

COURSE PLAN - CAY 2019-20

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SRI KRISHNA INSTITUTE OF TECHNOLOGY, BENGALURU



COURSE PLAN

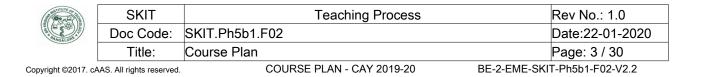
Academic Year 2019 – 20

Program:	BE
Semester :	2
Course Code:	18ME25
Course Title:	Elements of Mechanical Engineering
Credit / L-T-P:	3/2-1-0
Total Contact Hours:	40
Course Plan Author:	APPESE S D

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	SKIT	Teaching Process	Rev No.: 1.0
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	Title:	Course Plan	Page: 2 / 30
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F. EXAM P	REPARATIC)N	
		estion Paper	
		ons	
		itcomes	

Note : Remove "Table of Content" before including in CP Book Each Course Plan shall be printed and made into a book with cover page Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels



18ME25: ELEMENTS OF MECHANICAL ENGINEERING A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	ME
Year / Semester :	l year / 2 sem	Academic Year:	2019-20
Course Title:	ELEMENTS OF MECHANICAL ENGINEERING	Course Code:	18ME25
Credit / L-T-P:	3/2-1-0	SEE Duration:	3 Hours
Total Contact Hours:	40	SEE Marks:	60
CIA Marks:	40	Assignment	1 / Module
Course Plan Author:	APPESE S D	Sign	Dt:
Checked By:	NAVEEN KUMAR PATTAR	Sign	Dt:

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Module Content	Teaching Hours	Blooms Level
1	Introduction and application of energy sources Fossil fuels, hydel, solar, wind, nuclear fuels and bio-fuels Environmental issues like global warming and ozone depletion. Introduction, states, concept of work, heat, temperature; Zeroth, 1st, 2nd and 3rd laws of thermodynamics Concept of internal energy, enthalpy and entropy (simple numerical). Formation of steam and thermodynamic properties of steam Properties of steam (simple numericals).	08	L3
2	Introduction to boilers, classification, Boilers: Introduction to boilers, classification, Introduction to boiler mountings and accessories (no sketches) Hydraulic Turbines – Classification specification, Principles and operation of Pelton wheel turbine, Francis turbine and Kaplan turbine classification and specification of pumps, Reciprocating pump and centrifugal pump, Concept of cavitation and priming.	08	L2
3	Classification, I.C. Engines parts,2 and 4 stroke petrol and 4-stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Simple problems on indicated power, brake power, indicated thermal efficiency, brake thermal	08	L2

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e C I I F L v a a	efficiency, mechanical efficiency and specific fuel consumption. Definitions – Refrigerating effect, Ton of Refrigeration, ce making capacity, COP, relative COP, Unit of Refrigeration Refrigerants, Properties of refrigerants, ist of commonly used refrigerants. Principle and working of vapor compression refrigeration and vapor absorption refrigeration. Domestic refrigerator. Principles and applications of air conditioners, window and split air conditioners	
4 T C C S C C S C C S C C S C C S C C S C C S C C S C C S C C S C C S C C S C C S C C S C S C S C S S C S S C S	Metals – Ferrous: cast iron, tool steels and stainless Metals – Ferrous: cast iron, tool steels and stainless Ateels and nonferrous: aluminum, brass, bronze. Polymers – Thermoplastics and thermo setting polymers. Ceramics -Glass, optical fiber glass, cermets. Composites – Fiber reinforced composites, Metal Matrix Composites Smart materials – Piezoelectric materials, chape memory alloys, semiconductors and insulators. Definitions. Classification and methods of soldering, orazing and welding. Brief description of arc welding, oxyacetylene welding, TG welding, and MIG welding. Open & crossed belt drives, Definitions -slip, creep, relocity ratio, derivations for length of belt in open and erossed belt drive, Ratio of tension in flat belt drives, idvantages and lisadvantages of V belts and timing belts, simple numerical problems. Types-spur, helical, bevel, worm and rack and pinion. Velocity ratio, Advantages and disadvantages over belt lrives, simple numerical problems on velocity ratio.	L3
C C F o p a n l	Principle of working of a center lathe. Parts of a lathe. Operations on lathe -Turning, Facing, Knurling, Thread 08 Cutting, Drilling, Taper turning by Tail stock offset nethod and Compound slide swiveling method, Specification of Lathe. Principle of milling, types of milling machines. Working of horizontal and vertical milling machines. Milling processes – plane milling, end milling, slot milling, angular milling, form milling, straddle milling, and gang nilling. Introduction, components of CNC, open loop and closed pop systems, Advantages of CNC, CNC Machining	L2



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	centers and Turning centers.					
	Robot anato					
	configurations	. Applications of Robots in material				

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).

handling, processing and assembly and inspection

1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts; 15 – 30 minutes

2. Design: Simulation and design tools used – software tools used ; Free / open source

3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modu	Details	Available
le		
Α	Text books (Title, Authors, Edition, Publisher, Year.)	
1, 2,	Elements of Mechanical Engineering, K. R. Gopalakrishna, Subhas	In Lib, In dept
3, 4,	Publications, Bangalore,2008.	
5		
1, 2,	Elements of Mechanical Engineering, Vol1 & 2, Hajra Choudhury,	In Lib, In dept
3, 4,	Media Promoters, New Delhi, 2001.	
5		
1, 2,	A Text Book of Elements of Mechanical Engineering", S. Trymbaka	In Lib, In dept
3, 4,	Murthy, 3 rd revised edition 2006, I. K. International Publishing	
5	House Pvt. Ltd., New Delhi.	
В	Reference books (Title, Authors, Edition, Publisher, Year.)	
1, 2,	Elements of Mechanical Engineering, R.K. Rajput, Firewall Media,	In Lib, In dept
3, 4,	2005.	
5		
1, 2,	Elements of Mechanical Engineering, Kestoor Praveen, Suggi	
3, 4,	publication-2018.	
5		
1, 2,	Elements of Mechanical Engineering, Dr. A. S. Ravindra, Best	In Lib, In dept
3, 4,	Publications, 7th edition, 2009.	
5		



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Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content .

SNo	Course	Course Name	Module / Topic / Description			Sem	Remarks	Blooms	
	Code								Level
1	-			energy	wave,	heat	-	Basic	L2
			engine						

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area. Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

2 00110			oopt.		1		
Module	#	Cos	Teach.	Concept	Instr	Assessment	Blooms'
		Student should able to	Hours		Method	Method	Level
1	CO-1	Identify different sources of	8	Energy	Chalk	Assignmen	L2
		energy and their conversion		sources	&	t	
		process.			board,	CIA	
					PPT's	SEE	
		Explain the working principle	8	Formatio	Chalk	Assignmen	L2
2	CO-2	of hydraulic turbines, Boilers,		n of	&	t	
		pumps, IC Engines and		Steam,	board,	CIA	
		Refrigeration.		power	PPT's	SEE	
				transfer			
3	CO-3	Recognize various joining	8	Joining	Chalk	Assignmen	L2
		processes and power		Processe	&	t	
		transmission.		S	board,	CIA	
					PPT's	SEE	
4	CO-4	Understand properties of	8	Smart	Chalk	Assignmen	L2
		engineering materials and		materials	&	t	
		there application in			board,	CIA	
		industries.			PPT's	SEE	
5	CO-5	Discuss the working of	8	Machinin	Chalk	Assignmen	

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advanced manufa systems.	acturing	S	PPT's	SEE	
machining operation		operation			

2. Course Applications

SNo	Application Area	CO	Level
1	Power generation in Solar, wind, hydro, nuclear, thermal power plants	CO1	L2
2	Design of Heat transfer equipment's	CO2	L3
3	Thermal power plants, food processing industry, sugar plants, Textiles	CO3	L2
4	Hydro power plants	CO3	L2
5	Running of automobile vehicles	CO3	L2
6	Fridges for domestic and household purposes, air-conditioners for rooms	CO2	L2
7	Design and fabrication of various machine components	CO4	L2
	Power transmission in vehicles, power transmission between machine components	CO4	L3
	Used in manufacturing cylindrical jobs, flat surfaces of machine components	CO5	L2
10	Automation in industries	CO5	L2

3. Articulation Matrix

(CO - PO MAPPING)

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

-	Course Outcomes				I	Prog	ram (Outc	ome	5				
COs	Student should able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	Level
CO1	Identify different sources of energy and their conversion process.	\checkmark	-	-	-	-	-	-	_	_	_	_	_	L2
CO2	Explain the working principle of hydraulic turbines, Boilers, pumps, IC Engines and Refrigeration.	\checkmark	-	-	-	-	-	-	-	-	-	-	-	L2
CO3	Recognize various joining processes and power transmission.	\checkmark	-	-	-	-	-	-	-	-	-	-	-	L2
CO4	Understand properties of engineering materials and	\checkmark	_	-	_	-	-	-	-	-	-	-	-	L2

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	there appli industries.	cation in														
CO5	convention machining	he working of al machine tool, operations and manufacturing	\checkmark	-	-	-	-	-	-	-	-	-	-	-	L2	
18ME25	Average a or 3)	attainment (1, 2,														
	P	O, PSO	3.D Inv Toc 7.E 9.Ir 11 Lea all req org eng Des stur ma	Desig estig nvir ndivi Proj arnir the aniz aniz gine sign den nag	gn / gatic Usa onn idua ect hg; bas d f zatio ers ar ts eme	De ons ge; nent I an Mar S1.(ic pi in I in spec nd I are ent	velo of 6. nd nage Dur rinci both S ciali. Data	pme Con The Ind Tear gra gra gra gra gra gra gra gra gra g	ent o nple Er Su mwc nt ar dua clua clua clua clua clua clua clua cl	of S x F ngin usta prk; nd F te e mec te E Fher Ma c anc anc	Solut Prob eer inal 10. Final engi han proc mal proc mal ganag ed	tions lems bility Con nce; neei nical gem duce , Ma gem	s; 4: s; 5 nd r; nmu 12: rs w eng ublic e anuf ent; h	Cor 5.Mc 5.Mc 8.Et unica Life vill a gine grac factu S3 indu	lysis; aduct odern ciety; hics; ation; -long ering ector luate uring, 3.Our strial inary	

4. Mapping Justification

Мар	ping	Justification	Mapping Level
СО	PO		-
CO1	1	'Engineering Knowledge:' - Acquisition of Engineering Knowledge of Energy resources is essential to accomplish solutions to complex engineering problems in Mechanical Engineering.	L2

Мар	ping	Justification				
CO	CO PO					
CO2	1	Acquisition of Engineering Knowledge of thermodynamic properties is essential to accomplish solutions to complex engineering problems in Mechanical Engineering.	L2			

Mapping	Justification	Mapping
		Level



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СО	PO			-
			-	

CO3	1	Acquisition of Engineering Knowledge of turbines and	L2	ĺ
		boilers is essential to accomplish solutions to complex		
		engineering problems in Mechanical Engineering.		

Мар	ping	g Justification M				
CO	PO		-			
CO4	1	Acquisition of Engineering Knowledge of hydraulic pumps is essential to accomplish solutions to complex engineering problems in Mechanical Engineering.	L2			

Мар	ping	Justification					
СО	РО		-				
CO5	1	Engineering Knowledge:' - Acquisition of Engineering Knowledge of engines is required t0 know the performance parameters to accomplish solutions to complex engineering problems in Mechanical Engineering.	L2				

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1	Automotive Sensors	Seminar	-	Self	5

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Mod	Title	Teaching		No. o	f quest	tion in	Exam		CO	Levels
ule #		Hours	CIA-1	CIA-2	CIA-3	Asg	Extra	SEE		
							Asg			
1	Sources of Energy, Basic	08	2	-	-	1	1	2	CO1	L2
	concepts of Thermodynamics,									
	Steam									
2	Boilers, Turbines, Hydraulic	08	2	-	-	1	1	2	CO2	L2
	pumps									
3	Internal Combustion Engines,	08	-	2	-	1	1	2	CO3	L3
	Refrigeration and Air									
	conditioning									
4	Properties, Composition and		-	2	-	1	1	2	CO4	L2
	Industrial Applications of	08								

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engineering materials, Joining														
	Proce	sses,	1	power										
	transr	nission												
5	Lathe	, milling m	nachine,	CNC	08	-	-	4	1	1	2	CO5	L2	
	and ro	obots												
-		Tota	al		40	4	4	4	5	5	10	-	-	

2. Continuous Internal Assessment (CIA)

Evaluation	Weight-age in Marks	CO	Levels
CIA Exam – 1	30	CO1, CO5	L2
CIA Exam – 2	30	CO2, CO3	L2
CIA Exam – 3	30	CO4	L2
Assignment - 1	5	CO1, CO5	L2
Assignment - 2	5	CO2, CO3	L2
Assignment - 3	5	CO4	L2
Seminar - 1	2.5	CO1, CO5	L2
Seminar - 2	2.5	CO2, CO3	L2
Seminar - 3	2.5	CO4	L2
Other Activities -	2.5	CO1 to CO5	L2
define – Slip test			
Final CIA Marks	40	-	-

D1. TEACHING PLAN – 1

Module – 1

Title:	Sources of Energy, Basic concepts of Thermodynamics, Steam	Appr	8 Hrs
		Time:	
а	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Identify different sources of energy and their conversion	CO1	L1
	process.		
b	Course Schedule	-	-
Class	Module Content Covered	СО	Level
No			
1	Sources of Energy: Introduction and application of energy	C01	L1
	sources like fossil fuels, hydel,		
2	solar, wind, nuclear fuels and bio-fuels;	C01	L2

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	environmental issues like global warming and ozone depletion.	C01	L2
	Basic concepts of Thermodynamics: Introduction, states, concept of work, heat, temperature;	C01	L2
5	Zeroth, 1st, 2nd and 3rd laws of thermodynamics.	C01	L2
	Concept of internal energy, enthalpy and entropy (simple numericals).	C01	L2
	Steam: Formation of steam and thermodynamic properties of steam	C01	L2
8	Properties of steam (simple numericals)	C01	L2
С	Application Areas	CO	Level
	Power generation in Solar, wind, hydro, nuclear, thermal power plants	C01	L3
2	Design of Heat transfer equipment's	C01	L3
d	Review Questions	-	-
1	Briefly explain Sources of Energy	C01	L2
	Distinguish between Non-Renewable and Renewable energy resources.	C01	L2
	Define: i) Wet Steam; ii) Enthalpy of wet steam; iii) Dryness fraction.	C01	L2
	Explain the formation of steam at constant pressure with suitable sketches.	C01	L2
	Define fuel, calorific value. Describe two types of the calorific values of fuel.	C01	L2
6	Explain global warming	C01	L2
	Explain ozone depletion	C01	L2
8	Explain the terms thermodynamic states, concept of work, heat, temperature	C01	L2
	Define Zeroth, law of thermodynamics.	C01	L2
	Define 1st law of thermodynamics.	C01	L2
	Define 2nd law of thermodynamics.	C01	L2
	Define 3rd laws of thermodynamics.	C01	L2
е	Experiences	-	-
1			



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Module – 2

Title:	Boilers, Turbines and Hydraulic Pumps	Appr Time:	08 Hrs
а	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Explain the working principle of hydraulic turbines, Boilers, pumps, IC Engines and Refrigeration.		L2
b	Course Schedule	-	-
Class No	Module Content Covered	CO2	Level
1	Boilers: Introduction to boilers, classification,	CO2	L2
2	Lancashire boiler, Babcock and Wilcox boiler.	CO2	L2
3	Introduction to boiler mountings and accessories (no sketches).	CO2	L2
4	Turbines: Hydraulic Turbines – Classification and specification, Principles and operation of Pelton wheel turbine,	CO2	L2
5	Francis turbine and Kaplan turbine (elementary treatment only).	CO2	L2
6	Hydraulic Pumps: Introduction, classification and specification of pumps,	CO2	L2
7	Reciprocating pump and centrifugal pump,	CO2	L2
8	concept of cavitation and priming.	CO2	L2
С	Application Areas	СО	Level
1	Thermal power plants, food processing industry, sugar plants, Textiles	CO2	L3
2	Hydro power plants	CO2	L3
d	Review Questions	-	-
1	Write the detailed classification of boilers	CO2	L2
2	Briefly explain the construction & working of Lancashire Boiler	CO2	L2
3	Explain the working of Babcock and Wilcox Boiler	CO2	L2
4	Write a brief note on boiler mountings and accessories	CO2	L2
5	List the detailed classification of hydraulic turbines	CO2	L2
6	Write a note on specification of hydraulic turbines	CO2	L2

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	7	Explain workii	ng principle of impulse and reaction turbine.		CO2	L2	
	8	Explain the w		CO2	L2		
	9	Explain briefly	oine.	CO2	L2		
	10	Explain the w	orking of a Kaplan Turbine.		CO2	L2	
	11	List the detaile		CO2	L2		
	12	Write a note c	CO2	L2			
	13	Explain the w	CO2	L2			
	14	Explain briefly	the working of centrifugal pump		CO2	L2	

Explain the concept of cavitation and priming.

E1. CIA EXAM – 1

Experiences

15

е 1

a. Model Question Paper – 1

Div:		ME		2/A, B	Course:	EME	Elec	ctive:		Ν
		C Code:	18ME25	Max	Max Marks:		50			
No	te: An	swer all ful	l questi	ons. All question	s carry 25 r	marks.				
G	QN0			Questio	ns		CO	Leve	Mark	Modu
								1	S	le
1	а	Write sho depletion.	rt notes	on (i) Global wa	irming	(ii) Ozone laye	er 01	L2	8	01
	b		•	f T-h diagram, t pressure.	explain the	e generation o	of 01	L2	9	01
	С	A stationary mass of gas is compressed without friction from an initial state of 0.3m ³ and 0.105 MPa to a final state of 0.1 m ³ , the pressure remaining constant. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?		5 of	L2	8	01			
				OR						
2	а	State Ze thermodyr		law, first law	and se	econd law o	of 01	L2	09	01
	b	dry satura	ated (ii 250ºc.	of 1kg of steam) Steam is 22% Take specific he	wet (iii) S	Steam is supe	r-	L2	06	01
	С	Write a no cell with n		⊣ydro energy and tch.	d explain p	rinciple of Sola	ar 01	L2	10	01
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L2

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CO2

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3 a	Briefly expl	ain the construction & working of Lancashire	02	12	10	5

3	а	Briefly explain the construction & working of Lancashire Boiler	02	L2	10	5
	b	List the detailed classification of pumps		L2	5	5
	С	Explain briefly with a sketch the working of a Francis	02	L2	10	5
		Turbine.				
		OR				
4	а	Write a brief note on boiler mountings and accessories	02	L2	5	5
	b	Explain the working principle of Reciprocating pump		L2	10	5
	С	Explain briefly the working of centrifugal pump	02	L2	10	5

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

				Model A	ssignment Que	estions					
C Co	ode:	18ME2 5	Sem:	II	Marks:	10 / 10	Time:	90 – 12	0 – 120 minutes		
Cou	rse:	ELEME	NTS OF M	IECHANIC	CAL ENGINEEF	RING					
Note	: Eac	ch studer	nt to answe	r 2-3 assi	gnments. Each	assignm	ent carri	es equa	al mark	κ.	
SNo	ι	JSN		Assigi	nment Descripti	on		Marks	CO	Level	
1			Nrite a not	e on Energ	gy sources			10	CO1	L2	
2			Differentiate Renewable			enewabl	e an	d 10	CO1	L2	
3 Explain With a neat sketch Hydro-electric power plant						t. 10	CO1	L2			
4 Explain the following terms: i) Wet Steam; ii) Enthalpy of wet steam; iii) Dryness fraction.					y 10	CO1	L2				
5			Explain the formation of steam at constant pressure with suitable sketches.				e 10	CO1	L2		
6			Define fuel calorific val		value. Describe I.	e two typ	es of th	e 10	CO1	L2	
7					ar 10	CO1	L2				
8			Explain glo	bal warmir	ng			10	CO1	L2	
9		I	Explain ozo	one deplet	ion			10	CO1	L2	
10					c 10	CO1	L2				
11			State and e	xplain Zer	roth, law of ther	modynar	nics.	10	CO1	L2	
12								CO1	L2		
13			State and e	xplain 2nd	d law of thermo	dynamics	6.	10	CO1	L2	

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		Title	e:	Course Plan	Page: 15 / 30				
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14			State	e and explain 3rd laws of thermodynamics.	10	CO1	L2		
15			Write	e the detailed classification of boilers	10	CO2	L2		
16			Brief Lanc	ly explain the construction & working of ashire Boiler with a neat sketch	10	CO2	L2		
17				ch and explain the working of Babcock and ox Boiler	10	CO2	L2		
18			Expla	ain boiler mountings and accessories	10	CO2	L2		
19	Write the detailed classification of hydraulic turbines		10	CO2	L2				
20	Write a note on specification of hydraulic turbines		10	CO2	L2				
21	Explain working principle of impulse and reaction turbine sketches.				10	CO2	L2		
22				a neat sketch explain the working principle of a on Turbine.	10	CO2	L2		
23	Expla Turbi		· ·	ain briefly with a sketch the working of a Francis ine.	10	CO2	L2		
24				a schematic diagram explain the working of a an Turbine.	10	CO2	L2		
25			List t	he detailed classification of pumps	10	CO2	L2		
26			Write	e a note on specification of pumps	10	CO2	L2		
27	With a neat sketch explain the working principle Reciprocating pump			10	CO2	L2			
28			Expla pum	ain briefly with a sketch the working of centrifugal o	10	CO2	L2		

D2. TEACHING PLAN – 2

Module - 3

Title:	Internal Combustion Engines, Refrigeration and Air conditioning		08 Hrs
		Time:	
а	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Explain the working principle of IC Engine & Refrigeration.	CO2	L2
b	Course Schedule		
Class	Module Content Covered	CO	Level
No			
1	Internal Combustion Engines-Classification, I.C. Engines parts,	CO2	L2
2	2 and 4 stroke petrol and 4-stroke diesel engines.	CO2	L2
3	P-V diagrams of Otto and Diesel cycles.	CO2	L2
4	Simple problems on indicated power, brake power, indicated	CO2	L2
	thermal efficiency, brake thermal efficiency, mechanical		
	efficiency and specific fuel consumption.		

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	Title: Course Plan	Page: 16	
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5	Refrigeration – Definitions – Refrigerating effect, Ton of Refrigeration, Ice making capacity,	CO2	L2
6	COP, relative COP, Unit of Refrigeration. Refrigerants, Properties of refrigerants, List of commonly used refrigerants.	CO2	L2
7	Principle and working of vapor compression refrigeration and vapor absorption refrigeration. Domestic refrigerator.	CO2	L2
8	Principles and applications of air conditioners, window and split air conditioners.	CO2	L2
С	Application Areas	CO	Level
1	Aerospace and Automotive industries	CO2	L3
2	Fridges for domestic and household purposes, air-conditioners for rooms	CO2	L3
d	Review Questions	-	-
1	Explain Parts of Internal Combustion Engine	CO2	L2
2	Explain the working of a four stroke petrol and diesel engine.	CO2	L2
3	Explain the working of a four stroke diesel engine.	CO2	L2
4	Explain the working of a two stroke petrol engine.	CO2	L2
5	Distinguish between two stroke and four stroke I.C. Engine.	CO2	L2
6	Write the differences between petrol engine and diesel engine.	CO2	L2
7	Define the following terms-indicated power, brake power, indicated thermal efficiency.	CO2	L2
8	Define the following terms-brake thermal efficiency, mechanical efficiency and specific fuel consumption.	CO2	L2
9	Explain the parts of refrigerator.	CO2	L2
10	Define: a. Refrigeration b. Refrigeration Effect	CO2	L2
11	Explain working of Vapour absorption refrigeration.	CO2	L2
12	Define: a. Ton of Refrigeration b. Ice making capacity	CO2	L2
13	Define: a. Co-efficient of performance b. Relative Co-efficient of performance	CO2	L2
14	Explain working of Vapour compression refrigeration.	CO2	L2
15	What are the properties of good refrigerant?	CO2	L2
16	List different types of refrigerants.	CO2	L2
e	Experiences	-	-
1			

Module – 4

	Engineering materials, Joining Processes, Belt drives, Gear drives	Appr Time:	08 Hrs	
a	Course Outcomes	-	Blooms	

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	Title: Course Plan	Page: 17	
	cAAS. All rights reserved. COURSE PLAN - CAY 2019-20 BE-2-EME-SK The student should be able to:		Level
	Recognize various joining processes and power transmission.	CO3	Level L2
	Understand properties of engineering materials and there	CO4	L2
	application in industries.	004	LZ
b	Course Schedule		
Class No	Module Content Covered	СО	Level
	Metals – Ferrous: cast iron, tool steels and stainless steels and nonferrous: aluminum, brass, bronze. Polymers - Thermoplastics and thermosetting polymers. Ceramics - Glass, optical fiber glass, cermets.	CO4	L2
2	Composites - Fiber reinforced composites, Metal Matrix Composites Smart materials – Piezoelectric materials, shape memory alloys, semiconductors and insulators.	CO4	L2
	Definitions. Classification and methods of soldering, brazing and welding.	CO3	L2
	Brief description of arc welding, oxy-acetylene welding, TIG welding, and MIG welding.	CO3	L2
	Belt drives Open & crossed belt drives, Definitions -slip, creep, velocity ratio, derivations for length of belt in open and crossed belt drive, ratio of tension in flat belt drives,	CO3	L2
	advantages and disadvantages of V belts and timing belts, simple numerical problems.	CO3	L2
	Types–spur, helical, bevel, worm and rack and pinion. Velocity ratio, advantages and disadvantages over belt drives,	CO3	L2
8	simple numerical problems on velocity ratio.	CO3	L2
С	Application Areas	СО	Level
1	Design and fabrication of various machine components in Aerospace and Automotive industries?	CO4	L2
	Power transmission in vehicles, power transmission between machine components	CO3	L2
d	Review Questions	-	-
	Define a composite material. How are composite materials classified? Give example for each.	CO4	L2
	Write the applications of Composite Materials.	CO4	L2
3	What are the key applications of composite materials in Aerospace and Automotive industries?	CO4	L2
	State the composition and application of any four ferrous	CO4	L2

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	metals.				
5	Briefly explai	n the types and applications of Non-ferrous alloys.	CO4	L2	
6	State the c	omposition, properties and applications of high	CO4	L2	
	carbon steels	5.			
7	Write a note	on Ferrous Alloys.	CO4	L2	
8	Write a note	on Non-Ferrous Alloys	CO4	L2	
9	Define the for tension in fla	CO3	L2		
	Derive the re drive,	elation for length of belt in open and crossed belt	CO3	L2	
11	Write the ad belts	vantages and disadvantages of V belts and timing	CO3	L2	

Write the advantages and disadvantages of gear drives over CO3

E2. CIA EXAM – 2

belt drives

Experiences

a. Model Question Paper – 2

De	pt:	ME	Sem : Div:	2/A, B	Course:	EME	Ele	ctive:		Ν
Da	te:		Time:	9:30–10:45 AM	C Code:	18ME15	Ma	x Marks	S:	50
No	te:	Answer all	full question	s. All questions o	arry 25 ma	rks.				
QI	No			Questions			CO	Level	Marks	Module
1	а	Explain 4-s diagram.	xplain 4-stroke Petrol engine with neat sketch along with PV (liagram.				02	L2	10	03
		118 mm a 650mm rad	A single cylinder 4-s engine runs at 1000 rpm and has a bore of 02 118 mm and a stroke of 145mm. the brake load is 80 N at 650mm radius and the mechanical efficiency is 75%. Calculate brake power and mean effective pressure.					L2	5	03
	с	With the I Absorption	•	ketch, explain t	he functior	ning of vapor	02	L2	10	03
				OR						
2	а	Difference	between Fo	ur stroke and Tw	o stroke Er	igine.	02	L2	5	03
	b	Define i) Ton of Refrigeration (TOR) ii) Coefficient of 02 performance (COP) iii) Refrigerating effect iv) Ice making Capacity v) Refrigeration cycle.				L2	10	03		
	С		at sketch ex rs and its ap	plain the workin	g principle	of Room Air	02	L2	10	03

L2

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L2

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3	a	Derive the relation for length of belt in open and crossed belt drive,		L2	10	04
		Define the following terms -slip, creep, velocity ratio, ratio of tension in flat belt drives	03	L2	5	04
		Define a composite material. How are composite materials classified? Give example for each.	04	L2	10	04
		OR				
4		Write the advantages and disadvantages of gear drives over belt drives	03	L2	10	04
	b	Briefly explain the types and applications of Non-ferrous alloys.	04	L2	05	04
		What are the key applications of composite materials in Aerospace and Automotive industries?	04	L2	10	04

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

	Model Assignment Questions									
Crs Code:		18ME2 5	Sem:	II	Marks:	10/ 10	Time:	90 – 12	90 – 120 minu	
Cou	rse:	ELEME	NTS OF M	ECHANIC	AL ENGINEE	RING				
Note	: Eac	h studer	nt to answe	r 2-3 assi	gnments. Eac	h assigr	nment carri	es equa	l mark	ζ.
SNo	ι	JSN		Assig	nment Descri	ption		Marks	CO	Level
1			Explain w Combustior		eat sketch	Parts	of Interna	al 10	CO2	L2
2			Explain the the help of	-	of a four strok m.	e petrol	engine wit	h 10	CO2	L2
3 With the help of PV diagram explain the wo					working of	a 10	CO2	L2		
4			With a neat petrol engir		plain the wor	king of a	a two strok	e 10	CO2	L2
5			Distinguish Engine.	between	two stroke a	and four	stroke I.C	C. 10	CO2	L2
6			Write the diesel engir		es between	petrol (engine an	d 10	CO2	L2
7 Define the following terms-in power, indicated thermal efficie					•	ower, brak	e 10	CO2	L2	
8	8 Define the following terms-brake thermal efficiency, mechanical efficiency and specific fuel consumption.					y, 10	CO2	L2		
9			Explain the	parts of r	efrigerator.			10	CO2	L2
10			Define: a. F	Refrigerati	on b. Refriger	ation Ef	fect	10	CO2	L2

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	Title:	Course Plan	Page: 20 / 30	
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11	Explain with neat sketch vapour absorption refrigeration.	10	CO2	L2
12	Define: a. Ton of Refrigeration b. Ice making capacity	10	CO2	L2
13	Define: a. Co-efficient of performance b. Relative Co-efficient of performance	10	CO2	L2
14	Explain with neat sketch vapour compression refrigeration.	10	CO2	L2
15	What are the properties of good refrigerant?	10	CO2	L2
16	List different types of refrigerants.	10	CO2	L2
17	Define a composite material. How are composite materials classified? Give example for each.	10	CO3	L2
18	Write the applications of Composite Materials.	10	CO3	L2
19	What are the key applications of composite materials in Aerospace and Automotive industries?	10	CO3	L2
20	State the composition and application of any four ferrous metals.	10	CO3	L2
21	Briefly explain the types and applications of Non- ferrous alloys.	10	CO3	L2
22	State the composition, properties and applications of high carbon steels.	10	CO3	L2
23	Write a note on Ferrous Alloys.	10	CO3	L2
24	Write a note on Non-Ferrous Alloys	10	CO3	L2
25	Briefly describe arc welding,	10	CO4	L2
26	Describe oxyacetylene welding with a neat sketch,	10	CO4	L2
27	Explain with sketch TIG welding,	10	CO4	L2
28	Briefly describe MIG welding.	10	CO4	L2
29	Define the following terms -slip, creep, velocity ratio, ratio of tension in flat belt drives	10	CO4	L2
30	Derive the relation for length of belt in open and crossed belt drive,	10	CO4	L2
31	Write the advantages and disadvantages of V belts and timing belts	10	CO4	L2
32	Write the advantages and disadvantages of gear drives over belt drives	10	CO4	L2



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D3. TEACHING PLAN - 3

Module – 5

Title:	Lathe, Milling machine, CNC and Robots	Appr	08 Hrs
а	Course Outcomes	Time:	Blooms
-	The student should be able to:	-	Level
1	students will be able to Discuss the working of conventional machine tools, machining processes, tools and accessories.	CO5	L2
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	Lathe - Principle of working of a center lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling,	CO5	L2
2	Taper turning by Tail stock offset method and Compound slide swiveling method, Specification of Lathe.	CO5	L2
3	Milling Machine – Principle of milling, types of milling machines. Working of horizontal and vertical milling machines.	CO5	L2
4	Milling processes – plane milling, end milling, slot milling, angular milling, form milling, straddle milling, and gang milling.	CO5	L2
5	Computer Numerical Control (CNC): Introduction, components of CNC,	CO5	L2
6	open loop and closed loop systems, advantages of CNC, CNC Machining centers and Turning centers.	CO5	L2
7	Robots: Robot anatomy, joints and links, common robot configurations.	CO5	L2
8	Applications of Robots in material handling, processing and assembly and inspection	CO5	L2
С	Application Areas	CO	Level
1	Used in manufacturing cylindrical jobs, flat sufaces of machine components	CO5	L2
	Automation in industries	CO5	L2

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d	Review Questions		-	-
1	Write the Specification of Lathe.		CO5	L2
2	Explain the Principle of working of a center lat	he.	CO5	L2
3	Explain the following Operations on lathe - Knurling, Thread Cutting, Drilling,	- Turning, Facing,	CO5	L2
4	Explain with a sketch Taper turning by Tail-sto	ock offset method	CO5	L2
5	Explain with a sketch Taper turning by swiveling method,	Compound slide	CO5	L2
6	Illustrate with sketch Principle of milling,		CO5	L2
7	Explain with sketches the following Milling milling, end milling, slot milling, angular mi straddle milling, and gang milling.	· · ·	CO5	L2
8	Sketch and explain the Working of horizontal r	milling machine.	CO5	L2
9	Sketch and explain the Working of vertical mill	ling machine.	CO5	L2
10	Define Automation? Explain briefly different ty	pes of Automation	CO5	L2
11	Explain briefly NC and CNC Machines with diagram.	the help of flow	CO5	L2
12	Define Robot? Explain with a neat sketch difference system of robots.	erent configuration	CO5	L2
13	Write the Advantages and Disadvantages Machines.	of NC and CNC	CO5	L2
14	Categorize the applications of Robots in processing and assembly and inspection.	material handling,	CO5	L2
е	Experiences		-	-
1	-			

E3. CIA EXAM – 3

a. Model Question Paper – 3

De	ept:	ME Sem / Div: 2/		2/A, B	Course:	EME Ele		Elective:		Ν
Da	ate:		Time:	9:30–10:45 AM	C Code:	18ME25	Max	Mark	s:	50
Nc	Note: Answer all full questions. All questions carry 25 marks.									
Q	No			Questions			СО	Lev	Mark	Modu
								el	S	le
1	а	Sketch a	nd explain th	e Working of hori	zontal millin	g machine.	05	L2	8	5
	b	Write the	e Advantage	s and Disadvar	tages of N	C and CNC	05	L2	9	5
		Machines	S.							
	С	Define	Automation?	Explain brief	fly differen	t types of	05	L2	8	5
		Automati	on							

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С	Sketch and explain the Working of vertical milling machine.	05	L2	10	5
а	Explain the following operations on lathe with neat sketches.	05	L2	10	5
	I) Turning ii) knurling iii) facing iv) thread cutting v) Taper				
	turning by off-set.				
b	Difference between up milling and down milling.	05	L2	5	5
С	Elaborate the various robot configurations with simple sketches	05	L2	10	5
	OR				
а	Explain the components of CNC with a block diagram	05	L2	5	5
b	Explain the following operations on Milling machine with neat	05	L2	10	5
	sketches i) Form milling ii) Angular milling iii) slot milling iv)				
	Straddle milling v) slab milling				
С	Define robot & write down industrial application with	05	L2	10	5
	advantages and disadvantages.				
	a b c a b	 a Explain the following operations on lathe with neat sketches. I) Turning ii) knurling iii) facing iv) thread cutting v) Taper turning by off-set. b Difference between up milling and down milling. c Elaborate the various robot configurations with simple sketches OR a Explain the components of CNC with a block diagram b Explain the following operations on Milling machine with neat sketches i) Form milling ii) Angular milling iii) slot milling iv) Straddle milling v) slab milling c Define robot & write down industrial application with 	aExplain the following operations on lathe with neat sketches. I) Turning ii) knurling iii) facing iv) thread cutting v) Taper turning by off-set.05bDifference between up milling and down milling.05cElaborate the various robot configurations with simple sketches050OR05aExplain the components of CNC with a block diagram05bExplain the following operations on Milling machine with neat05cExplain the following operations on Milling machine with neat05cDefine robot & write down industrial application with05	aExplain the following operations on lathe with neat sketches. I) Turning ii) knurling iii) facing iv) thread cutting v) Taper turning by off-set.05L2bDifference between up milling and down milling. E laborate the various robot configurations with simple sketches OR05L2cElaborate the various robot configurations with simple sketches b05L2dOR1000000000000000000000000000000000000	aExplain the following operations on lathe with neat sketches. I) Turning ii) knurling iii) facing iv) thread cutting v) Taper turning by off-set.05L210bDifference between up milling and down milling. C05L25cElaborate the various robot configurations with simple sketches OR05L210aExplain the components of CNC with a block diagram sketches i) Form milling ii) Angular milling iii) slot milling iv) Straddle milling v) slab milling05L210cDefine robot & write down industrial application with05L210

b. Assignment - 3

Note: A distinct assignment to be assigned to each student.

	Model Assignment Questions										
Crs Cod			Time:	90 – 12	90 – 120 minutes						
Cou	rse:	ELEI	MEI	NTS OF M	ECHANIC	AL ENGINE	ERING				
Note	: Ead	ch stud	den	t to answe	r 2-3 assig	nments. Ea	ch assigi	nment carri	es equa	l mark	κ.
SNo	U	SN			Assignn	nent Descrip	otion		Marks	CO	Level
1			Wri	ite the Spe	cification of	of Lathe.			10	CO5	L2
2			Exp	plain the P	rinciple of	working of a	a center la	athe.	10	CO5	L2
3	3 Explain the following Operations on lathe – Turning Facing, Knurling, Thread Cutting, Drilling,					, 10	CO5	L2			
4	4 Explain with a sketch Taper turning by Tail-stock offset method						t 10	CO5	L2		
5	5 Explain with a sketch Taper turning by Compound slide swiveling method,					e 10	CO5	L2			
6			Illus	strate with	sketch Pri	inciple of mi	lling,		10	CO5	L2
7			pla	ne milling,	end milli	he following ng, slot mill illing, and ga	ing, angi	ular milling		CO5	L2
8				etch and e chine.	explain the	e Working	of horizo	ntal milling	j 10	CO5	L2

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9	CAAS. All rights reserved.	and explain the Working of vertical milling	<u>5kii-Ph5</u> 10	CO5	L2
	machi		10	000	LZ
10		Automation? Explain briefly different types of	10	CO5	L2
	Autom		10	000	LZ
11		n briefly NC and CNC Machines with the help of	10	CO5	L2
	-	agram.	10	000	LZ
12	Define	e Robot? Explain with a neat sketch different	10	CO5	L2
	config	uration system of robots.			
13	Write	the Advantages and Disadvantages of NC and	10	CO5	L2
		Machines.			
14	Categ	orize the applications of Robots in material	10	CO5	L2
	handli	ng, processing and assembly and inspection.			
15	Write	the Specification of Lathe.	10	CO5	L2
16	Explai	n the Principle of working of a center lathe.	10	CO5	L2
17	Explai	n the following Operations on lathe - Turning,	10	CO5	L2
	Facing	g, Knurling, Thread Cutting, Drilling,			
18	Explai	n with a sketch Taper turning by Tail-stock offset	10	CO5	L2
	metho	d			
19	Explai	n with a sketch Taper turning by Compound slide	10	CO5	L2
	swivel	ing method,			
20	Illustra	ate with sketch Principle of milling,	10	CO5	L2
21	Explai	n with sketches the following Milling processes -	10	CO5	L2
	-	milling, end milling, slot milling, angular milling,			
	form n	nilling, straddle milling, and gang milling.			
22	Sketch	n and explain the Working of horizontal milling	10	CO5	L2
	machi	ne.			
23		n and explain the Working of vertical milling	10	CO5	L2
	machi	ne.			
24		e Automation? Explain briefly different types of	10	CO5	L2
	Autom				
25	· ·	n briefly NC and CNC Machines with the help of	10	CO5	L2
		agram.			
26		e Robot? Explain with a neat sketch different	10	CO5	L2
		uration system of robots.			
27	\\/rita	the Advantages and Disadvantages of NC and	10		12

27	Write the Advantages and Disadvantages of NC and	10	CO5	L2
	CNC Machines.			
28	Categorize the applications of Robots in material	10	CO5	L2
	handling, processing and assembly and inspection.			



COURSE PLAN - CAY 2019-20

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F. EXAM PREPARATION

1. University Model Question Paper

Course:		ELEMENTS	OF MECH	ANICAL EN	GINEERIN	G	Month Year	1	May /2018	May /2018	
Crs Co	Crs 18ME25 Sem: II Marks: 100 Time:				Time:		180 minu	tes			
-	Note	Answer all F	IVE full que	stions. All q	uestions ca	rry equal r	marks.	Mark s	CO	Leve I	
1		Distinguish I resources.	between No	on-Renewa	ble and Re	enewable	energy	20	CO1	L2	
		Define: i) W fraction.	et Steam;	ii) Enthalpy	of wet ste	eam; iii) D	ryness		CO1	L2	
	с	Explain globa	al warming						CO1	L2	
		Write a note of work, heat		-	ermodynami	c states, c	concept		CO1	L2	
				0	R						
-		With a neat plant.	sketch br	iefly explai	n the Hyd	ro-electric	power	20	CO1	L2	
		Explain the suitable sket		of steam	at constar	nt pressur	e with		CO1	L2	
	С	Explain ozon	e depletion						CO1	L2	
	d	Define laws o	of thermody	namics.					CO1	L2	
2	а	Write a brief	note on boi	ler mounting	gs and acce	essories		20	CO2	L2	
	b	Explain briefl	ly with a ske	etch the wor	rking of cen	trifugal pu	mp		CO2	L2	
		With a neat Boiler	sketch expl	ain the wor	king of Bab	bcock and	Wilcox		CO2	L2	
	-	With a ne Reciprocating	eat sketch g pump	explain	the working	ng princi	ple of		CO2	L2	
				OR							
-	а	Write the det	ailed classi	fication of b	oilers			20	CO2	L2	
		With a neat Turbine.	sketch exp	plain the w	orking prind	ciple of a	Pelton		CO2	L2	
		Briefly explai with a neat s		truction & v	working of l	_ancashire	e Boiler	,	CO2	L2	
	d	Explain briefl	ly with a ske	etch the wo	rking of a Fi	rancis Turk	oine.		CO2	L2	



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•					0.00	
3	а		a neat sketch Parts of Internal Combustion Engine	20	CO3	L2
	b	· · ·	parts of refrigerator.		CO3	L2
	С		p of PV diagram explain the working of a four stroke		CO3	L2
		diesel engin				
	d	Explain with	neat sketch Vapour absorption refrigeration.		CO3	L2
			OR			
-	а	-	p of PV diagram explain the working of a four stroke iesel engine.	20	CO3	L2
	b	Define: a. Re	efrigeration b. Refrigeration Effect		CO3	L2
	С	With a neat engine.	sketch explain the working of a two stroke petrol		CO3	L2
	d	Define: a. To	on of Refrigeration b. Ice making capacity		CO3	L2
4	а	Write a note	on Ferrous Alloys.	20	CO4	L2
	b	Write the ad belts	Ivantages and disadvantages of V belts and timing		CO4	L2
	С	State the c carbon steel	composition, properties and applications of high s.		CO4	L2
	d	Derive the r drive,	elation for length of belt in open and crossed belt		CO4	L2
-	а		omposite material. How are composite materials Give example for each.	20	CO4	L2
	b	Briefly descr	ibe arc welding,		CO4	L2
	С	Write the ap	plications of Composite Materials.		CO4	L2
	d	•	y-acetylene welding with a neat sketch,		CO4	L2
5	а		following Operations on lathe - Turning, Facing, read Cutting, Drilling,	20	CO5	L2
	b	Define Autor	mation? Explain briefly different types of Automation		CO5	L2
			OR			
	а	milling, end	sketches the following Milling processes - plane milling, slot milling, angular milling, form milling,	20	CO5	L2
		straddle mill	ing, and gang milling.			

b

diagram.

Explain briefly NC and CNC Machines with the help of flow

CO5 L2



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2. SEE Important Questions

Course:		ELEMENTS	OF MECH	IANICAL E		NG	Mo Yea		May /2	018
Crs Code:		18ME25	BME25 Sem: II Marks: 100 Tin						180 mii	nutes
		Answer all I marks.	FIVE full	questions.	All questio	ons carry e	qual	-	-	
Mo dul e	Q no.	Important Qu	lestion					Marks	CO	Year
1	1	Explain globa	al warming	3				20	CO1	2014
-		Explain ozon							CO1	2016
	3	Write a not	e on foll	owing terr		lynamic sta	ates,		CO1	2004
	4	Define Zerotl	h law of th	ermodynar	nics.				CO2	2007
	5	Define 1st la	w of therm	nodynamics	6.				CO2	2007
2		With a neat Wilcox Boiler		explain the	e working o	f Babcock	and	20	CO2	2005
	2	Write a brief	note on b	oiler mount	ings and ac	cessories			CO2	2015
		With a neat Turbine.	sketch ex	plain the w	orking princ	iple of a Pe	elton		CO2	2009
		With a nea Reciprocating		explain	the workin	ig principle	e of		CO3	2016
	5	Explain the c	oncept of	cavitation	and priming.				CO3	2008
3		Explain with Engine	a neat	sketch Pa	rts of Interr	nal Combus	stion	20	CO3	2012
		With the hel stroke petrol	•	•	plain the wo	orking of a	four		CO3	2010
		Write the d engine.	ifferences	between	petrol eng	ine and di	ese		CO3	2007
	4	Explain with	neat sketo	ch vapour c	ompression	refrigeratio	n.		CO3	2004
		Explain with			-				CO3	2011
4		State the co carbon steels	•	, propertie	s and appli	cations of	high	20	CO4	2004
	2	Describe oxy	-acetylen	e welding v	vith a neat s	ketch,			CO4	2004
	3	Define the fo	ollowing te	rms -slip. (creep, veloci	ity ratio. rat	io of		CO4	2006

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onsion in fla	t helt drives			

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	tension in flat belt drives			
4	Derive the relation for length of belt in open belt drive,		CO4	2004
5	Write the advantages and disadvantages of gear drives over belt drives		CO4	2007
		00	005	0000
1	explain with a sketch laper turning by Compound slide swiveling method,	20	005	2009
2	Sketch and explain the Working of vertical milling machine.		CO5	2007
3	Define Automation? Explain briefly different types of Automation		CO5	2016
4	Explain briefly NC and CNC Machines with the help of flow diagram.		CO5	2015
5	Define Robot? Explain with a neat sketch different configuration system of robots.		CO5	2017
	5 1 2 3 4	 4 Derive the relation for length of belt in open belt drive, 5 Write the advantages and disadvantages of gear drives over belt drives 1 Explain with a sketch Taper turning by Compound slide swiveling method, 2 Sketch and explain the Working of vertical milling machine. 3 Define Automation? Explain briefly different types of Automation 4 Explain briefly NC and CNC Machines with the help of flow diagram. 5 Define Robot? Explain with a neat sketch different 	 4 Derive the relation for length of belt in open belt drive, 5 Write the advantages and disadvantages of gear drives over belt drives 1 Explain with a sketch Taper turning by Compound slide 20 swiveling method, 2 Sketch and explain the Working of vertical milling machine. 3 Define Automation? Explain briefly different types of Automation 4 Explain briefly NC and CNC Machines with the help of flow diagram. 5 Define Robot? Explain with a neat sketch different 	4Derive the relation for length of belt in open belt drive,CO45Write the advantages and disadvantages of gear drives over belt drivesCO41Explain with a sketch Taper turning by Compound slide swiveling method,20CO52Sketch and explain the Working of vertical milling machine.CO53Define Automation? Explain briefly different types of AutomationCO54Explain briefly NC and CNC Machines with the help of flow diagram.CO55Define Robot? Explain with a neat sketch differentCO5

G. Content to Course Outcomes

1. TLPA Parameters

Mod	Course Content or Syllabus			-		Instructio	Assessment
ule-		Teachin	Learning			n	Methods to
#		g Hours	Levels	ms'	Verbs for	Methods	Measure
			for	Level	Learning	for	Learning
			Content			Learning	
Α	В	С	D	Ε	F	G	Н
1	Introduction and application of energy	8	L2	L2	Underst	Chalk	Assignme
	sources Fossil fuels, hydel, solar,				and	and	nt and
	wind, nuclear fuels and bio-fuels					board,	Class Test
	Environmental issues like global					PPT &	
	warming and ozone depletion.					Video	
	Introduction, states, concept of work,						
	heat, temperature; Zeroth, 1st, 2nd						
	and 3rd laws of thermodynamics						
	Concept of internal energy, enthalpy						
	and entropy (simple numerical).						
	Formation of steam and						
	thermodynamic properties of steam						
	Properties of steam (simple						
	numericals).						
2	Introduction to boilers, classification,	8	L2	L2	Underst	Chalk	Assignme
	Boilers: Introduction to boilers,				and	and	nt and
	classification, Introduction to boiler					board,	Class Test

Table 1: TLPA – Example Course

(Martin Carlos C	SKIT Tea	aching Pr	ocess			Rev No	o.: 1.0
Sel Kal	Doc Code: SKIT.Ph5b1.F02	-				Date:2	2-01-2020
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Copyrig	nt ©2017. cAAS. All rights reserved. COURSE PLA	N - CAY 20)19-20		BE-2-EME-S		-F02-V2.2
	mountings and accessories (no					PPT &	
	sketches)					Video	
	Hydraulic Turbines – Classification						
	specification, Principles and operation						
	of Pelton wheel turbine, Francis						
	turbine and Kaplan turbine						
	classification and specification of						
	pumps, Reciprocating pump and						
	centrifugal pump, Concept of						
	cavitation and priming.	0	L2	10	llus el sus f	Chall	
3	Classification, I.C. Engines parts,2 and		LZ		Underst		Assignme nt and
	4 stroke petrol and 4-stroke diesel				and	and	Class Test
	engines. P-V diagrams of Otto and Diesel					PPT &	
	cycles. Simple problems on indicated					Video	
	power, brake power, indicated thermal					VIGEO	
	efficiency, brake thermal efficiency,						
	mechanical efficiency and specific fuel						
	consumption.						
	Definitions – Refrigerating effect, Ton						
	of Refrigeration, Ice making capacity,						
	COP, relative COP, Unit of						
	Refrigeration Refrigerants, Properties						
	of refrigerants, List of commonly used						
	refrigerants. Principle and working of						
	vapor compression refrigeration and						
	vapor absorption refrigeration.						
	Domestic refrigerator. Principles and						
	applications of air conditioners,						
	window and split air conditioners						
4	Metals – Ferrous: cast iron, tool steels	8	L2	L2	Underst	Chalk	Assignme
	and stainless steels and nonferrous:				and	and	nt and
	aluminum, brass, bronze. Polymers –					board,	Class Test
	Thermoplastics and thermo setting					PPT &	
	polymers. Ceramics -Glass, optical					Video	
	fiber glass, cermets. Composites –						
	Fiber reinforced composites, Metal						
	Matrix Composites Smart materials –						
	Piezoelectric materials, shape memory						
	alloys, semiconductors and insulators.						
	Definitions. Classification and methods						
	of soldering, brazing and welding.						

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		•	of arc v								
	oxyacetylene welding, TIG welding,										
	and MIG welding.										
	Open & crossed belt drives,										
	Definitions -slip, creep, velocity ratio,										
	derivations for length of belt in open										
	and crossed belt drive, Ratio of										
	tension in flat belt drives, advantages										
	and										
	disadvantages of V belts and timing										
		•	erical problem								
	Types-spur, helical, bevel, worm and										
	rack and pinion. Velocity ratio,										
	Advantages and disadvantages over belt drives, simple numerical problems										
		•	e numerical pr	oblems							
		locity ratio.			-				<u> </u>		
5		•	ng of a cente		8	L2	L2	Underst		Assignme	
			Operations on					and	and	nt and	
		•	Knurling,							Class Test	
		•	Faper turning	-					PPT &		
			hod and Cor	•					Video		
		-	nethod, Spec	ification							
	of Lat	-									
		-	ng, types of	-							
			ng of horizon								
	vertica	0		Milling							
	· ·	•	e milling, end	0.							
		•	gular milling	-							
	-		milling, and	a gang							
	milling	-	, ,								
			nponents of								
	· ·	•	losed loop s								
		-	NC, CNC Ma	achining							
		rs and Turni	•								
			oints and links	,							
		ion robot coi	•	:							
			bots in mater								
			ing and asser	noiy							
	and in	spection									