1 CO2 CO3 Student expect formul testing dissert and an respect per the	Search th Design a Create th at Create th ts are exp ed that the lation of th t, and ana ation work alyzed the ts in this se institute r	Cours ne existing litera nd develop the a nd develop the a nd develop the a ne new knowled ected to carry of student has can research prob lysis of initial a. It is expected to results so obta emester. The stu- ule.	e Outcome Staten ture and identificat solution for comple ge in the specialize Course out independent res tried out substantia lem, development// results thus obtai hat the student has ained as proposed idents are required Tex opic	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation t Books	Taxonomy       Level       IV       V       VI	Taxonomy       Description       Analysing       Evaluating       Creating       s semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		
CO1 CO2 CO3 Studen expect formul testing dissert and an respect per the	Search th Design a Create th ats are exp ed that the lation of th ation work halyzed the ts in this se institute r	Cours ne existing litera nd develop the s ne new knowled ected to carry of student has can be research prob lysis of initial this expected to e results so obta emester. The stu- ule.	e Outcome Staten ture and identificat solution for comple ge in the specialize Course out independent res tried out substantia lem, development// results thus obtai hat the student has ained as proposed idents are required Tex opic Ref	ion of research problem ex engineering problem d field e Contents search work on the chos l research work includin fabrication of experimen ned. In fourth semester completed most of the ex in the synopsis. The wo to submit the dissertation t Books erences	Taxonomy       Level       IV       V       VI       en topic. In this       g exhaustive lit       tal set-up (if any       r, the students       perimental/com       rk should be con       n work in the form	Taxonomy       Description       Analysing       Evaluating       Creating       s semester it is       erature survey,       y/required) and       continue their       putation works       ompleted in all       rm of report as		

Course Contents for M. Tech. Programme, Department of Mechanical Engineering, AY2023-24

## Useful Links

https://nptel.ac.in/courses/110/104/110104073/

CO-PO Mapping								
		Programme Outcomes (PO)						
	1	2	3	4	5	6		
CO1	1			1		2		
CO2	1		1		2	2		
CO3		2				2		
The strengt	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.

1

### 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
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
LAZ	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
LauESE	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.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)					
AY 2023-24					
		Course ]	Information		
Program	ne	M. Tech. (Mecha	nical Heat Power Eng	neering)	
Class, Ser	nester	Second Year M.	Tech., Sem IV		
Course C	ode	6IC601			
Course N	ame	Value Education			
Desired R	lequisites:				
	-				
Tea	ching Scheme		Examination Scho	me (Marks)	
Lecture	2 Hrs/wee	k MSE	ISE	ESE	Total
Tutorial	-	30	20	50	100
			Credits	0	1
		Course	Objectives		
1	To impart knowled	lge on value of educat	tion and self- develop	nent.	
2	To imbibe good va	alues in students.	<b>^</b>		
3	To highlight impo	rtance of character.			
	Cour	se Outcomes (CO) w	ith Bloom's Taxonor	ny Level	
At the end	of the course, stud	ents will be able to,			
CO	Course Outcome Statement/s			Bloom's	Bloom's
		Surse Outcome State	inchu s	Level	Description
CO1	Explain value of e	ducation and self- dev	velopment.	II	Understanding
CO2	Summarize impo	rtance of good char	racter, and Behaviou	r V	Evaluating
	development.				
Module		Module C	Contents		Hours
т	Values and self-d	evelopment –Social v	values and individual	attitudes. Wor	k
1	and principles Va	on of numanism, wora lue judgments	al and non- moral valu	ation. Standard	S O
	Importance of cul	tivation of values, Se	ense of duty. Devotio	n, Self-reliance	2.
II	confidence, Conc	entration. Truthfulnes	ss, Cleanliness, Hone	sty, Humanity	, 6
	Power of faith, Na	tional Unity, Patriotis	m, Love for nature, D	scipline.	
	Personality and Be	haviour Development	t - Soul and Scientific a	ttitude. Positiv	e
	Thinking. Integrity	and discipline, Punct	uality, Love and Kindi	less, Avoid fau	lt
III	religious tolerance	True friendshin H	appiness vs. suffering	love for truth	u 7
	Aware of self-dest	ructive habits. Associ	appliess vs. surfering	. Doing best for	r
	saving nature			,8	
	Character and Cor	npetence –Holy books	s vs. Blind faith, Self-r	nanagement an	d
IV	Good health, scien	nce of reincarnation, H	Equality, Nonviolence	Humility, Rol	e 7
	ot Women, All re	ligions and same me	ssage, Mind your Min	nd, Self-contro	I.
	110hesty, Studying	, enecuvery			

	Text Books			
1	Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University			
1	Press, New Delhi			
	References			
1				
Useful Links				
1	https://nimsuniversity.org/wp-content/uploads/2018/02/Value-Education-Human-Rights-and-			
1	Legislative-Procedures.pdf			
2	http://cbseacademic.nic.in/web_material/ValueEdu/Value%20Education%20Kits.pdf			
3	https://www.verywellmind.com/personality-development-2795425			
4	https://trudreadz.com/2019/09/10/blind-faith-in-religion-destroys-our-ability-to-critically-			
4	think-for-ourselves/			

CO-PO Mapping									
	Programme Outcomes (PO)								
	1	1 2 3 4 5 6							
CO1	2				1	2			
CO2	1		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 mu	ist map to at leas	st one PO.						