MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

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			ESSON PL									
		Department	of Mechanica	<u>l</u> Engineer	ing							
Name Sub	of the oject	THERMAL ENGINEERING - I		Name of handling I	Vianas	Vigneshwaran V						
Subjec	et Code	ME8493		Year / S	Sem II / IV	II / IV						
Acad	Year	2021-22		Bate	h 2020-2 0	2020-2024						
		Co	urse Objec	tive	•							
Γο integ	grate the	concepts, laws and methodologies from the f	irst course in t	hermodyna	mics into analy	sis of cyclic p	rocesses					
To apply	y the ther	rmodynamic concepts into various thermal a	pplication like	IC engines	, Steam.							
Γο study	y the Tur	bines, Compressors and Refrigeration and A	ir conditioning	systems								
		Co	ourse Outco	me								
CO1: A ₁	pply ther	modynamic concepts to different air standar	d cycles and so	lve problei	ns.							
CO2: So	olve prob	lems in single stage and multistage air comp	ressors									
CO3: Ex	xplain the	e functioning and features of IC engines com	ponents and a	ıxiliaries.								
CO4: M	leasure p	erformance parameters of IC engines										
CO5: Ex	xplain the	e flow in gas turbines and solve problems.										
			Lesson Plan									
Sl. No.		Topic(s)	T / R*	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	1 (1.1-1.6)	CO	РО				
UNIT	I - GAS	S AND STEAM POWER CYCLES	S									
1	Air Stan	dard Cycles	Т2	2	ВВ	L2	CO1	PO1, PO2 & PO3				
2	Otto Cyo	cle Analysis	Т3	1	ВВ	L3	CO1	PO1, PO2 & PO3				
3	Diesel C	ycle Analysis	Т4	1	BB	L3	CO1	PO1, PO2 & PO3				
4	Dual Cy	cle Analysis	T5	1	BB	L3	CO1	PO1, PO2 & PO3				
5	Brayton	– Cycle Analysis	Т6	2	ВВ	L3	CO1	PO1, PO2 & PO3				

T7

2

BB

L2

CO1

PO1, PO2

& PO3

Suggested Activity: Assignment Given

and regenerative cycle

6

Evaluation method: Evaluation of Assignment

UNIT II - RECIPROCATING AIR COMPRESSOR

Performance and Comparison - Rankine, reheat

	,						
7	Classification and comparison, working principle, work of compression	T2	2	BB	L2	CO2	PO1, PO2 & PO3
8	work of compression - with and without clearance	T2	2	BB	L3	CO2	PO1, PO2 & PO3
9	Volumetric efficiency, Isothermal efficiency and Isentropic efficiency	T2	1	BB	L3	CO2	PO1, PO2 & PO3
10	Multistage air compressor with Intercooling	T2	2	BB	L3	CO2	PO1, PO2 & PO3
11	Working principle and comparison of Rotary compressors with reciprocating air compressors	T2	2	BB	L2	CO2	PO1, PO2 & PO3
Sugges	ted Activity: Assignment Given						<u> </u>
	tion method: Evaluation of Assignment III - INTERNAL COMBUSTION ENGIN	NES AND O	COMBUS	STION			
	IC engine – Classification, working, components						Ī
12	and their functions.	R2	2	BB	L2	CO3	PO1
13	Ideal and actual: Valve and port timing diagrams	R2	1	BB	L2	CO3	PO1
14	p-v diagrams- two stroke & four stroke	R2	1	BB	L2	CO3	PO1
15	SI & CI engines – comparison	R2	1	BB	L2	CO3	PO1
16	Geometric, operating, and performance comparison of SI and CI engines.	R2	1	BB	L2	СОЗ	PO1
17	Desirable properties and qualities of fuels. Air-fuel ratio calculation – lean and rich mixtures	R2	2	BB	L2	CO3	PO1
18	Combustion in SI & CI Engines – Knocking – phenomena and control	R2	1	ВВ	L2	СОЗ	PO1
	ted Activity: Poster Presentation given to the stude	nts			•		•
	tion method: Evaluation of the Presentation						
UNIT	IV - INTERNAL COMBUSTION ENGIN	E PERFO	RMANC	E AND SYS'	TEMS		
19	Performance parameters and calculations.	R2	2	ВВ	L3	CO4	PO1,PO2
20	Morse and Heat Balance tests	R2	2	BB	L3	CO4	PO1,PO2
21	Multipoint Fuel Injection system and Common Rail Direct Injection systems	R2	1	BB	L2	CO4	PO1
22	Ignition systems – Magneto, Battery and Electronic	R2	1	BB	L2	CO4	PO1
23	Lubrication and Cooling systems	R2	1	BB	L2	CO4	PO1
24	Concepts of Supercharging and Turbocharging	R2	1	BB	L2	CO4	PO1
25	Emission Norms.	R2	1	BB	L1	CO4	PO1 & PO7
	ted Activity:Video Presentation Given to the studer	nts	-	-	-	-	•
	tion method: Evaluation of Video Presentation V - GAS TURBINES						
	I				_		PO1, PO2
26	Gas turbine cycle analysis – open and closed cycle.	T2	2	BB	L3	5	& PO3
27	Performance and its improvement	T2	2	BB	L3	5	PO1, PO2 & PO3
28	Regenerative, Intercooled, Reheated cycles and their combinations	T2	3	BB	L3	5	PO1, PO2 & PO3

29	Material	ls for Turbi	nes			Т	2	2]	ВВ	I	<u>L</u> 2	5	PO1
uggest	ed Activ	vity: Case s	tudies give	en to the st	tudent									
valuat	ion met	hod: Evalu	ation of C	ase Studie	s									
ontent	Beyond	l the Syllab	ous Planne	d										
1	Striling	& Ericssion	ı Cycle											
						Text	Books							
1	Kothand	daraman.C.P., Domkundwar. S,Domkundwar. A.V., "A course in thermal Engineering", Fifth Edition, "Dhanpat Rai &												npat Rai & s
2	Rajput.	R. K., "Thermal Engineering" S.Chand Publishers, 2017												
					R	eferen	ce Boo	oks						
1	Arora.C	.P, "Refrige	eration and	Air Condi	tioning ," T	ata Mco	Graw-H	ill Publish	ers 200	8				
2	Ganesan	V" Interr	nal Combus	tion Engin	es", Third	Edition	, Tata N	Acgraw-Hi	11 2012					
		gam. K.K.,								2009.				
		oorthy, R, "					-)3					
5	Sarkar, l	B.K,"Thern	nal Enginee	ring" Tata			-							
							L Ref	ferences						
		nptel.ac.in												
2	https://i	nptel.ac.in	/courses/1	12/103/1				_						
	(T.4)				T	Bloom			1) 1			ı	l	
		Remembe			Level 4 (L4): Analysing Higher Order Order									
Level 2 (L2): Understanding Order Thinking							ur Level 5 (L5) : Evaluating						Thinkin	Mini Projects
evel 3	(L3):	Applying		Exa	Level 6 (L6): Creating g						Trojects			
		Mapping	; syllabus	with Bl	oom's Ta	axonoi	my LC	OT and F	TOI		•			
Unit	t No		Unit	Name		L1	L2	L3	L4	L5	L6	LOT	НОТ	Total
Uni	it 1	Gas And S	Steam Powe	er Cycles			2	4				6	0	6
Uni	it 2	Reciproca	ting Air Co	mpressor			2	3				5	0	5
Uni	it 3	Internal Combustic	ombustion i	Engines A	nd		7					7	0	7
Uni	it 4	Internal Co And Syste	ombustion ms	Engine Per	formance	1	4	2				7	0	7
Uni	it 5	Gas Turbi	nes				1	3				4	0	4
Total							16	12	0	0	0	29	0	29
	Total Percentage							41.3793	0	0	0	100	0	100
						O PO	Mappir	ng						
					_				1					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1 1	PO1 2	PSO1	PSO2
CO1	PO1 2	PO2 3	PO3	PO4		PO6	PO7	PO8	PO9	PO10			PSO1 2	PSO2
CO1 CO2				PO4		P06	PO7	PO8	PO9	PO10				
	2	3	2	PO4		PO6	PO7	PO8	PO9	PO10			2	1

CO5	2	3	2										2	1
Avg	2.4	2.75	2										2	1
Justification for CO-PO mapping														
CO1	CO1 PO1: Basic engineering knowledge is required PO2: Problem analysis is required and PO3: Design of complex engineering is do													
CO2	CO2 PO1: Basic engineering knowledge is required PO2: Problem analysis is required and PO3: Design of complex engineering is dor													
CO3	PO1: Basic engineering knowledge is required													
CO4	CO4 PO1: Basic engineering knowledge is required PO2: Problem analysis is required and PO7: Need to consider the impact on environmental potential and PO7: Need to consider the impact on environmental potential poten												pact on enviro	
CO5	PO1: Ba	sic enginee	ring knowl	edge is req	uired PO2:	Proble	m analy	sis is requi	red and	l PO3: D	esign	of com	plex engi	neering is dor
	3		High level		2		M	oderate le	vel	1			Low 1	evel
Name &	& Sign o	f Faculty	Incharge :	VIGNES	HWARA]	N								
Name &	& Sign o	f Subject	Expert :	Mr.Muha	ımmed Irf	an.A.A	_							
Head o	f the De	partment	:	Dr.S.Pras	ath									

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