KONGU ENGINEERING COLLEGE

(Autonomous Institution Affiliated to Anna University, Chennai)

PERUNDURAI ERODE – 638 060 TAMILNADU INDIA



REGULATIONS, CURRICULUM & SYLLABI – 2024

(CHOICE BASED CREDIT SYSTEM AND OUTCOME BASED EDUCATION)

(For the students admitted from the academic year 2024 - 2025)

BACHELOR OF ENGINEERING DEGREE IN CHEMICAL ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING



B.TECH.CHEMICAL ENGINEERING CURRICULUM - R2024 (For the students admitted from the academic year 2024-25 onwards)

SEMESTE	₹-1			,	ñ								
			Н	ours /	Seme	ster			Max	imum N	/larks		
Course Code	Course Title	С	ı	LI	TW	CI.	TU	Cre dit	CA	ESE	Total	Cate gory	Туре
		L T P TW SL TH		e.	CA	ESE	Total						
Theory/The	eory with Practical				9		L.	-					
24EGT11	English for Effective Communication	45	0	0	45	0	90	3	40	60	100	HS	С
24MAC11	Matrices and Ordinary Differential Equations	45	7	16	52	0	120	4	50	50	100	BS	Α
24CYT14	Chemistry for Chemical Engineering	45	0	0	45	0	90	3	40	60	100	BS	С
24CSC11	Problem Solving and Programming in C	45	0	30	45	0	120	4	100	0	100	ES	ОТ
24MET11	Engineering Drawing	30	15	0	45	0	90	3	40	60	100	ES	· A
24TAM01	Heritage of Tamils	15	0	0	15	0	30	1	100	0	100	HS	ОТ
Practical /	Employability Enhancement	E											
24CYL14	Chemistry Laboratory for Chemical Engineering	0	0	30	0	0	30	1	60	40	100	BS	
24GCL12	Foundation Laboratory – Electrical, IoT and Web Technologies	0	0	90	0	0	90	3	100	0	100	ES	
24MNT12	Quantitative Aptitude – I	30	0	0	0	0	30	0	100	0	100	МС	
24MNT11	Student Induction Program	0	0	90	0	0	90	0	100	0	100	МС	
	Total Credits to be e	earne	d					22		_)		

 $CI-Classroom\ Instructions,\ LI-Laboratory\ Instructions,\ TW-Term\ Work,\ SL-Self\ Learning,\ L-Lecture,\ T-Lecture,\ T-Lec$ Tutorial, P - Practical, C - Credit, TH - Total Hours, CA - Continuous Assessment, ESE - End Semester Examination.

Type: A - Analytical, D - Design using Hardware, S - Simulation using Coding, C - Concept, OC - Online course, OT - others

Signature of the Chairman of Studies - Chemical Board of Studies -



B.TECH.CHEMICAL ENGINEERING CURRICULUM – R2024 (For the students admitted from the academic year 2024-25 onwards)

		9	Н	ours	/ Seme	ester			Maximum Marks				-
Course Code	Course Title	С	ı	LI	TIA	CI.	T1.	Cre dit		ESE	Total	Cate gory	Туре
		L	Т	Р	TW	SL	TH		CA	ESE	Total	*	
Theory/The	eory with Practical											-	
24EGT21	English for Effective Communication - II	45	0	0	45	0	90	3	40	60	100	HS	С
24MAC22	Multivariable Calculus and Partial Differential Equations	45	7	16	52	0	120	4	50	50	100	BS	Α
24PHT22	Physics for Chemical Engineering	45	0	0	45	0	90	3	40	60	100	BS	С
24ITC23	Python Programming	45	0	30	45	0	120	4	50	50	100	ES	ОТ
24CHT21	Chemical Process Industries	45	0	0	45	0	90	3	40	· 60	100	PC	С
24TAM02	Tamils and Technology	15	0	0	15	0	30	1	100	0	100	HS	ОТ
Practical /	Employability Enhancement				a						. ,		
24PHL22	Physics Laboratory for Chemical Engineering	0	0	30	0	0	30	1	60	40	100	BS	50
24GCL11	Foundation Laboratory – Manufacturing, Design and Robotics	0	0	90	0	0	90	3	100	0	100	ES	
24MNT21	Quantitative Aptitude – II	30	0	0	0	0	30	0	100	0	100	МС	
24VEC11	Yoga and Values for Holistic Development	15	0	15	0	0	30	1	100	0	100	HS	
		11			e:			23		Е			

CI – Classroom Instructions, LI – Laboratory Instructions, TW – Term Work, SL – Self Learning, L – Lecture, T – Tutorial, P – Practical, C – Credit, TH – Total Hours, CA – Continuous Assessment, ESE – End Semester Examination

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Signature of the Chairman Board of Studies - Chemical





B.TECH.CHEMICAL ENGINEERING CURRICULUM – R2024 (For the students admitted from the academic year 2024-25 onwards)

SEMESTER	₹ – III											, ,	
			Н	ours /	Seme	ster			Max	imum N	larks		
Course Code	Course Title		1	LI	TW	SL	тн	Cre dit	CA	ESE	Total	Cate gory	Туре
		L	Т	Р	IVV	SL	111	_	CA	ESE	Total	-	×
Theory/The	eory with Practical							3			а	r.	
24EET34	Basics of Mechanical and Electrical Engineering	45	0	0	45	0	90	3	40	60	100	ES	С
24CHT31	Chemical Process Calculations	45	15	0	60	0	120	4	40	60	100	РС	Α
24CHT32	Fluid Mechanics	30	15	0	45	0	90	3	40	60	100	РС	A
24CHT33	Applied Organic Chemistry	45	0	0	45	0	90	3	40	60	100	РС	С
24CHC31	Chemical Engineering Thermodynamics	45	0	30	45	0	120	4	50	50	100	РС	А
24GET31	Universal Human Values	30	0	0	30	0	60	2	100	0	100	HS	ОТ
Practical /	Employability Enhancement			1/	×								· ·
24CHL31	Fluid Mechanics Laboratory	0	0	30	0	0	30	1	60	40	100	PC	
24CHL32	Applied Organic Chemistry Laboratory	0	0	30	0	0	30	1	60	40	100	PC	
24GEP31	Mini Project - I	0	0	30	0	0	30	1	100	0	100	EC	
	Total Credits to be	earne	d					22	я				-1

CI – Classroom Instructions, LI – Laboratory Instructions, TW – Term Work, SL – Self Learning, L – Lecture, T – Tutorial, P – Practical, C – Credit, TH – Total Hours, CA – Continuous Assessment, ESE – End Semester Examination.

Type: A - Analytical, D - Design using Hardware, S - Simulation using Coding, C - Concept, OC - Online course, OT - others

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Board of S

of the Chairman Chemical





		(Common to all Engine	ering and Tech	nnology Brand	hes)					
Programme Branch		All B.E/B.Tech Branches	Sem	Category	L	Т	Р	SL*	Total	Credi
Prerequisit	tes	Nil	1	HS	45	0	0	45	90	3
Preamble		s course is designed to enhance the co various workplace communication and			al apti	ude i	n Eng	lish la	nguage i	required
Unit – I		ammar, Verbal Aptitude, Listening, S Speech – Articles – Determiners –								9
Building a Po Unit – II Grammar: T Prefixes and Asking Ques Strategies: A	Gray ypes of Suffixed tions – n Exce	g: Importance of Good Communication Attitude: An Excerpt from You Can Windermar, Verbal Aptitude, Listening, Soff Sentences – Assertive, Interrogative as – Collocations – Idiomatic Expression Role Play – Reading: Reading for Corpt from You Can Win-Writing: Description	 Writing: Empeaking, Read Imperative and Emperative an	nail Etiquette - ding & Writin and Exclamato : Identifying r - Verbal and	– Emai g ory – C nain a d Non-	Uuest nd Se Verba	ing – ion T econd	Respo ags- V ary Po mmunic	/erbal A ints – Sp	Emails 9 ptitude peaking Winning
Unit – III Grammar: To from a Disconding: Narra Unit – IV Grammar: P Sentence Correct	Graenses cussion—Sc ative an Graenmelsi annels Graenmels Graenmels Graenmels Graenmels	ermission and Inviting Chief Guest ammar, Verbal Aptitude, Listening, S.— Phrasal Verbs— Verbal Aptitude: Jun — Speaking: Retelling an Incider anning - Motivating Yourself and Other and Compare & Contrast ammar, Verbal Aptitude, Listening, Stions — Transitional Words/Phrases — on — Listening: Listening for Specific of communication — Building Positive ammar, Verbal Aptitude, Listening, Sammar, Verbal Aptitude, Listening, S	peaking, Read mbled Senten nt — Discuss is Every Day: peaking, Read Discourse Ma Information — Self-Esteem a peaking, Read	ding & Writin lices – Senten sing Tourist An Excerpt fr ding & Writin arkers – Verl – Speaking: and Image: And	ice For Destin Com You Ig Bal Ap Small In Exce	matic ations ou Ca otitud Talk erpt fr	e: Oi Teleom Y	istenir Readi n – Wr ne Wo phonic	ng: Takir ng: Pro iting: Pro ord Subs c Conver n Win –	9 ng Note ocess of aragrap 9 titution reations Writing
Unit – III Grammar: To from a Disc Communicati Writing: Narra Unit – IV Grammar: P Sentence Co Reading: Ch Instructions – Unit – V Grammar: S – Cloze Test Speaking: A Excerpt from Specific Voca	Graenses cussion cussion Scative an Preposi pmpleti nannels Recon Gra ubject t using greein you abulary	ermission and Inviting Chief Guest ammar, Verbal Aptitude, Listening, S.— Phrasal Verbs— Verbal Aptitude: Jun — Speaking: Retelling an Incider anning - Motivating Yourself and Other and Compare & Contrast ammar, Verbal Aptitude, Listening, Stions — Transitional Words/Phrases — on — Listening: Listening for Specific of communication — Building Positive ammar, Verbal Aptitude, Listening, Sommar, Verbal Aptitude, Listening, S	peaking, Reambled Sentent — Discusses Every Day: peaking, Reambled Sentential Piscourse Mais Information — Self-Esteem and Peaking, Reambled Self-Esteem and Peaking, Reambled Self-Esteeming — Reading to the Peaking of the Peaking Reading of the Peaking Reading to the Peaking Reading R	ding & Writin ices – Senten sing Tourist An Excerpt fr ding & Writin arkers – Verl – Speaking: and Image: And ding & Writin Aptitude: Hore Listening and to Summarize	ng Destination Young Small n Exceeding The Small nonymark Iden in Exceeding The Section 1981 and 1981	matic ations ou Ca otitud Talk rpt fr	e: Oi Tele om Y	istenir Readi n – Wr ne Wo phonic ou Cal nones a	ng: Takir ng: Pro iting: Pro ord Subs c Conver n Win –	9 ng Note ocess of aragraph 9 titution reations Writing 9 nograph cription
Unit – III Grammar: To from a Disc Communicati Writing: Narra Unit – IV Grammar: P Sentence Co Reading: Ch Instructions – Unit – V Grammar: S – Cloze Test Speaking: A Excerpt from Specific Voca TEXT BOOK	Grannels - Recon - Recon - Grannels - Recon - Grannels - Recon - Grannels - Union - Grannels - Recon - Grannels - Grannel	ermission and Inviting Chief Guest ammar, Verbal Aptitude, Listening, S — Phrasal Verbs— Verbal Aptitude: Jun — Speaking: Retelling an Incide anning - Motivating Yourself and Other and Compare & Contrast ammar, Verbal Aptitude, Listening, Stions — Transitional Words/Phrases — on — Listening: Listening for Specific of communication — Building Positive ammar, Verbal Aptitude, Listening, Storm Agreement — Gerunds and Infinitive Forms, Prepositions and Articles and Disagreeing — Reading: Skimmir Can Win — Writing: Transcoding: Identity and N P and Savitha C, English for Technical Can Win — Writing: Transcoding: Identity and N P and Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English For Technical Can Win — Writing: Identity A Pan	peaking, Reacmbled Sentent — Discuss s Every Day: peaking, Reac Discourse Mail Information Self-Esteem a peaking, Reacyes—Verbal As—Listening: ng — Reading 1 tifying Trends	ding & Writing Ices – Sentending Tourist An Excerpt from	ice For Destin Tom Young Small In Exceeding Identification of the International Identification of Iden	maticonstantial material mater	e: Or Yes and Aranda	istenir Readi n – Wr ne Wo phonic ou Car nones a ts from chievin Expres	ng: Takir ng: Pro iting: Pa ord Subs c Conver n Win –	9 ng Notes ocess of aragraph 9 titution reations Writing 9 nograph cription - ioals: Ai h Graph
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Unit – III Grammar: To from a Disc Communicati Writing: Narra Unit – IV Grammar: P Sentence Co Reading: Ch Instructions – Unit – V Grammar: S – Cloze Test Speaking: A Excerpt from Specific Voca TEXT BOOK 1. Sudh Delhi	Graenses cussion cussion Graenses Graen	ermission and Inviting Chief Guest ammar, Verbal Aptitude, Listening, S — Phrasal Verbs— Verbal Aptitude: Jun — Speaking: Retelling an Incide anning - Motivating Yourself and Other and Compare & Contrast ammar, Verbal Aptitude, Listening, Stions — Transitional Words/Phrases — on — Listening: Listening for Specific of communication — Building Positive ammar, Verbal Aptitude, Listening, Storm Agreement — Gerunds and Infinitive Forms, Prepositions and Articles and Disagreeing — Reading: Skimmir Can Win — Writing: Transcoding: Identity and N P and Savitha C, English for Technical Can Win — Writing: Transcoding: Identity and N P and Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Transcoding: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English for Technical Can Win — Writing: Identity A Pand Savitha C, English For Technical Can Win — Writing: Identity A Pan	peaking, Reading Sentent — Discusses Every Day: peaking, Reading Discourse Mais: Information — Self-Esteem as peaking, Reading Reading — Reading to tifying Trends	ding & Writing Ices – Sentending Tourist An Excerpt from	ice For Desting of Small on Exceeding of Identity of Sin Grid Identity o	matic ation: bu Ca btitud Talk Talk rpt fr s, Ho tifying araphs	e: Or Yes and Arand Aran	istenir Readi n – Wr ne Wo phonic ou Car nones a ts from chievin Expres	ng: Takir ng: Pro iting: Pa ord Subs c Conver n Win –	9 ng Note ocess of aragraph 9 titution reations Writing 9 nograph cription doals: Ai th Graph ss, New
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^{*} includes Term Work (TW) & Assignments, Tutorials and Case Studies

	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	learn and use various aspects of English vocabulary to perform well in verbal aptitude tests of different types	Applying (K3)
CO2	listen and understand different spoken discourses	Applying (K3)
CO3	present ideas clearly and confidently in formal and informal conversations and discussions	Creating (K6)
CO4	comprehend the given text and respond appropriately for technical and professional purposes	Understanding (K2)
CO5	select appropriate words , phrases and grammatical units and apply them in both spoken and written communication	Analyzing (K4)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PSO2
CO1						1.		1	3	1	.1		
CO2			= ,		-	i i		1	3		1		- 7
CO3								2	3	1	2		
CO4						1			3	1	2		
CO5					. =1				3		2		

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understa nding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	35	50	=	-	15	100
CAT2		45	35	· - 1	y ee 🛌	20	100
CAT3	-	30	35	35			100
ESE	-	20	40	20	-	20	100

* ±3% may be varied (CAT 1,2& 3 – 50 marks & ESE – 100 marks)

Signature of the Chairman Board of Studies - Sr H (English)



1	(Common to all Engi	neering and T	echnology l	orano	ches)			
Programme & Branch	All B.E/B.Tech Branches	Sem.	Category	L	Т	Р	SL*	Total	Credit
Prerequisites	Nil	1.	BS	45	7	16	52	120	4
Preamble	To provide the skills to the stude and ordinary differential equation	lents for solving	g different re	al tim	ne pr	oblen	ns by a	applying	matrices
Unit – I	Matrices:	C There	Jakob Fer Si	. 170			9	Tell ?	9
and Eigen vector matrices – Ortho	naracteristic equation – Eigen valuors (without proof) – Cayley – Ha gonal transformation of a symmet on of quadratic form to canonical f	amilton theorer tric matrix to dia	m (Statemen agonal form -	t and Qua	d app adrat	olicati	ions or	nly) - Or	thogona
Unit – II	Ordinary Differential Equation				9				9
Introduction – Se	olution of First order differential ed	quations: Exac	t differential	equat	tions	– Le	ibnitz's	Linear I	Equation
Unit – III	ation – Clairaut's equation - Appli Ordinary Differential Equation			wth a	nd d	ecay			
	l equations of second and higher			ents -	Par	ticula	r Inten	rale for th	9
eax - cosax /	$\sin ax - x^n - e^{ax}x^n$, $e^{ax}\sin bx$ and $e^{ax}\cos ax$	eax cosbx – Diff	erential Equa	ations	s with	h vari	able co	pefficient	s: Euler-
Cauchy's equati	on – Legendre's equation.	, , , , , , , , , , , , , , , , , , ,		1.					
Unit – IV	Applications of Ordinary Diffe							k	9
Method of varia	ation of parameters – Simultan differential equations: Simple h	eous first ord	er linear eq	uatio	ns \	with (consta	nt coeffi	cients –
associated cond	itions need to be given).	iarmonic mond	on – ⊏iecuio	CITO	uits	(וווט	erentia	ıı equatio	ons and
Unit – V	Laplace Transform:				-			-	9
Introduction - Co	onditions for existence - Laplace t	transform of ele	mentary fun	at: a =					
and integrals of			silicitially full	Cuon	s – E	Basic	proper	ties – De	rivatives
and integrals of t	ransforms – Transform of periodic	c functions - Inv	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fu	nctions – Partial fraction method	c functions - Inv	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fu	ransforms – Transform of periodic nctions – Partial fraction method th constant coefficients.	c functions - Inv	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fu second order wi	nctions – Partial fraction method	c functions - Inv	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fu second order with LIST OF EXPER	nctions – Partial fraction method th constant coefficients.	c functions - Inv	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients.	c functions - Inv – Convolution	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
LIST OF EXPER 1. Introduct 2. Compute	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: ction to MATLAB	c functions - Inv - Convolution /ectors	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
LIST OF EXPER 1. Introduct 2. Comput 3. Solving	nctions – Partial fraction method the constant coefficients. RIMENTS / EXERCISES: etion to MATLAB the transfer of eigen values and eigen values eigen values and eigen values eigen eigen values eigen e	c functions - Inv - Convolution // Convolution // Convolution	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
LIST OF EXPER 1. Introduct 2. Compute 3. Solving 4. Solving	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: etion to MATLAB the total and eigen values and eigen values order ordinary differential equations.	c functions - Inv - Convolution /ectors uations equations	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: etion to MATLAB ration of eigen values and eigen values order ordinary differential equipment order ordinary differential equipment order ordinary differential	c functions - Inv - Convolution // ectors uations equations	erse Laplace	e tran	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: ction to MATLAB ration of eigen values and eigen values order ordinary differential equipment of Simultaneous first order ODE	rectors uations equations s f parameters	rerse Laplace Theorem – A	e tran Applio	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: ction to MATLAB ration of eigen values and eigen values order ordinary differential equipment of Simultaneous first order ODE second order ODE by variation or	rectors uations equations s f parameters e transform of	verse Laplace Theorem – /	e tran Applio	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order will LIST OF EXPER 1. Introduct 2. Compute 3. Solving 4. Solving 5. Solution 6. Solving 7. Determ 8. Solution	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: Etion to MATLAB Lation of eigen values and eigen values and eigen values of eigen val	rectors uations equations s f parameters e transform of	verse Laplace Theorem – /	e tran Applio	sfor	m: Inv	verse L	aplace tr	ansform
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: etion to MATLAB ration of eigen values and eigen values of eigen values and eigen values of eigen order ordinary differential equipment of Simultaneous first order ODE second order ODE by variation of eigen of Second order ODE by employed of Second order ODE by employed of Second order ODE by employed or entry	c functions - Inv - Convolution /ectors uations equations s of parameters e transform of lying Laplace transform	verse Laplace Theorem – /	ns	esfori	m: Inv	verse L olution	aplace tr of linear	ansform ODE of
of elementary fusecond order with second order w	nctions – Partial fraction method th constant coefficients. RIMENTS / EXERCISES: Etion to MATLAB Lation of eigen values and eigen values and eigen values of eigen val	c functions - Inv - Convolution //ectors uations equations s of parameters e transform of lying Laplace transform avathy K., "En	verse Laplace Theorem – /	ns	esfori	m: Inv	verse L olution	aplace tr of linear	ansform ODE of
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^{*}includes Term Work (TW) & Online / Certification course hours

	SE OUTCOMES: expletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	Use the matrix algebra methods and MATLAB for solving practical problems.	Applying (K3) Manipulation (S2)
CO2	Identify the appropriate method for solving first order ordinary differential equations.	Applying (K3) Manipulation (S2)
CO3	Solve higher order linear differential equations with constant and variable coefficients.	Applying (K3) Manipulation (S2)
CO4	Apply the concept of ordinary differential equations for modeling and finding solutions to engineering problems.	Applying (K3) Manipulation (S2)
CO5	Apply Laplace Transform to solve complex engineering problems.	Applying (K3) Manipulation (S2)

Mapping	of C	COs	with	POs	and	PSOs
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COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	1	3			1 1 1/10				-j .	
CO2	3	3	2		3	200	ation of	Mark Carlo		4.95		1 _ Al	14
CO3	3	3	2		3		- T	F E = 2	= < 1 =				
CO4	3	3	2		3				, =	T = = = =	I =	. 1-	
CO5	3	3	3		3								

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMEN	TDATT	EDN _ T	HEUDY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		40	60				100
CAT2		40	60	gereich geit	i amerikan	1 - 1	100
CAT3		30	70				100
ESE		30	70			1	100

* ±3% may be varied (CAT 1, 2 & 3 – 50 marks & ESE – 100 marks)

Signature of the Chairman Board of Studies - \$4 H



	24CYT14 - CHEMISTRY FOR	CILIVICAL	NOINEERIN	G		-			
Programme &	B.Tech - Chemical Engineering	Som	Cotogogy	1	 _		CI *	T-4-1	0 "
Branch		Sem.	Category	L	Т	Р	SL*	Total	Credi
Prerequisites	NIL	1	BS	45	0	0	45	90	3
Preamble	This course explores the basic principles of corrosion fuels, combustion and phase rule. It a in chemical engineering and also for societal approximately and also for societal approximately approxim	aims to impart							
Unit – I	WATER TECHNOLOGY	•••							9
hardness of wate disadvantages of carbonate and ca	es of water - hardness of water- expression of harder by EDTA method – determination of alkalin using hard water in industry: scale, sludge and begon conditioning - External treatment method - de	ity - DO, BC poiler corrosio	D and COD n - softening	of w	finiti ater:	on a Inte	nd Sig	nificance atment p	only) rocess
Unit – II	r: Introduction - cells - types - representation of g						•		9
Vs strong base. Cexamples - galvangles - gal	ENERGY STORAGE DEVICES	ing - bedworth corrosion co	n rule - electr ntrol by orga	ochei nic co	mica patin	l cor	rosion - aints) -	- mechan constitue	ism with ents and
Batteries: Introdu	iction - discharging and charging of battery - cha	racteristics of	battery - type	es of	batte	eries	– prim	ary batte	ry: silve
button cell - seco	ndary battery: Ni-Cd battery -modern battery: lit	thium-ion batt	ery - choice	of ba	atteri	es fo	or elect	ric vehicl	es. Fue
Cells: Introductio	n - Importance and classification of fuel cells - des	scription, princ	ciple, compor	nents	and	work	ing of	fuel cells:	alkaline
	ric acid fuel cell and direct methanol fuel cell - con	nparison of ba	tteries with fu	uel ce	lls.				
Unit – IV	FUELS AND COMBUSTION								9
								and the second second	
	ssification of fuels - characteristics of a good fue							et calorifi	c value
	-Flue gas analysis by Orsat's method- solid fue	els - coal and	its varieties	– pro	oxim	ate a	analysis	et calorifi – signifi	c value cance -
metallurgical coke) -Flue gas analysis by Orsat's method- solid fue e - Otto-Hoffman byproduct method - liquid fuel -	els - coal and - refining of pe	its varieties	– pro	oxim	ate a	analysis	et calorifi – signifi	c value cance -
metallurgical coke number, compres	-Flue gas analysis by Orsat's method- solid fue - Otto-Hoffman byproduct method - liquid fuel - sion ignition engine - cetane number - gaseous fu	els - coal and - refining of pe	its varieties	– pro	oxim	ate a	analysis	et calorifi s – signifi n engine	c values cance - - octane
metallurgical coke number, compres Unit – V	-Flue gas analysis by Orsat's method- solid fue - Otto-Hoffman byproduct method - liquid fuel - sion ignition engine - cetane number - gaseous fu PHASE RULE	els - coal and - refining of pe el - LPG.	its varieties etroleum - kr	– pro nockin	oxim ng: s	ate a	analysis ignition	et calorifi s – signifi n engine	c value: cance - - octane
metallurgical cokenumber, compres Unit – V Introduction - stat determination of t component syste	-Flue gas analysis by Orsat's method- solid fue - Otto-Hoffman byproduct method - liquid fuel - sion ignition engine - cetane number - gaseous fu	els - coal and - refining of poel - LPG. - component system of the consistency of the c	its varieties etroleum - kr tem – water s truction of ph	- pronockin	oxim ng: s m – p	ate a	ignition norphis y therr	et calorifi s – signifi n engine sm – expe	c value cance - - octano 9 erimenta sis – two
metallurgical cokenumber, compres Unit – V Introduction - stat determination of t component systemelting point.	p-Flue gas analysis by Orsat's method- solid fue e - Otto-Hoffman byproduct method - liquid fuel - sion ignition engine - cetane number - gaseous fuel PHASE RULE ement and explanation of terms involved – one corransition point – sulphur system - condensed phase	els - coal and - refining of poel - LPG. - component system of the consistency of the c	its varieties etroleum - kr tem – water s truction of ph	- pronockin	oxim ng: s m – p	ate a	ignition norphis y therr	et calorifi s – signifi n engine sm – expe	c value cance - - octano 9 erimenta sis – two
metallurgical cokenumber, compressurit – V Introduction - state determination of the component system melting point. TEXT BOOK: 1. Roussak 2013, for	PHASE RULE ement and explanation of terms involved – one corransition point – sulphur system – condensed phasem – simple eutectic system – Silver-Lead system, O.V. Gesser, H. D. "Applied Chemistry: A Texture of the content of the content of terms involved.	els - coal and - refining of pel - LPG component system - constant - constant - constant - constant - cook for Engin	its varieties etroleum - kr tem - water s truction of ph lodide-Water	- pronockin	m – pdiagr	oolyram b	ignition ignition norphis y therr	et calorification engine sm – expendant analyst and incompon ,Spring	c value: cance - cance
metallurgical cokenumber, compres Unit – V Introduction - stat determination of t component systemelting point. TEXT BOOK: 1. Roussak 2013, for Palanisar	-Flue gas analysis by Orsat's method- solid fuel - e - Otto-Hoffman byproduct method - liquid fuel - sion ignition engine - cetane number - gaseous fuel PHASE RULE ement and explanation of terms involved - one corransition point - sulphur system - condensed phasem - simple eutectic system - Silver-Lead system O.V. Gesser, H. D. " Applied Chemistry: A Textit	els - coal and - refining of poel - LPG. component system - constant - constant - constant - constant - cook for Engine	its varieties etroleum - kr tem - water s truction of ph lodide-Water	- pronockin	m – pdiagr	oolyram b	ignition ignition norphis y therr	et calorification engine sm – expendant analyst and incompon ,Spring	c value cance - octan g erimenta sis – two pngruer
metallurgical cokenumber, compress Unit – V Introduction - stat determination of t component systemelting point. TEXT BOOK: 1. Roussak 2013, for Palanisar	PHASE RULE ement and explanation of terms involved – one corransition point – sulphur system – Silver-Lead system n — Simple eutectic system – Silver-Lead system O.V. Gesser, H. D. " Applied Chemistry: A Texture of the corransition point in the corrange of the	els - coal and - refining of poel - LPG. component system - constant - constant - constant - constant - cook for Engine	its varieties etroleum - kr tem - water s truction of ph lodide-Water	- pronockin	m – pdiagr	oolyram b	ignition ignition norphis y therr	et calorification engine sm – expendant analyst and incompon ,Spring	c value: cance - cance
metallurgical cokenumber, compress Unit – V Introduction - state determination of technical component system melting point. TEXT BOOK: 1. Roussak 2013, for Palanisar Edition, P REFERENCES:	PHASE RULE ement and explanation of terms involved – one corransition point – sulphur system – Silver-Lead system n — Simple eutectic system – Silver-Lead system O.V. Gesser, H. D. " Applied Chemistry: A Texture of the corransition point in the corrange of the	els - coal and refining of pel - LPG. component system - constant n-Potassium cook for Engin Rani K., Kows	its varieties etroleum - kroten - water struction of pholodide-Water shalya V.N.,	- pronockin	oximnag: s m – p didiagr em -	ate a park oolyr am b con s", 2"	ignition norphis y therr ngruen	et calorification engine sm – expendant analyst and incompon ,Spring	c value cance - octan 9 erimenta sis – tw pngruer

*includes Term Work(TW) & Online / Certification course hours

	BT Mapped (Highest Level)
analyze the water quality parameters for suitability of industrial and domestic applications.	Analysing (K4)
investigate the fundamental principles of electrochemistry and corrosion control measures to prevent corrosion.	Analysing (K4)
examine the chemistry of energy storing devices and meeting the future prospectus of energy storage.	Analysing (K4)
investigate the concepts of fuels and combustion for efficient engineering applications.	Analysing (K4)
examine and identify phase diagram for one and two component systems for various engineering applications.	Analysing (K4)
	investigate the fundamental principles of electrochemistry and corrosion control measures to prevent corrosion. examine the chemistry of energy storing devices and meeting the future prospectus of energy storage. investigate the concepts of fuels and combustion for efficient engineering applications. examine and identify phase diagram for one and two component systems for various engineering

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PS01	PSO2
CO1	3	2	2	1	-	1					29		1-1-
CO2	3	2	1	1									1: kee
CO3	3	2	1	1	П					7		1 2	7 19.
CO4	3	2	1	1			×			n		Х	
CO5	3	2	1	1									1 7

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6)	Total %
CAT1		40	50	10		* , ! ! ! ! ! ! !	100
CAT2		40	50	10		- + =	100
CAT3		40	50	10	,		100
ESE		40	50	10	- 2		100

* ±3% may be varied (CAT 1, 2 & 3 -- 50 marks & ESE -- 100 marks)

Signature of the Chairman

Board of Studies -

Programme & Branch	All BE/BTech Engineering & Technology branches, except CSE, IT,CSD, Al&ML, Al&DS	Sem	Category	L	т	P	SL*	Total	Credit
Prerequisites	Nil	1	ES	45	0	30	45	120	4
Preamble	The course is designed for use by free deals with the techniques needed to p solve problems and the ways the confocuses on developing programming sk	ractice of mputers	computationa can be use	I thinked to s	ing,	the a	art of u	sing con	nputers t
Unit – I	Introduction to Computer and Proble					- 1	W		9
	omputers: Types, Generations, Charact orithms - Flowcharts – Pseudo codes -								
Unit – II	Introduction to C and Control Statem		7.9 10 37 12 3	100		23.5	THE SH		9
identifiers- Basic looping stateme Unit – III	a C program – Compiling and executing data Types – Variables – constants – Ints Arrays and Functions:	nput / C	oram – C Tok Output statem	ens – ients –	Cha op	erato	er set in rs - de	n C — Ke cision ma	eywords aking an 9
	izing and accessing arrays – operations	on arr	ave - Two d	imenc	iono	larro	We one	thoir o	0.000
Functions: Intro	duction- Using functions, function declara nctions: basic data types and arrays – sto	tion and	definition - f	unctio	n ca	II – re			
Unit – IV	Strings and Pointers:		*						9
character maniparithmetic, point	ction – operations on strings : finding I oulation functions, Arrays of strings. Poi ers and 1D arrays , pointers and strings	nters: d							
Unit – V	User-defined Data Types and File Ha								9
unions - enume	ta types: Structure: Introduction – neste erated data type. File Handling: Introduct ng file position indicator : fseek(), ftell() an	ion - op	ening and cl						
LIST OF EXPE	RIMENTS / EXERCISES:								
1 Writing a	algorithms and drawing flowcharts using Finishers n structures	Raptor T	ool for proble	ms inv	olvi	ng se	quentia	ıl, Select	ion and
	ns for demonstrating the use of different ty	pes of	format Specif	iers	-				
3. Program operator	ns for demonstrating the use of different ty	pes of c	perators like	arithm	etic	, logic	al, rela	itional ar	nd ternar
4. Program	ns for demonstrating using decision maki	ing state	ments	ž.		*		и	
5. Program	ns for demonstrating using repetitive sta	tements	, e a						
6. Program	ns for demonstrating one-dimensional arra	ay		17,3				·	- <u>\</u>
7. Program	ns for demonstrating two-dimensional arra	ay			1	-		ie.	with process
8. Program	ns to demonstrate modular programming of	concepts	s using function	ons				=	
9. Program	ns to demonstrate strings (Using built-in a	nd user-	defined funct	ions)					
10. Program	is to illustrate the use of pointers	*				· ·	*		
11. Program	ns to illustrate the use of structures and ur	nions	162, 24. 51	in i		. 7			
		nions	harish w	ini,		7	8 V		

^{*}includes Term Work(TW) & Online / Certification course hours

TEXT BO	OOK:						7 10			F V			
1.	Reema TI	nareja,	"Progra	mming i	n C ", 2	nd Editio	on, Oxfo	ord Unive	ersity Pr	ess, New	Delhi, 20	18	1
REFERE	NCES/ MA	ANUAL	/ SOFT	WARE:	ette 7	into.		6 (514			1,161	47.5	4-2-1
1.	Yashavar	t Kanet	tkar, "Le	et us C",	16th Ed	dition, B	PB Pub	lications	, 2018.			te, e se	
2.	Sumitabh	a Das, '	"Compu	ter Fund	damenta	als and	C Progr	amming	", 1st Ed	dition, Mc	Graw Hill,	2018.	
3.	Balagurus	samy E.	., "Progi	amming	in ANS	SI C", 7t	h Editio	n, McGra	aw Hill E	Education	, 2017.		- I
4.	Behrouz / C", 3 rd Ed				F.Gilbe	erg, "Co	mputer	Science	A Struc	ctured Pro	grammin	g Approac	ch Using
5.	https://ww	w.cpro	grammi	ng.com/	tutorial/	c-tutoria	ıl.html	1.	17.5	1,1			34.
	E OUTCOI		urse, th	e stude	nts wil	l be abl	e to					BT Ma (Highest	
CO1	apply problem-solving techniques to express the solutions for the real world problems. (Highest Leve Applying (K3) Precision (S3)												
CO2	develop s	simple (C progra	ıms usir	ng appr	opriate l	ooping	and con	trol state	ements		Applyin Precisio	g (K3)
СОЗ	develop s	simple (C progra	ms usir	g the co	oncepts	of array	s and m	nodular į	orogramm	ning	Applyin Precisio	
CO4	apply the	concep	ots of po	inters a	nd deve	elop C p	rograms	s using s	strings a	nd pointe	rs	Applyin Precisio	
CO5	make use	e of use	r-define	d data t	ypes an	d file co	ncepts	to solve	real wo	rld proble	ms	Applyin Precision	
		2 6		M	anning	of COs	with Po	Os and	PSOs		P 20		
COs/PC	s PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1			n te a V	- 1,5%	1	1	1	5.7	
CO2	3	2	2	. 1					1	1	1		
CO3	3	2	2	1					1.	1	1		-
CO4	3	2	2	1					1	1	1		
CO5	3	2	2	1	1	. ,		, .	1	1	1		
1 – Sligh	nt, 2 – Mod	erate. 3	B – Subs	stantial.	BT- Blo	om's Ta	xonomy	·		1/4			

Signature of the Chairman
Board of Studies - CSE

CADEMIC CELL

P. Malaivam

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, !	24MET11 – E	NGINEE	RING DRAW	ING						
	(Common to Civil, Mech, MTS,	Auto, Cl	hem, ECE, E	EE, EI	E, FT	brar	iches)			
Programme & Branch	BE / BTech – Civil, Mech, MTS, Auto, Chem, ECE, EEE, EIE, FT branches	Sem.	Category	L	Т	Р	SL*	Total	Credit	
Prerequisites	Nil	1 / 2#	ES	30	15	0	45	90	3	
Preamble To impart knowledge on engineering curves, orthographic projections, sectional views, development of surfaces, isometric projections and AutoCAD through free hand sketching and drawing instruments.										
Unit – I	I Introduction to Engineering drawing and Engineering Curves 6+3									
dimensioning. P (Eccentricity met	nstruments - BIS conventions and speci rojection of pointsin different quadrants hod). Cycloidal Curves- Cycloids and Inv	. Engine	ering Curves	: Cor	ic se				ola, Hyperbola	
Unit – II	Projection of planes and Solids ygonal surface and circular lamina inclin	II	<u> </u>					1	6+3	
p)	er and cone when the axis is inclined to o									
to VP - Obtaini	Sectioning of Solids and Developments sms, pyramids, cylinder and cone in simple true shape of section. Development ders and Cones(Cutting planes inclined to	ole verticate	al position by eral Surfaces	cuttin of Si	g plan	es ir	clined			
Sectioning of pri to VP - Obtaini	sms, pyramids, cylinder and cone in simp ng true shape of section. Developmen	ole verticate	al position by eral Surfaces	cuttin of Si	g plan	es ir	clined		perpendicular	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit - IV Principles of ison	sms, pyramids, cylinder and cone in simp ng true shape of section. Development ders and Cones(Cutting planes inclined to Isometric Projection metric projection - Isometric scale - Isom	ole vertica t of Late o HP and netric pro	al position by eral Surfaces perpendicula	cuttin of Si r to VI	g plan mple only	es ir and).	clined trunca	ted Solids	perpendicular Like Prisms, 6+3	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit - IV Principles of ison	sms, pyramids, cylinder and cone in simp true shape of section. Developmenters and Cones(Cutting planes inclined to Isometric Projection Isometric projection - Isometric scale - Isometric projection of orthographic in to isometric scale.	ole vertica t of Late o HP and netric pro- views	al position by eral Surfaces perpendicula jections of sir	cuttin of Si r to VI	g plan mple only	es ir and).	clined trunca	ted Solids	perpendicular Like Prisms, 6+3	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit - IV Principles of iso and cylinders. Counit - V Conversion of is Introduction to Codrawing with din	sms, pyramids, cylinder and cone in simp ng true shape of section. Development ders and Cones(Cutting planes inclined to Isometric Projection metric projection - Isometric scale - Isom	ole vertica t of Late o HP and netric pro- views uction to ection (Fro- design a um 2 exe	al position by eral Surfaces perpendicula jections of sir o AutoCAD eehand sketcland developmercises manda	cuttin of Si r to VI mple a hing onent o	g plan mple only and tru inly). f new	es ir and). uncat	ed soli	ds like pri	perpendicular Like Prisms 6+3 sms, pyramids 6+3 /o-dimensional	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit - IV Principles of iso and cylinders. Counit - V Conversion of is Introduction to Codrawing with din	sms, pyramids, cylinder and cone in simple true shape of section. Development lers and Cones(Cutting planes inclined to Isometric Projection metric projection - Isometric scale - Isomonversion of orthographic in to isometric orthographic Projection and Introdometric projection into orthographic projection projection into orthographic projection and Introdometric projection into orthographic projection into orthographi	ole vertica t of Late o HP and netric pro- views uction to ection (Fro- design a um 2 exe	al position by eral Surfaces perpendicula jections of sir o AutoCAD eehand sketcland developmercises manda	cuttin of Si r to VI mple a hing onent o	g plan mple only and tru inly). f new	es ir and). uncat	ed soli	ds like pri	perpendicular Like Prisms 6+3 sms, pyramids 6+3 /o-dimensional	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit – IV Principles of iso and cylinders. Counit – V Conversion of is Introduction to Codrawing with din 3D models of va	sms, pyramids, cylinder and cone in simple true shape of section. Development lers and Cones(Cutting planes inclined to Isometric Projection metric projection - Isometric scale - Isomonversion of orthographic in to isometric orthographic Projection and Introdometric projection into orthographic projection projection into orthographic projection and Introdometric projection into orthographic projection into orthographi	netric proviews uction (Froduction (Froduction) udesign a um 2 exempts software	al position by eral Surfaces perpendicular jections of sire of AutoCAD eehand sketcland developmercises mandare. (Minimum	cuttin of Si r to VI mple a hing onent o eatory) 2 exe	g planmple only only. Inly). In new only only only. Introises	es ir and). uncat proc ducti	ed soli	ted Solids ds like pri Creating two Solid Model).	perpendicular Like Prisms 6+3 sms, pyramids 6+3 /o-dimensional	
Sectioning of pri to VP - Obtaini Pyramids, Cylind Unit – IV Principles of iso and cylinders. Counit – V Conversion of is Introduction to Codrawing with din 3D models of va	sms, pyramids, cylinder and cone in simple true shape of section. Development ders and Cones(Cutting planes inclined to a lisometric Projection metric projection - Isometric scale - Isomonversion of orthographic in to isometric orthographic Projection and Introdometric projection into orthographic projection projection and introdometric projection into orthographic projection using suitable software (Minimurious components using suitable modelling	netric proviews uction (Froduction (Froduction) udesign a um 2 exempts software	al position by eral Surfaces perpendicular jections of sire of AutoCAD eehand sketcland developmercises mandare. (Minimum	cuttin of Si r to VI mple a hing onent o eatory) 2 exe	g planmple only only. Inly). In new only only only. Introises	es ir and). uncat proc ducti	ed soli	ted Solids ds like pri Creating two Solid Model).	perpendicular Like Prisms 6+3 sms, pyramids 6+3 /o-dimensional	

*includes Term Work(TW) & Online / Certification course hours

#sem1: Cvil, Mech, MTS, Auto, Chem branches & sem 2: ECE, EEE, EIE, FT branches

	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	interpret international standards of drawings and sketch the engineering curves	Applying (K3)
CO2	draw the projection of planes and solids	Applying (K3)
CO3	draw sectioning and developing of 3D primitive objects like prisms, pyramids, cylinders, cones	Applying (K3)
CO4	sketch the isometric projections of simple and truncated solids and convert orthographic projection in to isometric drawing	Applying (K3)
CO5	obtain multi view projections and solid models of objects using CAD tools	Applying (K3)

Mapping	of	COs	with	POs	and	DSOc
Mapping	OI	CUS	with	PUS	anu	POUS

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1		,	2		-			3			
CO2	3	1	1	(8	2	_				3	4 mg -		
CO3	3	1	1		2		9(3			
CO4	3	1	1		2					3	<i>z</i> .		
CO5	3	1	1		2		ps.			3			

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMEN	T PATTI	FRN - TI	HEORY
AGGLGGIVILIN	IFALL	-1/14 - 11	ILUKI

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		-	100	- L	-	-	100
CAT2	-	-	100	-	/ -	. Class a	100
CAT3			100	-	-		100
ESE	-	-	100	-	-	P	100

* $\pm 3\%$ may be varied (CAT 1, 2 & 3 – 50 marks & ESE – 100 marks)

Signature of the Chairman



		- HERITAGE OF						11k (1p!	
	(Common to All Eng	gineering and Tec	hnology Brar	nches)		y == 1		1 - 2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
Programme & Branch	All B.E/B.Tech Branches	Sem. Category L T P SL* To		Total	Credit				
Prerequisites	NIL	1	HS	15	0	0	15	30	
Preamble	The objective of this course is to impararts, heroic games, doctrines, contribu	rt knowledge abo	ut Tamil lang	uage,	liter	ature	, painting	gs, sculptu	ires, folk
UNIT I	Language and Literature	7							3
sangam literatu buddhism & jai	lies in india - dravidian languages – tami ure – distributive justice in sangam litera nism in tamil land - bakthi literature azh nil - contribution of bharathiyar and bhara	ature - managem wars and nayanr	ent principles	s in th	niruk	ural -	tamil ep	oics and in	mpact o
UNIT II	Heritage - Rock Art Paintings to Mo	dern Art – Sculp	ture					: e04	3
sculptures, villa	modern sculpture - bronze icons - tribes age deities, thiruvalluvar statue at kany aswaram - role of temples in social and e	akumari, making	of musical i	temp nstru	le ca	ar ma s - n	king nridhang	massive to am, parai	erracotta , veenai
UNIT III	Folk and Martial Arts	* ·	- 3 -					-	3
	karagattam - villu pattu - kaniyan kooth	ari e de la compania		- ,					
sports and gam	Thinai Concept of Tamils	n = 1 1	124 TS 1	5.95				1 75 69	3
UNIT IV Flora and faun education and	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cit	ot from tholkappiy ties and ports of	/am and san sangam age	gam l	litera	iture and ir	- aram c	concept of	tamils ·
unit iv Flora and faun	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cit	ties and ports of	sangam age	- exp	ort a	iture and ir	- aram c	concept of ring sanga	tamils -
UNIT IV Flora and faun education and overseas conquents UNIT V Contribution of	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cituest of cholas.	tional Movement	t and Indian e of tamils o	- exp	ire	and in	arts of in	concept of ring sanga andia – sel	tamils am age
UNIT IV Flora and faun education and overseas conquent V Contribution of movement - ro	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cituest of cholas. Contribution of Tamils to Indian Natatamils to indian freedom struggle - the	tional Movement	t and Indian e of tamils o	- exp	ire	and in	arts of in	concept of ring sanga andia – sel	tamils am age
UNIT IV Flora and faund education and overseas conquitation of movement - robooks. TEXT BOOK:	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cituest of cholas. Contribution of Tamils to Indian Natatamils to indian freedom struggle - the	tional Movement cultural influence stems of medicin	sangam age t and Indian e of tamils of the — inscription	- exp Cultu ver th	ire ne ot ma	her p	arts of in	concept of ring sanga ndia – sel int history	tamils am age am age affective for tamils
WNIT IV Flora and faund education and overseas conquitaries UNIT V Contribution of movement - robooks. TEXT BOOK: 1. S.Mu	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cituest of cholas. Contribution of Tamils to Indian Nata tamils to indian freedom struggle - the le of siddha medicine in indigenous systemathuramalingam, M.Saravanakumar, Heritatan description of Tamils to Indian Nata tamils to indian freedom struggle - the le of siddha medicine in indigenous systemathuramalingam, M.Saravanakumar, Heritatan description of Tamils to Indian Nata tamils	tional Movement cultural influence stems of medicin	sangam age t and Indian e of tamils of the — inscription	- exp Cultu ver th	ire ne ot ma	her p	arts of in	concept of ring sanga ndia – sel int history	tamils am age am age affective for tamils
WNIT IV Flora and faund education and overseas conquitation of movement - robooks. TEXT BOOK: 1. S.Mu REFERENCES	Thinai Concept of Tamils a of tamils & aham and puram concep literacy during sangam age - ancient cituest of cholas. Contribution of Tamils to Indian Nata tamils to indian freedom struggle - the le of siddha medicine in indigenous systemathuramalingam, M.Saravanakumar, Heritatan description of Tamils to Indian Nata tamils to indian freedom struggle - the le of siddha medicine in indigenous systemathuramalingam, M.Saravanakumar, Heritatan description of Tamils to Indian Nata tamils	tional Movement cultural influence stems of medicin	t and Indian e of tamils one — inscription	Cultuver thons &	re ot ma	her p nuscr	arts of in ipts – pr	concept of ring sangarandia – sel rint history	f tamils am age of a frespect of tamil
Sports and game UNIT IV Flora and faund education and overseas conquitaries of the contribution of the co	Thinai Concept of Tamils a of tamils & aham and puram concept literacy during sangam age - ancient cituest of cholas. Contribution of Tamils to Indian National States of Stat	tional Movement cultural influence stems of medicin itage of Tamils, Y	t and Indian e of tamils one — inscription es Dee Publi	Culturer thous &	Pvt	her p nuscr	arts of in ipts – pr	concept of ring sanga andia – sel int history Units I,II,I	f tamils am age 3 f-respect of tami

^{*}includes Term Work(TW) & Online / Certification course hours

COUR	SE OUTCOMES:	BT Mapped
படிப்	பை முடித்தவுடன், மாணவர்கள்	(Highest Level)
CO1	explain valuable concepts in language and literature of tamils.	Understanding (K2)
CO2	illustrate about the tamils sculpture and their paintings.	Understanding (K2)
CO3	summarize about the tamils folk and martial arts.	Understanding (K2)
CO4	explain the thinai concept of tamils.	Understanding (K2)
CO5	explain the contribution of Tamils to the Indian National Movement and Indian culture.	Understanding (K2)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	s. Fr		No.			2	3	2	2	y	3		
CO2	- 1 - 4					2	3	2	2		3		1 11
CO3						2	3	2	2		3		× ,
CO4						2 .	3	2	2		3		
CO5				2- T- F		2	3	2	2		3		- n - 1

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6)	Total
CAT1	40	60	= = /	44.	v = e, = _ ==	-	100
CAT2	40	60	н — а				100
CAT3	40	60					100
ESE			1 .	NA	. ,	· · · · · · · · · · · · · · · · · · ·	

* $\pm 3\%$ may be varied (CAT 1, 2 & 3 – 50 marks)

Signature of the Chairman



	24TAM01-தமிழ	ுர் மரபு			1			my W	
	(Common to All Engineering and	d Technol	ogy Branches)		-			3 1
Programme & Branch	All B.E/B.Tech Branches	Sem.	Category	L	T	Р	SL*	Total	Credit
Prerequisites	NIL	1	нѕ	15	0	0	15	30	1
Preamble	தமிழர்களின் மொழி, இலக்கியம், ஓவியங் விளையாட்டுக்கள், திணைக் கோட்பாடுகள், ழ பற்றிய அறிவை வழங்குவதே இந்த பாடத்தில்	இந்திய	பண்பாட்டிற			_		கலைகள பங்கள்	
<mark>அ</mark> லகு <i>-</i> ।	மொழி மற்றும் இலக்கியம்								3 2111
இலக்கியத்தி கருத்துக்கள் ஆழ்வார்கள் இலக்கிய வ	ழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ன் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமண மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் ளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகி	த்தில் ப பௌத்த - தமிழீ யோரின்	கிர்தல் அற சமயங்கவ இல் நவீன பங்களிப்பு)ம் - ளின் இல	திரு தாச் க்கிய	க்குர கம் பத்தி	றளில் - பச்	மேலான தி இல ளர்ச்சி -	ன்மைச் க்கியம் தமிழ்
அலகு - ॥	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவி ல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலை								3
குமரிமுனை தமிழர்களின் அலகு - III தெருக்கூத்து	பொருட்கள், பொம்மைகள் - தேர் செய்யும் கணையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் சமூக பொருளாதார வாழ்வில் கோவில்களின் நாட்டுப்புறக் கலைகள் மற்றும் வீர் விளையார், கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து	ா - மிரு பங்கு. ட்டுக்கள்	நதங்கம், ப ர	றை,	ഖ്ങ	ळ ा,	யாழ்,	நாதஸ்	வரம் 3
	ாட்டம், தமிழர்களின் விளையாட்டுகள்.			in the					
அலகு - IV	தமிழர்களின் திணைக் கோட்பாடுகள்			Fig. 3	-119				3
கோட்பாடுகள் சங்ககால ந	தாவரங்களும், விலங்குகளும் - தொல்காப்பிய ர் - தமிழர்கள் போற்றிய அறக்கோட்பாடு- சங் கரங்களும் துறை முகங்களும் - சங்ககாலத் சாழர்களின் வெற்றி. இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண் தெலைப்போரில் தமிழர்களின் பங்கு - இந்திய	கக்கால் ந்தில் ஏ ரபாட்டி <u>ர</u> ்	த்தில் தமிழ ரற்றுமதி ம ற குத் தமி ழ	ழகத்தி மற்றுட மர்களி	நில் ம் இ ன் ப	எழு இறக் பங்க	த்தறில குமதி ளிப்பு	பும் கல் - கட	வியும் லகடந்த
இந்திய விடு	த இயுக்கும் இக்கிய முகக்குமுக்கில்		•		_				
இந்திய விடு சுயமரியாதை	த இயக்கம் - இந்திய மருத்துவத்தில் ப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரல	சித்த	மருத்துவ		_	ாங்கு	-	கல்வெ	
இந்திய விடு சுயமரியாதை		சித்த	•		_	I ங்கு	-		
இந்திய விடு சுயமரியாதை கையெழுத்து TEXT BOOK:		சித்த பாறு.	மருத்துவத		_	Iங்கு	-		
இந்திய விடு சுயமரியாதை கையெழுத்து TEXT BOOK: 1. ஆ. பூ	பப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரல நபாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022,	சித்த பாறு.	மருத்துவத		_	ப ங்கு			
இந்திய விடு சுயமரியாதை கையெழுத்த TEXT BOOK: 1. ஆ ட REFERENCES நமிழ	பப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரல பூபாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022, ச : க வரலாறு- மக்களும் பண்பாடும்- கே கே பிள்ளை கள் கழகம்)	சித்த மாறு. அலகு 1, ர (வெளி	மருத்துவ <u>த</u>	த்தின் 	L))))	கல்வெ	ட்டுகள்
இந்திய விடு சுயமரியாதை கையெழுத்த TEXT BOOK: 1. ஆ ட REFERENCES 1. தமிழ பணி	பப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரல பாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022, : நக வரலாறு- மக்களும் பண்பாடும்- கே கே பிள்ளை கள் கழகம்) னித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிர	சித்த பாறு. அலகு I, I (வெளி! சுரம்)	மருத்துவத் II,III,IV,V. யீடு தமிழ்நா	ந்தின் ரடு பா	ட்டு	ால் ப))))	கல்வெ	ட்டுகள்
இந்திய விடு சுயமரியாதை கையெழுத்த TEXT BOOK: 1. ஆ ட REFERENCES 1. தமிழ பணி	பப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரல பூபாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022, ச : க வரலாறு- மக்களும் பண்பாடும்- கே கே பிள்ளை கள் கழகம்)	சித்த பாறு. அலகு I, I (வெளி! சுரம்)	மருத்துவத் II,III,IV,V. யீடு தமிழ்நா	ந்தின் ரடு பா	ட்டு	ால் ப))))	கல்வெ	ட்டுகள்

^{*}includes Term Work(TW) & Online / Certification course hours

SE OUTCOMES:	BT Mapped
ப முடித்தவுடன், மாணவர்கள்	(Highest Level)
தமிழ் மொழி மற்றும் இலக்கியத்தில் மதிப்புமிக்க கருத்துக்களை விளக்க முடியும்.	Understanding (K2)
தமிழர்களின் சிற்பம் மற்றும் அவர்களின் ஓவியங்கள் பற்றி விளக்க முடியும்.	Understanding (K2)
தமிழர்களின் நாட்டுப்புற மற்றும் தற்காப்புக் கலைகளைப் பற்றி சுருக்கமாகக் கூற முடியும்.	Understanding (K2)
தமிழர்களின் திணைக் கோட்பாடுகளைப் பற்றி விளக்க முடியும்.	Understanding (K2)
இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு பற்றி விளக்க முடியும்.	Understanding (K2)
	ப முடித்தவுடன், மாணவர்கள் தமிழ் மொழி மற்றும் இலக்கியத்தில் மதிப்புமிக்க கருத்துக்களை விளக்க முடியும். தமிழர்களின் சிற்பம் மற்றும் அவர்களின் ஓவியங்கள் பற்றி விளக்க முடியும். தமிழர்களின் நாட்டுப்புற மற்றும் தற்காப்புக் கலைகளைப் பற்றி சுருக்கமாகக் கூற முடியும். தமிழர்களின் திணைக் கோட்பாடுகளைப் பற்றி விளக்க முடியும். இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு பற்றி

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1			1			2	3	2	2	=	3		
CO2			18	A		2	3	2	2	2 2	3		
CO3	1 . 1 . 1					2	3	2	2		3		
CO4			_			2	3	2	2		3		
CO5						2	3	2	2		3		

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMENT	PATTERN -	THEORY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total
CAT1	40	60	1/2 35.	d x			100
CAT2	40	60			1	9	100
CAT3	40	60					100
ESE	_			NA		,	

* $\pm 3\%$ may be varied (CAT 1, 2 & 3 – 50 marks)

Signature of the Chairman
Board of Studies - S& H (Chemistry)



Progra Branc	amme & h	E	BTech - (Chemical	Enginee	ering		Sem.	Categor	y L	T	P.	SL*	Total	Credit
Prerec	quisites	1	Nil					1	BS	0	0	30	0	30	1
Pream	ble	IME	hardness imparts the and there	, alkalinity he basic eby, to im	y, chloride concepts prove the	e, DO, CC of transit	DD, iron to	develop erature, v	etermination the skills in volumetric,	handli	ng diffe	rent b	asic in	strument	s. It also
1.	Assess	ment		en water	sample fo		ability of o	drinking / i	ndustrial pu	rpose	by estir	natino	the c	arbonate,	, non-
2.							in the giv	en river/bo	ore well wa	er sam	ple.				
3.	Determ	inatio	n of chlor	ide conte	nt in the o	given wate	er sample	using Arg	entometric	metho	d.		-	_	1
4.	Perform	win	kler's met	hod for th	e determ	ination of	dissolved	d oxygen i	n the given	wastev	vater sa	ample			-
5.	Determ	inatio	n of stren	gth and a	mount of	acid in a	given sol	ution using	g pH meter.	(11)					
6.	Determ	inatio	n of stren	gth and a	mount of	mixture o	of acids pr	esent in the	ne given so	ution u	using Co	onduc	ctivity r	neter.	
7.	Determ	inatio	n of COD	in the giv	en water	sample.		X.		4					
8.	Estimat	ion o	f sulphur i	present in	the give	n fuel usir	ng electro	-analytical	techniques	 3.			,		
9.									sion rate of		acidic r	nediu	m.		
10.	Determ	inatio	n of trans	ition temp	perature o	of a hydra	ted salt.		9		7				
11.	Constru	ıction	and work	king of Zir	іс -Сорре	er Electro	chemical	Cell (Dem	onstration).			-			
12.	Report	prepa	aration -ba	ased on th	ne data re	eceived fr	om the ar	nalysed wa	ater quality	oarame	eters (D	emor	nstratio	on).	
REFE	RENCES/	_	_										nesson and a		,
1.			P.N., Man				Manjula F	Rani K., "C	hemistry La	borato	ry Man	ual",	1 st Ed	lition,	
COUR	SE OUTC			ners, Ero	uc, 2024.									BT Map	oed
On co	mpletion							llealimite	blada DO	\	00D -	. 41		lighest L	.evel)
CO1			sample.	ry, perma	inent and	i total na	raness, a	ikalinity, c	hloride, DC	and	COD 01	tne		nalyzing Precision	
CO2	estimat	e the	strength	and amou	ınt of acio	ds using p	H meter	and condu	ctivity mete	r.				Analyzing Precision	
СОЗ		analy							salt, sulphu um using F					Analyzing Precision	(K4),
			,		M	apping of	COs wit	h POs an	d PSOs						
COs/F		01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10) F	011	PSO1	PSO2
	01	2	2	3	2	-	2	1							
CO	12	2	2	3	2		2	1 1	1		1				1

*includes Term Work(TW) & Online / Certification course hours

Signature of the Chairman Board of Studies - C



									AL, IOT A				02001		
Progra Branc		. &	All BE	/BTech B				Sem.	Categor	y L	Т	Р	SL*	Total	Credit
Prerec		es	Nil				2	1/2	ES	0	0	90	0	90	3
Pream									nowledge		ineeri		th hand	505	-
LIST)F FX	PERIM		house wir		net of Th	ings and	Web Te	echnologie	S.				, si	
LIOT	<i>J</i> 1 LA	LIXIII	LINIO	LALKOR		A – Elec	trical Ins	tallatio	n (30 Hou	rs)			-		
1.	Det	erminat	tion of Ic	ad curren	its and se	elect suita	able comp	onents	for Protec	tion					(4)
2.	Dev	elop a	wiring c	ircuit for in	ncandesc	ent lamp	and fluor	escent	lamp using	Simpl	e and	Stair	case W	/iring	
3.	Dev	elop ar	nd Inves	tigate wiri	ng circuit	ts for Call	ling Bell S	System :	and Dimm	able Li	ght		4		
4.	Cre	ate wiri	ng circu	it for sing	e phase	motor	= 4	e e	- 10-10-1						
5.	Dev	elopme	ent of IC	T based	energy m	onitoring	and contr	rol		0					=
6.	Меа	asurem	ent and	analysis o	of electric	cal param	eters for l	Photovo	oltaic Sola	r Panel	X.				
	7						ernet of	Things	(30 Hour	s)					
1.	Des	sign a S	lingle la	yer PCB I	ayout des	signing		1	* 1				-		
2.	Fab	ricate S	Single la	yer PCB	printing							ji.	×	D	
3.	Ass	emblin	g, solde	ring and c	lesolderii	ng practio	e on sing	le layer	PCB					- 200	
4.	Ser	sor an	d actuat	or interfac	ing with	internet e	nabled m	icrocon	troller						
5.	Ser	nsor an	d actuat	or calibrat	tion										,
6.	Inte	gration	of micr	ocontrolle	r based s	system wi	th Cloud	platforn	n						
	Т				PAR	TC-We	b Techn	ologies	s (30 Hour	s)					*
1.	Des	sign a s	imple w	eb page ι	sing bas	ic HTML	tags and (CSS pro	perties				*		
2.	Des	sign a re	esponsiv	e webpag	e using E	Bootstrap	framewor	rk 		α <					
3.	Des	sign a v	vebpage	e for signu	p and log	gin valida	tion form	using J	avascript a	and PH	Р	-		· · · · · ·	
4.						PHP, M	ySQL and	d host th	ne website	in the	serve	ſ .			***
REFE	RENC	ES/ M	ANUAL	/SOFTW	ARE:										
1.			Manua												
2.		CI.Free Reilly, 2		isabeth R	obson, "I	Head Firs	t JavaScr	ipt Prog	gramming	A Brair	n-Frier	idly G	Buide",	1st Editio	n,
3.	Eric	T.Free	eman,El	isabeth R	obson, "I	Head Firs	t HTML a	ind CSS	6",2nd Edi	ion, O'	Reilly	, 201	2	(4)	, ,
4.	Lyn	ın Beigl	nley,"He	ead First S	QL",1st	Edition, C	Reilly,20	007.							
		UTCO		urse, the	studente	، مطالف	abla ta					2	Ι,	BT Map Highest I	
CO1	1			viring circ				heir rec	uirement					Applying	(K3)
		-												Precision Applying	
CO2	-			d solution:		1		e cases	.	-	<u> </u>			Precision Applying	(S3)
CO3	Des	sign an	a nost a	n interact				h DO-	and Doc					Precision	
COs/F		P01	PO2	PO3	PO4	PO5	PO6	PO7	PO PO	PO9	PO	10	PO11	PSO1	PSO
/PSC	-	3	3	3	2	3		1	3	2	2		2	1.001	1 302
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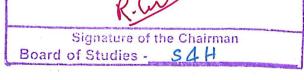


		· · ·		24	4MNT12	- QUAI	NTITATIV	VE AP	TITUDE - I			2	17		
			(C	ommo	n to all E	nginee	ring and	Tech	nology bra	ınche	s)				· · · · · · · · · · · · · · · · · · ·
Program Branch	nme &	All B.	E/B.Tec	h Bran	ches	¥	Se	em.	Category	L	Т	Р	SL*	Total	Credit
Prerequ	isites	Basic	Mather	natical	skills			1	МС	20	0	0	10	30	0
Preamb	le				lving skil		nhance a	analyti	cal skills.			-		-	
Unit – I	, avatama				Equation		divioibilit	, BO	DMAC Dl	- 11	`F.		20.4	.	6
-Simplif	ication – F	Problem	ıs.						DMAS Rul						
									linear equa	ations	with	ı two ı	/ariabl	les – Ap	plications
Unit - II	aneous li				nd Perce		simple pr	robiem	S.				-		6
Ratio ar	nd Propo	rtion: T	hird, Fo	ourth an	d mean p	proportio			son of ratio			ound	ratio -	Duplica	
									Simple pro						
Unit - II				ss, Inte		ercentag	jes – Pro	biems	on populat	ion –	Pro	biems	on de	preciation	on. 8
Profit ar	nd Loss:	Basic c	oncepts	- Cost	price – S	Selling p	orice – Pr	ofit an	d Loss – S	imple	pro	blems			-
Simple a	and Comp	pound i	interes	t: Conc	epts – Pe	ercentag	e of inter	est – D	Difference b	etwe	en s	imple	intere	st and c	ompound
	- Simple p	orobiem	S.	_						-					1
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1.	limited, 2		Quani	itative /	Aptitude 1	or Com	ipetitive i	=xamır	nations", Re	evised	1 Ec	lition,	S.Cha	ind and	company
REFERE	ENCES/ N	/IANUA	L/SOF	TWAR	E:				-						
1.	Abhijit G 2020.	uha,"Qu	ıantitati	ve Apti	tude for	Compet	titive Exa	aminati	on", 7 th Ed	dition,	Мс	Graw	Hill E	Education	on, India,
2.	https://wv	ww.india	abix.cor	n/aptitu	de/quest	ions-and	d-answer	<u>s</u>							***************************************
3.	https://w	ww.gee	ksforge	eks.org	/aptitude-	-questio	ns-and-a	answer	<u>'S</u>						
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CO1					two varia		ile to	17.						lighest	
		1.0												Applying	<u> </u>
CO2					centage									Applying	(K3)
CO3	Solve pr	ofit and	loss, s	imple in	iterest an	nd comp	ound inte	erest p	roblems.				,	Applying	(K3)
	. "				Mappin	g of CC)s with F	Os ar	nd PSOs	·					
COs/PO	s PO1	PO2	PO3	PO4	PO5	PO6	PO7	POS	PO9	PO	10	PO1	1 P	SO1	PSO2
CO1	2	2													
CO2	2	2											7		
CO3	3	3				6			1						
1 – Sligh	nt, 2 – Mo	derate,	3 – Sul	bstantia	l, BT- Blo	oom's T	axonomy	/	11					***	-
	ų,	-0			ASSES	SMENT	PATTE	RN - T	HEORY						(6)
	Bloom's gory*		nember (K1) %		Underst		Apply (K3)		Analyzing (K4) %		alu (K5	ating		eating (6) %	Total %
	.Τ1				30		70				, , ,		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-, ,,	100
CA	T2		0 _		30)	70		tionidade en actividade en actividade						100
CA	T3				30)	70		\ \				1		100
		1													



 * ±3% may be varied (CAT 1, 2 & 3 – 50 marks & ESE – 100 marks) *includes Term Work (TW) & Online / Certification course hours







	(Common to all E	ingineering and	Technology by	ranches	s)		1 3		
Programme & Branch	All B.E/B.Tech Branches	Sem	Category	L	T	Р	SL*	Total	Credit
Prerequisites	Nil	2	HS	45	0	0	45	90	3
Preamble	This course aims at up skilling students in practicing the langua and academic contexts.	ge skills to acc	quire verbal an	id com	munic	write a	as well proficie	as to fac ncy in pro	ilitate the ofessiona
sUnit – I	Grammar, Verbal Aptitude, List	ening, Speakir	ng. Reading &	Writin	a				9
to a Match Comm Etiquette – Readi <i>Atomic Habit</i> s Wr i	, Compound, and Complex Senten entary and Filling in a Table – List ng: Scanning a Text, Power Point ting: Business Letters: Enquiry and	ening to TED ta Presentations Complaint	alks - Speakin – The Best V	g: Apol Vay to	logizir Start	na – T	alking a	about Mar : An Exc	nners and erpt from
Unit – II	Grammar, Verbal Aptitude, List and Indirect Speech – Verbal Apti	ening, Speakir	ig, Reading &	Writin	g				9
Choices and Profe	ng Information – Career Related ssional Skills – Reading: Reading An Excerpt from <i>Atomic Habits</i> - Wr	for Local and G iting: Job Appl	Blobal Compret lication: Cover	nension	1 – Ho	w to I	Find and	Fix the	auses o
W1116 111	Grammar Verbal Antitude Liet	ening Speaking	na Readina 9	Mritim	~	toour	16 – Sil		
	Grammar, Verbal Aptitude, List	ening, Speakir	ng, Reading &	Writin	q				9
Grammar: Active	and Passive Voice - Verbal Aptitu	de: Error Spotti	ng, Reading & ng – Sentence	Writin	g /emer	nt – A	obreviat	ions and A	9 Acronyms
Grammar: Active - Listening: Liste	and Passive Voice – Verbal Aptitu ning to Podcast Interviews and Nev	de: Error Spotti	ng, Reading & ng – Sentence Speeches – Sr	Writin Improv	g /emer a: Pre	nt – Al	obreviat	ions and A	9 Acronyms
Grammar: Active - Listening: Liste Opinions about P	and Passive Voice – Verbal Aptitu ning to Podcast Interviews and Nev odcast – Reading: Reading a Pr	de: Error Spotti vs/Motivational ocedure – Cro	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co	Writin Improv peaking	g /emer g: Pre icatio	nt – Al esentii n - H	obreviating a Poi	ions and A	9 Acronyms / – Giving
Grammar: Active – Listening: Liste Opinions about P Inevitable and Bac	and Passive Voice – Verbal Aptitu ning to Podcast Interviews and Nev	de: Error Spotti vs/Motivational ocedure – Cro	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co	Writin Improv peaking	g /emer g: Pre icatio	nt – Al esentii n - H	obreviating a Poi	ions and A	9 Acronyms / – Giving
Grammar: Active – Listening: Liste Opinions about P Inevitable and Bac based Essays	and Passive Voice – Verbal Aptitu ning to Podcast Interviews and Nev odcast – Reading: Reading a Pr I Habits Impossible: An Excerpt fro	de: Error Spotti vs/Motivational ocedure – Cro m <i>Atomic Habit</i> :	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T	Writin Improverse Deaking Ommun Types o	g /emer g: Pre icatio f Essa	nt – Al esentii n - H	obreviating a Poi	ions and Ant of View Make Goo	9 Acronyms / – Giving od Habits d Opinior
Grammar: Active – Listening: Liste Opinions about P Inevitable and Bac based Essays Unit – IV	and Passive Voice – Verbal Aptituning to Podcast Interviews and Newodcast – Reading: Reading a Pril Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List	de: Error Spotti vs/Motivational ocedure – Cro m Atomic Habiti ening, Speakir	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T	Writin Improved the community of the com	g /emer g: Pre icatio f Essa	nt – Al esentii n - H ays: 7	obreviating a Poi ow to I Argumei	ions and Ant of View Make Goo ntative and	9 Acronyms / – Giving od Habits d Opinior
Grammar: Active - Listening: Liste Opinions about P Inevitable and Bace based Essays Unit – IV Grammar: If/Conc	and Passive Voice – Verbal Aptituning to Podcast Interviews and Newodcast – Reading: Reading a Pril Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List litional Clause – Modals Verbs – Co	de: Error Spotti vs/Motivational ocedure — Cro m Atomic Habits ening, Speakir onversational D	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T ng, Reading & evices - Verba	Writin Improved the community of the com	g /emer g: Pre icatio f Essa g ude:	nt – Alesentii n - H ays: /	obreviating a Poi ow to I Argumei	ions and Ant of View Make Goontative and	9 Acronyma
Grammar: Active - Listening: Liste Opinions about P Inevitable and Bac based Essays Unit – IV Grammar: If/Conc Selection – Listen	and Passive Voice – Verbal Aptituning to Podcast Interviews and Newodcast – Reading: Reading a Pril Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List litional Clause – Modals Verbs – Coing: Listening and Filling a Mind Mind Mind Mind Mind Mind Mind Mind	de: Error Spotti vs/Motivational ocedure — Cro m Atomic Habits ening, Speakir onversational D ap — Listening to	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T ng, Reading & evices - Verba o Interviews, C	Writin Improve the seaking of the se	g /emer g: Pre icatio f Essa g ude:	nt – Alesentii n - Hays: /	obreviating a Poi ow to I Argumen nce Cor	ions and Ant of View Make Goontative and	9 Acronym: / – Giving d Habit: d Opinion 9 Sentence
Grammar: Active - Listening: Liste Opinions about P Inevitable and Bac based Essays Unit - IV Grammar: If/Conc Selection - Listen Suggestions - Inte	and Passive Voice – Verbal Aptituning to Podcast Interviews and New odcast – Reading: Reading a Professional Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List litional Clause – Modals Verbs – Coling: Listening and Filling a Mind Merviewing Classmates - Reading: F	de: Error Spotti vs/Motivational ocedure — Cro m Atomic Habits ening, Speakir onversational D ap — Listening to Reading for Info	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T ng, Reading & evices - Verba o Interviews, Co mation, Rese	Writin Improve the community of the comm	yemer g: Pre- icatio f Essa g ude: y talks	nt – Alesentii n - Hays: /	obreviating a Poi ow to I Argument nce Coreaking:	ions and Ant of View Make Goontative and	9 Acronyms 7 – Giving 8 d Habits 9 Sentence dvice and
Grammar: Active - Listening: Liste Opinions about P Inevitable and Bac based Essays Unit – IV Grammar: If/Conc Selection – Listen Suggestions – Inte Communication: M	and Passive Voice – Verbal Aptituning to Podcast Interviews and New odcast – Reading: Reading a Professional Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List litional Clause – Modals Verbs – Coling: Listening and Filling a Mind Merviewing Classmates - Reading: Flodes of Technology-based Committed	de: Error Spotti s/Motivational ocedure — Cro m Atomic Habits ening, Speakir onversational D ap — Listening to Reading for Info unication — Ho	ng, Reading & ng – Sentence Speeches – Sp ss Cultural Co s – Writing: T ng, Reading & evices - Verba o Interviews, Co mation, Rese w to Stick with	Writin Improve oeaking ommun ypes o Writin Il Aptit elebrity arching	yemer g: Pre- icatio f Essa g ude: (talks) for S	nt – Alesentiin – Hays: /	obreviating a Poi ow to I Argumen nce Cor eaking: rting Every Day	ions and Ant of View Make Goontative and	9 Acronyms 7 – Giving 8 d Habits 9 Sentence dvice and
Grammar: Active - Listening: Liste Opinions about P Inevitable and Bac based Essays Unit - IV Grammar: If/Conc Selection - Listen Suggestions - Inte Communication: M Atomic Habits Wri Unit - V	and Passive Voice – Verbal Aptituring to Podcast Interviews and New odcast – Reading: Reading a Professional Habits Impossible: An Excerpt from Grammar, Verbal Aptitude, List litional Clause – Modals Verbs – Coing: Listening and Filling a Mind Merviewing Classmates - Reading: Flodes of Technology-based Committing: Dialogue Writing – Writing Reformmar, Verbal Aptitude, List	de: Error Spotti s/Motivational ocedure — Cro m Atomic Habits ening, Speakir onversational D ap — Listening to Reading for Info unication — Ho views: Product a ening, Speakir	ng, Reading & ng – Sentence Speeches – Speeches – Speeches – Writing: Tag, Reading & evices - Verbaco Interviews, Commation, Resew to Stick with and Documenting, Reading & Read	Writin Improved the control of the c	g /emer g: Pre icatio f Essa g ude: / talks / for S Habi /s/We	nt – Alesentiin – Hays: A	obreviating a Poi ow to I Argumen nce Cor eaking: rting Every Day es	ions and Ant of View Make Goontative and Trection — Giving Addrice — An Exc	9 Acronyms 7 – Giving 8 d Opinior 9 Sentence dvice and Technica erpt from
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^{*} includes Term Work (TW) & Assignments, Tutorials and Case Studies

2020 20 0 0 0 0 0	SE OUTCOMES: npletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	construct contextual and functional grammar to enhance the linguistic competence	Applying (K3)
CO2	listen, comprehend and infer implied meanings of the given text	Applying (K3)
CO3	speak clearly to develop competence to participate in oral discourses such as discussions / meetings / interviews and deliver presentations	Creating (K6)
CO4	critically read various texts by understanding contextual meanings and respond appropriately	Understanding (K2)
CO5	Analyze different genres of writing and making precise non-technical and technical documents	Analyzing (K4)
, VI (-	Mapping of COs with POs and PSOs	

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PSO2
CO1	a a mystic	ent.			system in	1 1	ومستهاج	1	3	1	1		
CO2	ie i							2	3	-3,	1		E .
CO3					1 42 -		1 7	2	3	1	2	i in lega	
CO4						1		. 4.7	3	1	2		er f
CO5	,=								3		2		- 11

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understand ing (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	30	70		The State of the S	<u> </u>	100
CAT2		30	35		67 July 1197 4	35	100
CAT3		20	45	35	15 15 15 15 15 15 15 15 15 15 15 15 15 1		100
ESE	-	20	55	10		15	100

* $\pm 3\%$ may be varied (CAT 1, 2& 3 – 50 marks & ESE – 100 marks)

Door.

Signature of the Chairman Board of Studies - SaH (English) J. Region



	(Common to AUTO a		RTIAL DIFFI						
Programme & Branch	B.E - Automobile Engineering & B.Tech – Chemical Engineering	Sem.	Category	L	Т	Р	SL*	Total	Credit
Prerequisites	Nil	2	BS	45	7	16	52	120	4
17 14 14 17 17									
Preamble	To impart the knowledge of partial de students and solving the partial difference							r calculu	is to the
Unit – I	Functions of Several Variables:	dharebn l	nahtan norra	الإناس	4.0	Ša ot	845	d.hali	9
	o or more variables – Partial derivative xima and minima – Lagrange's multiplie			Appl	licat	ions:	Maxim	a and n	ninima -
Unit – II	Multiple Integrals:	ar a Carl India la .							9
	on in cartesian coordinates – Change o ion in cartesian coordinates – Volume a			Applio	catio	on: Ar	ea betv	ween two	o curve
Unit – III	Vector Calculus:	V-12 1.	Track and the	0.50					9
Directional deriv	vative – Gradient of a scalar point funct	ion – Dive	rgence of a v	ector	poi	nt fun	ction -	Curl of	a vecto
	d Irrotational vectors – Vector Integrati						s diver	gence th	neorem
	 Verification of the above theorems and Partial Differential Equations: 	evaluatio	n of integrals	using	j tne	em.			
Unit – IV Introduction – F	ormation of partial differential equation	s by elimin	nation of arbi	rany	nnn	stante	and a	rhitran, f	9 unction
 Lagrange's li 	near equation – Solution of homogene	ous linear	partial diffe	rential	l en	uatio	and al	igher or	der wit
constant coeffic	ients.	out intour	partial airo	Ontid		uutioi	15 01 1	ilgilici Oi	der wit
Unit – V	Applications of Partial Differential I	Equations	:						9
Classification of	f second order quasi linear partial d	ifferential	equations -	Solut	tion	s of	one di	mension	al wav
	e dimensional heat equation (zero b		conditions of	nly) -	- S	teady	state	solution	of tw
dimensional he				-					
	at equation (excluding insulated & infinit	e edges).						2000	ns h
Y		e edges).							ora A
LIST OF EXPE	RIMENTS / EXERCISES:	e edges).						- 17	
LIST OF EXPE		e edges).							
1. Finding 2. Comput	RIMENTS / EXERCISES: ordinary and partial derivatives. ing extreme values of function of two va						*	133	
1. Finding 2. Comput	RIMENTS / EXERCISES: ordinary and partial derivatives.								
1. Finding 2. Comput 3. Evaluat	RIMENTS / EXERCISES: ordinary and partial derivatives. ing extreme values of function of two va							132	
LIST OF EXPE 1. Finding 2. Comput 3. Evaluat 4. Finding	RIMENTS / EXERCISES: ordinary and partial derivatives. ing extreme values of function of two values double and triple integrals.	ariables.	S.	day to				133	
1. Finding 2. Comput 3. Evaluat 4. Finding 5. Comput 6. Solving	RIMENTS / EXERCISES: ordinary and partial derivatives. ing extreme values of function of two values double and triple integrals. the area between two curves. ing gradient, divergence and curl of poisecond order partial differential equations.	ariables. nt function	S.					133	
LIST OF EXPE 1. Finding 2. Comput 3. Evaluat 4. Finding 5. Comput 6. Solving 7. Solving	ordinary and partial derivatives. ing extreme values of function of two values double and triple integrals. the area between two curves. ing gradient, divergence and curl of poisecond order partial differential equation.	ariables. nt function	S.						No.
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*includes Term Work (TW) & Online / Certification course hours

	SE OUTCOMES: npletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	Compute the total derivatives and extreme values of multivariable functions.	Applying (K3) Manipulation (S2)
CO2	Apply multiple integrals to compute the area and volume of the regions.	Applying (K3) Manipulation (S2)
CO3	Apply the concepts of derivatives and line integrals of point functions in engineering problems.	Applying (K3) Manipulation (S2)
CO4	Formulate and solve higher order partial differential equations.	Understanding (K2) Manipulation (S2)
CO5	Solve boundary value problems involving partial differential equations.	Applying (K3) Manipulation (S2)

				Ma	apping	of COs	with P	Os and P	SOs	1	mar ter Se	The state of	
COs/POs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2		3					- P			
CO2	3	3	2	e për	3	thin		11 -11 -121		D.			
CO3	3	3	1		3	70, 10	Pr 5						±,
CO4	3	2	1	-	3		· 30 -		7			7	NIL .
CO5	3	3	3		3			100					

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

		ASSESSMENT	PATTERN -	THEORY			
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		40	60		¥		100
CAT2		40	60				100
CAT3		50	50	unit più il ser	3 76 ,79	Late V	100
ESE		30	70	Y LANGE	E 4 % 2 2 2 7		100
	Category* CAT1 CAT2 CAT3	Category* (K1) % CAT1 CAT2 CAT3	Test / Bloom's Category* Remembering (K1) % Understanding (K2) % CAT1 40 CAT2 40 CAT3 50	Test / Bloom's Category* Remembering (K1) % Understanding (K2) % Applying (K3) % CAT1 40 60 CAT2 40 60 CAT3 50 50	Test / Bloom's Category* Remembering (K1) % Understanding (K2) % Applying (K3) % Analyzing (K4) % CAT1 40 60 60 CAT2 40 60 60 CAT3 50 50 50	Category* (K1) % (K2) % (K3) % (K4) % (K5) % CAT1 40 60	Test / Bloom's Category* Remembering (K1) % Understanding (K2) % Applying (K3) % Analyzing (K4) % Evaluating (K5) % Creating (K6) % CAT1 40 60

* ±3% may be varied (CAT 1, 2 & 3 – 50 marks & ESE – 100 marks)

Signature of the Chairman

Board of Studies - 5 & H Maths



Prerequisites Nil 2 BS 45 0 0 45 90 3 Preamble This course aims to impart the knowledge on crystal physics, quantum physics, ultrasonics, nano material and select materials characterization techniques. It also describes the applications of aforementioned topics chemical engineering. Unit - I Crystal Physics: 9 Classification of solids - Space lattice - Unit cell - Crystal structure - Bravais lattice - Single and polycrystalline materials - Lattic planes - Miller indices - Interplanar spacing in cubic crystal - Number of atoms per unit cell - Atomic radius - Coordinatic number - Atomic packing factor - Body centered cubic - Face centered cubic - Hexagonal close packed crystal structure - Cryst imperfections: line, surface and volume imperfections. Unit - II Quantum Physics and Applications: 9 Blackbody radiation - Planck's theory - Compton scattering - Matter waves - Properties - Heisenberg uncertainty principle Schrodinger's time-independent and time-dependent wave equations - Physical significance of wave function - Particle in a on dimensional box. Unit - III Ultrasonics: 9 Properties of ultrasonic waves - Generation of ultrasonic waves - Magnetostrictive generator - Piezoelectric generator Determination of velocity of ultrasonics in a liquid - Acoustic grating - Non-destructive testing - Flaw detection - Applications ultrasonic technology in chemical industries (qualitative) - Ultrasonic degradation of wastewater. Unit - IV Nanomaterials: 9 Nano scale - Surface-to-volume ratio - Quantum confinement - Nano structures: Quantum well, Quantum wire and Quantum deposition - Chemical vapour deposition - Sol-gel method - Applications. Unit - V Materials Characterization: 9 Importance of materials characterization - X-ray diffraction (powder method) - Scanning electron microscope - Transmissic electron microscope - UV-visible spectroscopy - Raman spectroscopy - Nuclear Magnetic Resonance - Thermo gravimetri analysis.	Programme& Branch	B.Tech - Chemical Engineering	Sem.	Category	L	T	Р	SL*	Total	Credit
and select materials characterization techniques. It also describes the applications of aforementioned topics chemical engineering. Unit - I Crystal Physics: 9 Classification of solids - Space lattice - Unit cell - Crystal structure - Bravais lattice - Single and polycrystalline materials - Lattic planes - Miller indices - Interplanar spacing in cubic crystal - Number of atoms per unit cell - Atomic radius - Coordination number - Atomic packing factor - Body centered cubic - Face centered cubic - Hexagonal close packed crystal structure - Cryst imperfections: line, surface and volume imperfections. Unit - II Quantum Physics and Applications: 9 Blackbody radiation - Planck's theory - Compton scattering - Matter waves - Properties - Heisenberg uncertainty principle Schrodinger's time-independent and time-dependent wave equations - Physical significance of wave function - Particle in a on dimensional box. Unit - III Ultrasonics: 9 Properties of ultrasonic waves - Generation of ultrasonic waves - Magnetostrictive generator - Piezoelectric generator ultrasonic technology in chemical industries (qualitative) - Ultrasonic degradation of wastewater. Unit - IV Nanomaterials: 9 Nano scale - Surface-to-volume ratio - Quantum confinement - Nano structures: Quantum well, Quantum wire and Quantum deposition - Chemical vapour deposition - Sol-gel method - Applications. Unit - V Materials Characterization: 9 Importance of materials characterization - X-ray diffraction (powder method) - Scanning electron microscope - Transmissic electron microscope - UV-visible spectroscopy - Raman spectroscopy - Nuclear Magnetic Resonance - Thermo gravimet analysis. TEXT BOOK: 1. Katiyar A.K., Pandey C.K., "Engineering Physics: Theory and Practical", 2 nd edition, Wiley, 2015 (Unit I, II). 2. Tamilarasan K and Prabu K, "Physics for Engineering I", 1 st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023(Unit II), IV, V). REFERENCES: 1. Avadhanulu M.N., Kshirsagar P.G and Arun Murthy T.V.S., "A Textbook of Engineering Phy	Prerequisites	Nil	2	BS	45	0	0	45	90	3
Classification of solids – Space lattice – Unit cell – Crystal structure – Bravais lattice – Single and polycrystalline materials – Lattic planes – Miller indices – Interplanar spacing in cubic crystal – Number of atoms per unit cell – Atomic radius – Coordinatic number – Atomic packing factor – Body centered cubic – Face centered cubic – Hexagonal close packed crystal structure – Cryst imperfections: line, surface and volume imperfections. Unit – II Quantum Physics and Applications: 9 Blackbody radiation – Planck's theory – Compton scattering – Matter waves – Properties – Heisenberg uncertainty principle Schrodinger's time-independent and time-dependent wave equations – Physical significance of wave function – Particle in a on dimensional box. Unit – III Ultrasonics: 9 Properties of ultrasonic waves – Generation of ultrasonic waves – Magnetostrictive generator – Piezoelectric generator Determination of velocity of ultrasonics in a liquid – Acoustic grating – Non-destructive testing – Flaw detection – Applications ultrasonic technology in chemical industries (qualitative) – Ultrasonic degradation of wastewater. Unit – IV Nanomaterials: 9 Nano scale – Surface-to-volume ratio – Quantum confinement – Nano structures: Quantum well, Quantum wire and Quantum of – Nanomaterial synthesis: Top-down and bottom-up approaches – Ball milling – Electron beam lithography – Physical vapo deposition – Chemical vapour deposition – Sol-gel method – Applications. Unit – V Materials Characterization: 9 Importance of materials characterization – X-ray diffraction (powder method) – Scanning electron microscope – Transmissic electron microscope – UV-visible spectroscopy – Raman spectroscopy – Nuclear Magnetic Resonance – Thermo gravimet analysis. TEXT BOOK: 1. Katiyar A.K., Pandey C.K., "Engineering Physics: Theory and Practical", 2 nd edition, Wiley, 2015 (Unit I, II). Tamiliarasan K and Prabu K, "Physics for Engineering I", 1 st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023(Unit I, IV, V).	Preamble	and select materials characterization te								
planes – Miller indices – Interplanar spacing in cubic crystal – Number of atoms per unit cell – Atomic radius – Coordination umber – Atomic packing factor – Body centered cubic – Face centered cubic – Hexagonal close packed crystal structure – Cryst imperfections: Unit – II Quantum Physics and Applications: 9 Blackbody radiation – Planck's theory – Compton scattering – Matter waves – Properties – Heisenberg uncertainty principle Schrodinger's time-independent and time-dependent wave equations – Physical significance of wave function – Particle in a on dimensional box. Unit – III Ultrasonics: 9 Properties of ultrasonic waves – Generation of ultrasonic waves – Magnetostrictive generator – Piezoelectric generator Determination of velocity of ultrasonics in a liquid – Acoustic grating – Non-destructive testing – Flaw detection – Applications ultrasonic technology in chemical industries (qualitative) – Ultrasonic degradation of wastewater. Unit – IV Nanomaterials: 9 Nano scale – Surface-to-volume ratio – Quantum confinement – Nano structures: Quantum well, Quantum wire and Quantum d – Nanomaterial vapour deposition – Sol-gel method – Applications. Unit – V Materials Characterization: 9 Importance of materials characterization – X-ray diffraction (powder method) – Scanning electron microscope – Transmissic electron microscope – UV-visible spectroscopy – Raman spectroscopy – Nuclear Magnetic Resonance – Thermo gravimetranalysis. TEXT BOOK: 1. Katiyar A.K., Pandey C.K., "Engineering Physics: Theory and Practical", 2 nd edition, Wiley, 2015 (Unit I, II). 2. Tamilarasan K and Prabu K, "Physics for Engineering I", 1 st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023 (Unit I, IV, V). REFERENCES: 1. Avadhanulu M.N., Kshirsagar P.G and Arun Murthy T.V.S., "A Textbook of Engineering Physics", 11 th edition, S Chan 2021. 2. Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera	Unit – I		mare distin	- Production			ماوق	net (%)	A. Un	
Unit – III Ultrasonics: Properties of ultrasonic waves – Generation of ultrasonic waves – Magnetostrictive generator – Piezoelectric generator Determination of velocity of ultrasonics in a liquid – Acoustic grating – Non-destructive testing – Flaw detection – Applications ultrasonic technology in chemical industries (qualitative) – Ultrasonic degradation of wastewater. Unit – IV Nanomaterials: Nano scale – Surface-to-volume ratio – Quantum confinement – Nano structures: Quantum well, Quantum wire and Quantum denotory – Nanomaterial synthesis: Top-down and bottom-up approaches – Ball milling – Electron beam lithography – Physical vapo deposition – Chemical vapour deposition – Sol-gel method – Applications. Unit – V Materials Characterization: 9 Importance of materials characterization – X-ray diffraction (powder method) – Scanning electron microscope – Transmissic electron microscope – UV-visible spectroscopy – Raman spectroscopy – Nuclear Magnetic Resonance – Thermo gravimetrianalysis. TEXT BOOK: 1. Katiyar A.K, Pandey C.K, "Engineering Physics: Theory and Practical", 2 nd edition, Wiley, 2015 (Unit I, II). 2. Tamilarasan K and Prabu K, "Physics for Engineering I", 1 st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023(Unil, II, IV, V). REFERENCES: 1. Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11 th edition, S Chan 2021. 2. Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera	Unit – II Blackbody radia Schrodinger's tir	Quantum Physics and Applications: tion – Planck's theory – Compton scatterine-independent and time-dependent wave								rinciple -
Determination of velocity of ultrasonics in a liquid – Acoustic grating – Non-destructive testing – Flaw detection – Applications ultrasonic technology in chemical industries (qualitative) – Ultrasonic degradation of wastewater. Unit – IV Nanomaterials: Nano scale – Surface-to-volume ratio – Quantum confinement – Nano structures: Quantum well, Quantum wire and Quantum d – Nanomaterial synthesis: Top-down and bottom-up approaches – Ball milling – Electron beam lithography – Physical vapo deposition – Chemical vapour deposition – Sol-gel method – Applications. Unit – V Materials Characterization: Unit – V Materials Characterization: Importance of materials characterization – X-ray diffraction (powder method) – Scanning electron microscope – Transmissic electron microscope – UV-visible spectroscopy – Raman spectroscopy – Nuclear Magnetic Resonance – Thermo gravimetranalysis. TEXT BOOK: Katiyar A.K, Pandey C.K, "Engineering Physics: Theory and Practical", 2 nd edition, Wiley, 2015 (Unit I, II). Tamilarasan K and Prabu K, "Physics for Engineering I", 1 st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023(Unill, IV, V). REFERENCES: Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11 th edition, S Chan 2021. Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera	Unit – III						****			9
Nano scale – Surface-to-volume ratio – Quantum confinement – Nano structures: Quantum well, Quantum wire and Quantum denomaterial synthesis: Top-down and bottom-up approaches – Ball milling – Electron beam lithography – Physical vaporage deposition – Chemical vapour deposition – Sol-gel method – Applications. Unit – V	Determination o	f velocity of ultrasonics in a liquid – Acoust	ic grating - Non	-destructive t	estin	g – F				
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 Katiyar A.K, Pandey C.K, "Engineering Physics: Theory and Practical", 2ndedition, Wiley, 2015 (Unit I, II). Tamilarasan K and Prabu K, "Physics for Engineering I", 1st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023(Unill, IV, V). REFERENCES: Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11th edition, S Chan 2021. Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera 	Importance of n	naterials characterization - X-ray diffractio								nsmission
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REFERENCES: 1. Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11 th edition, S Chan 2021. Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera										
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Euth Ortiz Ortega, HamedHosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera		nulu M.N. Kehireagar P.G. and Arun Murth	V T V S "A Toy	book of Eng	ineer	ing F	Physic	s". 11 th	edition	S Chanc
		ilulu M.N. Ksillisagai F.O aliu Afuli Multii	y 1.v.o, A 10x	book of Eng			,		o dittiority	o onan

*includes Term Work (TW) & Online / Certification course hours

	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	analyze seven crystal systems, interplanar spacing in cubic lattice, BCC, FCC, HCP crystal systems and the types of crystal imperfections and their impacts.	Analyzing (K4)
CO2	investigate the concepts of quantum mechanics to describe Planck's theory, Compton effect and the behavior of electrons in a metal by solving Schrodinger's wave equations.	Analyzing (K4)
CO3	explore the production techniques of ultrasonic wave, working of acoustic grating, non-destructive testing using ultrasonic waves and their applications in chemical engineering.	Analyzing (K4)
CO4	examine appropriate methods to prepare the nanomaterials and also to comprehend their properties and applications.	Analyzing (K4)
CO5	inpect the concepts of Raman effect, X-ray diffraction, matter waves, nuclear magnetic resonance and thermogram to describe the principle and working of select material characterization techniques.	Analyzing (K4)

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COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	1 # 1 5	de la	y Ne	Mahr.	1	1	62 4 9	1	A, - Minu	- 100 P
CO2	3	2	2					1	1		1		H.A. III
CO3	3	2	2		e nge	.=		1	1		1		
CO4	3	2	2					1	1		1		· ·
CO5	3	2	2					1	1		1		as a million

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMEN	T PATT	ERN -	THEORY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total
CAT1	and the second	40	50	10		l Eran	100
CAT2		40	50	10		The state of the s	100
CAT3	0	40	50	10		- 36Z to Util 13	100
ESE		40	50	10	n = =		100

* ±3% may be varied (CAT 1,2,3 – 50 marks & ESE – 100 marks)

Signature of the Chairman

Board of Studies - 5 & H / Physics

	Civil, Mechanical, Mechatronics, Chemica	i, Food Tec	nnology& A	utomo	bile	Eng	ineerin	g branc	hes)
Programme & Branch	B. E Civil , Mechanical, Automobile B.Tech Chemical Engineering ,Food Technology	Sem.	Category	L	T	Р	SL*	Total	Credit
Prerequisites	Programming in C	2	ES	45	0	30	45	120	4
Preamble	This course deals with core python programm python constructs and libraries.	ing. It gives	a comprehens	sive in	trodu	ction	to probl	em solvi	ng using
Unit -I	Introduction:							9	F
identifiers - da	ng strategies – program design tools – Types of ata types – input operation – comments – resentents: Introduction – conditional statement – its sein loops.	/ed words -	indentation -	Opera	ators	and I	Express	ions - D	ecision
Unit –II	Lists, Tuples and Dictionary:	×					1 2 3	9	
add and modification unit –III Strings: Conca	ons, assignments, returning multiple values, nes y, delete, sort, looping, nested, built-in methods – Strings and Regular Expressions: atenation, append, multiply on strings – Immutal	list vs tuple ole – formatti	vs dictionary.	- Built-	in str	ing m	nethods	9 and fund	tions –
findall and find	 functions – operators – comparing – iteratiniter functions – flag options. 	g – string m	iodule – Regi	ular Ex	kpres	sions	- mate	ch, searc	h, sub,
Unit –IV	Functions and Modules:							9	
 documentation 	oduction – definition – call – variable scope and l on strings – programming practices recursive fun	itetime – reti	ırn statement	- tunc	tion	argun	nents –	lambda f	unction
function redefin	nition.	ction- Modul	es: Modules -	- раска	ages	– sta	ndard lil	brary met	thods –
Unit –V	nition. Object Orientation:							9	
Unit –V Class and Obje	nition. Object Orientation: ects: Class and objects–class methods and self–	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Obje private data me	nition. Object Orientation:	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data me	nition. Object Orientation: ects: Class and objects–class methods and self– ember. NumPy: NumPy Arrays – Computation o	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data median LISTOF EXPE	nition. Object Orientation: ects: Class and objects–class methods and self–ember. NumPy: NumPy Arrays – Computation o	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data median LISTOF EXPE 1. Program 2. Imp	nition. Object Orientation: ects: Class and objects–class methods and selfember. NumPy: NumPy Arrays – Computation of RIMENTS / EXERCISES: grams using conditional and looping statements	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
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Unit –V Class and Objectivate data media in the control of the con	nition. Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays — Computation of RIMENTS / EXERCISES: grams using conditional and looping statements lementation of list and tuple operations	constructor–	class and obje	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	nition. Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs monstration of different types of functions and parameters.	constructor- n NumPy Arr	class and obje ays. Matplotli	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays — Computation of RIMENTS / EXERCISES: grams using conditional and looping statements lementation of list and tuple operations lementation of dictionary operations form various string operations regular expressions for validating inputs monstration of different types of functions and partelop programs using classes and objects	constructor- n NumPy Arr	class and obje ays. Matplotli	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs and particular programs using classes and objects form computation on Numpy arrays	constructor- n NumPy Arr	class and obje ays. Matplotli	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays — Computation of RIMENTS / EXERCISES: grams using conditional and looping statements lementation of list and tuple operations lementation of dictionary operations form various string operations regular expressions for validating inputs monstration of different types of functions and partelop programs using classes and objects	constructor- n NumPy Arr	class and obje ays. Matplotli	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs and particular programs using classes and objects form computation on Numpy arrays	constructor- n NumPy Arr	class and obje ays. Matplotli	ct vari	able	s–des	structor-	9 public an	
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs and particles programs using classes and objects form computation on Numpy arrays we different types of plots using Matplotlib	constructor— n NumPy Arr ameter pass	class and obje	ect vari	ables	s-des	structor- catter P	9 public an Plots	nd
Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs monstration of different types of functions and particle programs using classes and objects form computation on Numpy arrays we different types of plots using Matplotlib	constructor— n NumPy Arr ameter pass	class and obje	ect vari	ables	s-des	structor- catter P	9 public an Plots	nd
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Unit –V Class and Objectivate data media in the control of the con	Object Orientation: ects: Class and objects—class methods and self—ember. NumPy: NumPy Arrays—Computation of RIMENTS / EXERCISES: grams using conditional and looping statements dementation of list and tuple operations dementation of dictionary operations form various string operations regular expressions for validating inputs monstration of different types of functions and particle programs using classes and objects form computation on Numpy arrays we different types of plots using Matplotlib	constructor— n NumPy Arr ameter pass vingapproac	class and objective ays. Matplottiing h",3 rd impress Press, New De	ion, O	ables e plo	s-des	structor- catter P	9 public an Plots	nd

^{*}includes Term Work(TW) & Online / Certification course hours

	SE OUTCOMES: appletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	use basic python constructs to build simple programs	Applying(K3), Precision(S3)
CO2	apply list, tuple and dictionary to handle variety of data.	Applying(K3), Precision(S3)
CO3	apply strings and regular expression for searching and retrieval	Applying(K3), Precision(S3)
CO4	solve the problems using functions and modules.	Applying(K3), Precision(S3)
CO5	apply object oriented concepts and perform data science operations using python	Applying(K3), Precision(S3)

COs/Pos	PO1	P02	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	1				1	1	1	3	1
CO2	3	2	2	2	1	3 ×			1	1	1	3	1
CO3	3	2	2	2	1				1	1	1	3	1
CO4	3	2	2	2	1			V	1	1	1	3	1
CO5	3	2	2	2	1				1	1	- 1	3	1

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSME	NT PATTERN	N – THEORY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		25	75				100
CAT2		25	75	**			100
CAT3		25	75				100
ESE		25	75			7	100

*±3% may be varied (CAT 1,2,3-50marks & ESE-100marks)

Signature of the Chairman Board of Studies - IT



	24CHT21 - CHEMICAL	PROCESS	SINDUSTRI	ES		-		7	
Programme& Branch	B.Tech Chemical Engineering	Sem.	Category	L	Т	Р	SL*	Total	Credit
Prerequisites	Nil	2	PC	45	0	0	45	90	3
Preamble	This course will educate students about	t manufacti	ure process of	of vari	ous	cher	nical p	roducts	-
Unit – I	Overview of Chemical Industries		t -			as ii	-1.1	5 7	9
Operations and Industries – Ma	Chemical Industries and Products in Glob Unit Processes, Construction of Block I Inufacture of Sulfur by Finnish Process, ss of manufacture of Synthesis Gas	Diagrams a	nd Process	Flow	Diag	gram	s. Ino	rganic C	hemical
Unit – II	Fertilizers and Chemicals			(9
	Fertilizer, Major fertilizer manufacturer of by strong acid process, Manufacture of ters. Chlor-Alkali and Cement								
	Soda Ash by Solvay Process, Chlorine	and Causti	a Cada Caa	lium [Dioor	hon	oto U	,drooblo	
	es – Types of cement and its constituents								ne acid.
Unit – IV	Consumer Products			L.,V		-1	- 1		9
Soaps and De Detergents. Ext	etergents – Classification, Batch and raction of Sucrose from Sugarcane, Man ufacture of wood pulp by sulfate process a	ufacture of	Starch from	Maiz					
Unit – V	Petrochemicals and Polymers		No.						9
Manufacture of	s for Petrochemical Industries, Manufact Iso-propyl alcohol. Outline of Polymeri acture of Vinyl Polymer, Manufacture of F	zation, Ma	nufacture of	Poly	olefi	n by	/ low-	oressure	Zeigler
TEXT BOOK:			-						35
	Rao M. and Marshall Sittig, "DRYDEN'S C lew Delhi, 2008	Outlines of C	Chemical Tec	chnolo	gy "	, 3rd	Editio	n, East-\	West

Press, New Delhi, 2008
*includes Term Work (TW) & Online / Certification course hours

COURS On com	ple	tion of	the co			ents will			1			(1	BT Mappe Highest Lev	
CO1						rations a ufacture			ses, a	nd construc	block	Un	derstanding	(K2)
CO2						enginee diagram		llustrate	the r	nanufacturin	g process		Applying (K	3)
CO3	e	xplain tl	he manı	ufacturin	g proce	ess of inc	organic	chemic	als an	d cement		Un	derstanding	(K2)
CO4						epts to ders and a			erpret	process flow	v sheets		Applying (K	3)
CO5	01	utline th	ne manu	facture	of petro	chemica	als and p	oolymei	S			Un	derstanding	(K2)
tag in a		j				Mapping	of CO	s with I	POs a	nd PSOs	1		UI je sa j	
COs/PC	Os	PO1	PO2	PO3	PO4	PO5	PO6	P07	POS	PO9	PO10	PO11	PSO1	PSO2
CO1		3	2						Mark towards		1	2	2	3
CO2	- 17	3	2					7			1	2	2	3
CO3		. 3	2								1	2	2	3
CO4		3	2							1 (***) 1E-	1	2	2	3
CO5		3	2	,			1			×	1.	2	2	3
1 – Slig	ht, 2	2 – Mod	derate, 3	3 – Subs	tantial,	BT- Bloc	om's Ta	xonomy	/				h	
	PA.		11.11	<u> </u>			4,			1/				
			1 44		-					THEORY				1
		oom's ory*	Rei	member (K1) %	ring	Jndersta (K2)		Appl (K3)		Analyzing (K4) %	Evalua (K5)		Creating (K6) %	Total
	CAT	Γ1				. 80		20)	and the second	NIC NE		10 (10, 10, 10)	
1	CAT	Γ2		i.		80		20)	1 1	-		× = 1	pt r
	CAT	Г3		-	7.	- 80		20)		+ *			F
-	ES	F		-		80		20)					

R. only.

Signature of the Chairman

Chemical



125

	24TAM02 - TAMILS								
	(Common to All Engineering	ng and Techn	ology Branc	hes)				. 12 EF5	
Programme & Branch	All BE/BTech Branches	Sem.	Category	L	Т	Р	SL*	тот	Credit
Prerequisites	Nil	2	HS	15	0	0	15	30	1
Preamble	This course aims to impart the essential know	ledge on the t	tamil culture a	nd rel	ated	techn	ology		
UNIT – I	WEAVING AND CERAMIC TECHNOLOGY					. 7			3
Weaving Industr	y during Sangam Age – Ceramic technology – B	lack and Red	Ware Potterie	es (BF	RW) -	- Graf	fiti on P	otteries.	as le
UNIT – II	DESIGN AND CONSTRUCTION TECHNOLO	OGY	1 3243	25-4	4	_	PuP	12/9	3
stones of Sanga Temples of Cho	Structural construction House & Designs in house arm age – Details of Stage Constructions in Sila las and other worship places – Temples of Naya – Chetti Nadu Houses, Indo – Saracenic archited	appathikaram aka Period –	 Sculptures Type study (N 	and T ladura	Гетр ai Ме	les of	Mama	llapuram	- Grea
UNIT – III	MANUFACTURING TECHNOLOGY		T - 1			a -		-	3
Minting of Coin	ding – Metallurgical studies – Iron industry – Iro is – Beads making – industries Stone beads vidences – Gem stone types described in Silappa	- Glass bea							
UNIT – IV	AGRICULTURE AND IRRIGATION TECHNO	DLOGY	Territoria			,	71		3
	ds, Sluice, Significance of Kumizhi Thoompu of Agro Processing – Knowledge of Sea – Fish cific Society.								
UNIT – V	SCIENTIFIC TAMIL & TAMIL COMPUTING								3
	Scientific Tamil – Tamil computing – Digitalizati iil Digital Library – Online Tamil Dictionaries – Sc			pmer	nt of	Tamil	Softwa	re – Tan	nil Virtua
TEXT BOOK:						, r.			
1. Social Life	e of Tamils (Dr.K.K.Pillay) A joint Publication of T	NTB & ESC a	ınd RMRL – (i	n prin	t)		> -		
2. Social Life	e of the Tamils – The Classical Period (Dr.S.Siga	ravelu) (Publi	shed by: Inter	natior	nal In	stitute	of Tan	nil Studie	s).
REFERENCES:				w did	W.	9			
1 1.	வரலாறு - மக்களும் பண்பாடும் - கே ரி ல் பணிகள் கழகம்), உலகத் தமிழாராய்				U	ாடு ட	ாடநூ	ல் மற்ற	றும்
	ந்தமிழ் முனைவர் இல. சுந்தரம், விகட							11111	
3. கீழடி ை	வகை நதிக்கரையில் சங்ககால நகர ந	ாகரிகம்.(தெ	ால்லியல் த	துறை	၅ ရ	വണി	பீடு)		
· · · · ·		குறை வெ	பளியீடு	1				E E	
	ந ஆற்றங்கரை நாகரிகம் (தொல்லியல்	عادة الم	0						
4. பொருன ₅ Historical	Heritage of the Tamils (Dr.S.V.Subatamanian, D	<u> </u>		ublish	ed by	y : Inte	ernation	al Institu	te of
4. பொருன 5. Historical Tamil Stu 6. The Contr	Heritage of the Tamils (Dr.S.V.Subatamanian, Ddies) ibution of the Tamils to Indian Culture (Dr.M.Val	or.K.D. Thiruna	avukarasu) (P	nation	al Ins	stitute	of Tam	il Studie:	
4. G山爪仮の 5. Historical Tamil Stu 6. The Contr Keeladi –	Heritage of the Tamils (Dr.S.V.Subatamanian, Ddies)	or.K.D. Thiruna armathi)(Pupli aigai; (Jointly	avukarasu) (Pi shed by Interi Published by:	nation	al Ins	stitute	of Tam	il Studie:	
4. GUIT(頂の 5. Historical Tamil Stu 6. The Contr 7. Keeladi – Tamilnadi 8. Studies in	Heritage of the Tamils (Dr.S.V.Subatamanian, Ddies) ibution of the Tamils to Indian Culture (Dr.M.Vala'Sangam City Civilzation on the banks of river Vala Text Book and Educational Services Corporation the History of India with Special Reference to Table	armathi)(Pupli aigai; (Jointly on, Tamilnadu amilnadu (Dr.I	avukarasu) (Prished by Interi Published by:) K.K.Pillay) (Pu	nation Depa	al Ins	stitute nt of	of Tam Archae Autho	nil Studie: ology & r)	s).
4. GUIT(頂面 5. Historical Tamil Stu 6. The Control 7. Keeladi — Tamilnadi 8. Studies in	Heritage of the Tamils (Dr.S.V.Subatamanian, Ddies) ribution of the Tamils to Indian Culture (Dr.M.Vala'Sangam City Civilzation on the banks of river Vala Text Book and Educational Services Corporation	armathi)(Pupli aigai; (Jointly on, Tamilnadu amilnadu (Dr.I	avukarasu) (Prished by Interi Published by:) K.K.Pillay) (Pu	nation Depa	al Ins	stitute nt of	of Tam Archae Autho	nil Studie: ology & r)	s).

*includes Term Work (TW) & Online / Certification course hours

	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	explain weaving and ceramic technology in tamil culture and tamil society.	Understanding (K2)
CO2	Illustrate about the design and construction technology.	Understanding (K2)
CO3	summarize about the manufacturing technology.	Understanding (K2)
CO4	explain the agriculture and irrigation technology.	Understanding (K2)
CO5	explain the significance of tamil in scientific and computing.	Understanding (K2)
000	Oxplain the digitileance of tariii in coloraile and compating.	Chacrotanang

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	was wide			S. E.A.Te.	-1	3		3	2	2			
CO2	เล้ากรณ์	le de co		·	18 71	3	in-	3	2	2		1057 15	al section
CO3	THE STATE OF					3		3	2	2			
CO4						3		3	2	2			
CO5						3		3	2	2			

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSES	SMENT PA	ATTERN -	- THEORY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	40	60					100
CAT2	40	60	2	- 1			100
CAT3	40	60					100
ESE				NA	f		

* ±3% may be varied (CAT 1,2,3 - 50 marks)

Signature of the Chairman

Board of Studies - 5 & H (Physia)



	(Common to All Engineering and	Technolog	y Branches)			(
Programme & Branch	All BE/BTech Branches	Sem.	Category	L	Т	P S	SL*	TOT	Cred
Prerequisites	Nil	2	HS	15	0	0	15	30	0.4
முன்னுரை	தமிழ் கலாச்சாரத்தோடு ஒன்றிய தொழில் ந	<u>ј</u> ட்பங்கன	ள பற்றிப்	எடுத்	துரை	ரத் த	ல்	TO ST	
அலகு - ၊	நெசவு மற்றும் பானை தொழில்நுட்பம்					HEV.		3	112
சங்க காலத்த கீறல் குறியீ()	ில் நெசவு தொழில் – பானைத் தொழில்நுட்ட }கள்	பம் கரு	ப்பு சிவப்பு	ЦП	ன்∟ர்	பகள்	h÷,i	பாண்ட	_களி
அ லகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்ப	ம்	1500 p. r. n.	l bei		1 5	W.	3	
– சங்க கால விவரங்கள் – வழிபாட்டுத் மீனாட்சி அப	ில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சா நத்தில் கட்டுமான பொருட்களும் நடுகல்லும் மாமல்லபுரச்சிற்பங்களும், கோவில்களும் — தலங்கள் — நாயக்கர் காலக் கோயில்கள் மமன் ஆலயம் மற்றும் திருமலை நாயக்கர்	– சிலம் சோழர் ச –மாதிரிச	ப்பதிகாரத்தி காலத்து டெ கட்டமைப்பு	ல் (பருங் கள்	மேடை கோய பற்றி) 1) o 1) o 1) o 1) o 1) o 1) o 1) o 1)	அடை கள் அறித	மப்பு ப மற்று நல், ப	பற்றிட ம் பிர மதுை
	சன்னை இந்தோ-சாரோசெனிக் கட்டிடக் கலை.								
<u>அலகு - III</u>	<mark>உற்பத்தித் தொழில்நுட்பம்</mark> ம் கலை – உலோகவியல் – இரும்புத் தெ						-	3	
உருவாக்கும்	ான்றுகளாக செம்பு மற்றும் தங்க நாணய தொழிற்சாலைகள் – கல்மணிகள் – கண்ணாடி ண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதில	டி மணிக		ன் ப	ணிக	ள் -			மன ணிக
அலகு - №	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்ற								
அணை, ஏரி,	குளங்கள், மதகு – சோழர்கால குமிழித் தூ	ம்பின் பு							
அணை, ஏரி, கால்நடைகஞ – கடல்சார் அ அறிவுசார்சமூ	குளங்கள், மதகு – சோழர்கால குமிழித் தூட நக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான புறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு	ம்பின் மு ந்மை மற	ற்றும் வேள	ाळा ६	യന ഒ	ார்ந் _த	த செ	பராம் சயல்ப	ாடுக
அணை, ஏரி, கால்நடைகளு – கடல்சார் ச அறிவுசார் சமூ அலகு - v அறிவியல் த மென்பொருட் தமிழ் அகராத	குளங்கள், மதகு – சோழர்கால குமிழித் தூடி நக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான புறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு நகம்.	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ்	ற்றும் வேள பெருங்கட நூல்களை	ாண் ல் கு மில்	மை ச றித்த பதிட்	ார்ந் _? பன்	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் –	ாடுக புறிவு தமிழ
அணை, ஏரி, கால்நடைகளு – கடல்சார் ச அறிவுசார்சமூ அலகு - v அறிவியல் த மென்பொருட் தமிழ் அகராத	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குவ மகம். அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் கமிழின் வளர்ச்சி – கணினிதத்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக் திகள் சொற்குவைத் திட்டம்.	ம்பின் பு ன்மை மர ரித்தல் – – தமிழ் க்கழகம்	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி	ாண் ல் கு மின்	மை ச றித்த பதிட் நூலச	ார்ந் _த பன் பு ெ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிழ பத்தி
அணை, ஏரி, கால்நடைகஞ – கடல்சார் உ அறிவுசார்ச்டூ அலகு - V அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK:	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குவ நகம். அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் அமிலி வளர்ச்சி – கணினிதத்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்	ம்பின் பு ன்மை மர ரித்தல் – – தமிழ் ககழகம் ளை (வெ	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி	ாண் ல் சூ மின் ழநா	மை ச றித்த பதிட் நூலச	ார்ந் _த பன் பு ெ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிபு பத்தி
அணை, ஏரி, கால்நடைகளு – கடல்சார் உ அறிவுசார்சமூ அலகு - v அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மத்தில் தமிழ் மற்றும் கணினித்தமிழ் அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கிகள் சொற்குவைத் திட்டம்.	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் ககழகம் ளை (வெ றுவனம், (ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி	ாண் ல் சூ மின் ழநா	மை ச றித்த பதிட் நூலச	ார்ந் _த பன் பு ெ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிபு பத்தி
அணை, ஏரி, கால்நடைகஞ – கடல்சார் உ அறிவுசார்ச்டூ அலகு - V அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான பிறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மைற்றும் முத்துக்கு மைற்றும் தமிழ் மற்றும் கணினித்தமிழ் கிறிவியல் தமிழ் மற்றும் கணினித்தமிழ் கிறியின் வளர்ச்சி – கணினிதத்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கிகள் சொற்குவைத் திட்டம்.	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் னள (வெ றுவனம், 0	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி ளியீடு தமி சென்னை, 2	ாண் ம் மின் ம்நா ம்றை	மை ச றித்த பதிப் நூலச	ார்ந் _ர பன் பபு ெ டநூ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிபு பத்தி
அணை, ஏரி, கால்நடைகளு – கடல்சார் அ அறிவுசார்ச்சூ அலகு - V அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித REFERENCES: 1. கீழடி-ை	குளங்கள், மதகு – சோழர்கால குமிழித் தூர் நக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான புறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு நகம். அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் மிழின் வளர்ச்சி – கணினிதத்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக் நிகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ள குதமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசு வகை நதிக்கரையில் சங்ககால நகர நாகரிகம்.	ம்பின் பு ன்மை மந ரித்தல் — — தமிழ் க்கழகம் அவனம், டூ ரம், 2016 (தொல்லி	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி ளியீடு தமி சென்னை, 2	ாண் ம் மின் ம்நா ம்றை	மை ச றித்த பதிப் நூலச	ார்ந் _ர பன் பபு ெ டநூ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிபு பத்தில்
அணை, ஏரி, கால்நடைகளு – கடல்சார் அ அறிவுசார்ச்சூ அலகு - V அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித REFERENCES: 1. கீழடி-ை 2. பொருன	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான பிறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மைற்றும் முத்துக்கு மைற்றும் தமிழ் மற்றும் கணினித்தமிழ் மிறிவியல் தமிழ் மற்றும் கணினித்தமிழ் கிமிழின் வளர்ச்சி கனி உருவாக்கம் – தமிழ் இணையக் கல்விக்குகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறிக்கம் முனைவர் இல. சுந்தரம், விகடன் பிரசுவிகை நதிக்கரையில் சங்ககால நகர நாகரிகம்.	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் நுவனம், ப ரம், 2016 (தொல்லி வெளியீ(ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி ளியீடு தமி சென்னை, 2 யல் துறை நி)	ாண்க ல் கு மின் மின் ! ம்நா 0002	மை ச றித்த பதிப் நூலச	ார்ந் _ர பன் பபு ெ டநூ	த செ ன்னை செய்	பராம் சயல்ப டய அ 3 தல் – ணைய	ாடுக புறிவு தமிபு பத்தில்
அணை, ஏரி, கால்நடைகளு – கடல்சார் உ அறிவுசார்ச்ர அலகு - V அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித REFERENCES: 1. கீழடி-ை 2. பொருன 3. Social Life	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான பிறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மைற்றும் முத்துக்கு மற்றும் கணினித்தமிழ் அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் குமிழின் வளர்ச்சி – கணினிதத்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்குக் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ள கும் மிற்கு வைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ள கும் மிற்கு கை திக்கரையில் சங்ககால நகர நாகரிகம். இத்தமிழ் முனைவர் இல் சுந்தரம், விகடன் பிரசுவிகை நதிக்கரையில் சங்ககால நகர நாகரிகம். இந்-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை e of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & E	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் நுவனம், ப ரம், 2016 (தொல்லி வெளியீ(SC and RN	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி சென்னை, 2 யல் துறை நி) /RL — (in print	ாண் ல் சூ மின் ! ம்நா 002	மை ச றித்த பதிப் நூலச டு பா	ார்ந் _ர பன் பு ெ டநூ	த செ ஸ்ஸ் பிசய் பால் ப	பராம் சயல்ப 3 தல் – ணைய	ாடுக புறிவு தமிழ பத்தி
அணை, ஏரி, கால்நடைகளு – கடல்சார் ச அறிவுசார் சமூ அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித REFERENCES: 1. கீழடி-ை 2. பொருன 3. Social Life 4. Social Life 5 Historical	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான பிறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மைற்றும் முத்துக்கு மைற்றும் தமிழ் மற்றும் கணினித்தமிழ் மிறிவியல் தமிழ் மற்றும் கணினித்தமிழ் கிமிழின் வளர்ச்சி கனி உருவாக்கம் – தமிழ் இணையக் கல்விக்குகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறிக்கம் முனைவர் இல. சுந்தரம், விகடன் பிரசுவிகை நதிக்கரையில் சங்ககால நகர நாகரிகம்.	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் நுவனம், ட ரம், 2016 தொல்லி வெளியீ(SC and RN Published I	ற்றும் வேள பெருங்கட நூல்களை – தமிழ் மி சென்னை, 2 யல் துறை நி) //RL – (in print by: Internation	ாண் ல் கு மின் ம்ற்நா 002	மை ச றித்த பதிட் நூலச பியீ(ார்ந் _ர பன் பு ெ டநூ	த லெ ஸ்ஸ் - இ	பராம் சயல்ப 3 தல் – ணைய மற்றுப்	ாடுகள் பறிவு தமிழ் பத்தில
அணை, ஏரி, கால்நடைகளு – கடல்சார் அ அறிவுசார் சமூ அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித் REFERENCES: 1. கீழடி-ை 2. பொருன 3. Social Life 4. Social Life 5. Historical Studies) 6. The Conti	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான மறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மற்றும் முத்துக்கு மற்றும் கணினித்தமிழ் மற்றும் கணினித்தமிழ் மற்றும் கணினித்தமிழ் மற்றும் கணினித்தமிழ் வளர்ச்சி கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்குக் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ள கில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறுக்குமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுவைக் நதிக்கரையில் சங்ககால நகர நாகரிகம். இந்-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை e of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & E e of the Tamils — The Classical Period (Dr.S.Sigaravelu) (Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. The ibution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Fibution of the Tamil to Indian Culture (Dr.M.Valarmathi)	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் நுவனம், ட ரம், 2016 தொல்லி வெளியீ(SC and RN Published I pirunavukar	நூல்களை – தமிழ் மி எியீடு தமி சென்னை, 2 யல் துறை நி) ARL – (in print by: Internation asu) (Publish by Internation	ாண் ல் கு மின் ம்ற்நா 002 வெ al Ins	மை ச றித்த பதிப் நூலச ளியீ(titute o	ார்ந் ர பன் பபு ே ந்) நி) f Tan	த செய் நிசய் - இ nail Ir	பராம் சயல்ப 3 தல் – ணைய மற்றுப் tudies).	ாடுகள் பறிவு தமிழ் பத்தின்
அணை, ஏரி, கால்நடைகளு – கடல்சார் அ அறிவுசார் சமூ அறிவியல் த மென்பொருட் தமிழ் அகராத TEXT BOOK: 1. தமிழக கல்வியி 2. கணினித REFERENCES: 1. கீழடி-ை 2. பொருன 3. Social Life 4. Social Life 5. Historical Studies) 6. The Conti	குளங்கள், மதகு – சோழர்கால குமிழித் தூருக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளான அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்கு மைக்கம். அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் வளர்ச்சி கன் உருவாக்கம் – தமிழ் இணையக் கல்விக்கிகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்கிகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்கிகள் சொற்குவைத் திட்டம். வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்கிகள் தெயிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுவைக் நதிக்கரையில் சங்ககால நகர நாகரிகம். தெயிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுவைக் நதிக்கரையில் சங்ககால நகர நாகரிகம். தெரு-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & Ear of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Peritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. The ibution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Peritage of the Tamil to Indian Culture (Dr.M.Valarmathi)	ம்பின் பு ன்மை மர ரித்தல் — — தமிழ் க்கழகம் நுவனம், ட ரம், 2016 தொல்லி வெளியீ(SC and RN Published I pirunavukar	நூல்களை – தமிழ் மி எியீடு தமி சென்னை, 2 யல் துறை நி) ARL – (in print by: Internation asu) (Publish by Internation	ாண் ல் கு மின் ம்ற்நா 002 வெ al Ins	மை ச றித்த பதிப் நூலச ளியீ(titute o	ார்ந் ர பன் பபு ே ந்) நி) f Tan	த செய் நிசய் - இ nail Ir	பராம் சயல்ப 3 தல் – ணைய மற்றுப் tudies).	ாடுகள் பறிவு தமிழ் பத்தின்
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		JTCOM		orano ir	пċт								BT Map			
பர்ப				மாணவர் 		<u> </u>			-				(Highest L	evei)		
CO1 தமிழ் கலாச்சாரம் மற்றும் தமிழ் சமூகத்தினுடைய நெசவு மற்றும் பானை தொழில்நுட்பம் பற்றி விளக்க முடியும்.													Understanding (K2)			
CO2 தமிழர்களின் வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்ப ஆற்றல் பற்றி விளக்க முடியும்.														ng (K2)		
CO3 தமிழர்களின் உற்பத்தித் தொழில்நுட்பம் பற்றி சுருக்கமாகக் கூற முடியும்.														ng (K2)		
CO4		ஓர்களி .யும்.	ன் வே	ளாண்டை	ம மற	ற்றும்	நீர்ப்ப	ாசனத்	தெ	ாழில்நுட்ப	ம் பற்றி	விளக்க	Understandi	ng (K2)		
CO5	தமிழ	ழர்களி	ன் அறி	வியல்	தமிழ்	மற்றுப்	் கன	ளினித் <u>த</u>	ழ்வ	பற்றி வி	ாக்க முடியு	ம்.	Understandi	ng (K2)		
to L. I	-		''L DO	I De	10	n de c		OF 71.		97 - 9 -	C. C.	15611	N LA SA	-10-ja		
				s and PS		DOS	DOC	D07	DO:	DO0	D040	D044	D004	DOOG		
COs		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO		PO10	PO11	PS01	PSO2		
CC							3	Δ.	3	2	2	9 215)				
CC						1616	3	10° - 10	3	2	2	442				
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CC				1.57		, NF 1,	3	1	3	2	2	- ;-	- June	y M		
1 – SI	ight, 2	– Mode	rate, 3 –	Substantia	al, BT- E	Bloom's	Taxon	omy	, O	philatina 1	M. M. Carlot	Day of Street T	2181 F-7 MIN	-		
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1775	, IEGO	-1796		26899	Thu a	ASSE	SSME	NT PATI	TERN	- THEORY	GIV.	V 15-11.		E ST		
Test / Bloom's Remembering Category* (K1) %				g Un	Understanding (K2) %		Applying (K3) %		Analyzing (K4) %	Evaluating (K5) %		Creating (K6) %	Total			
(4)	CAT	1		40		60		-					e la Frakaz	100		
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Š., n. T.	CAT	3	lo es de sale	40		60		8 - 1 2					2	100		
	ESI	E		8.5	de la			, - v-	1 1	NA						

Signature of the Chairman
Board of Studies - 5 & H (Physics

* ±3% may be varied (CAT 1,2,3 – 50 marks)



				24PHI	.22 - P	HYSICS	SLABO	RATO	RY FOR	CHEM	ICAL ENGIN	IEEF	RING	1 -			
Progra Branc		e&	B.Tech	n - Che	Chemical Engineering Sem. Category L T P								Р	SL*	тот	Credit	
Prerec	quisit	es	Nil					•		2	BS	0	0	30	0	30	1
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1.	1						f the ma	aterial c	of a give	n beam	using unifor	m be	endir	na me	ethod		
2.	Determination of the Young's modulus of the material of a given beam using uniform bending method. Determination of the rigidity modulus of the given metallic wire using torsional pendulum.																
3.	Determination of the rigidity modulus of the given metallic wire using torsional pendulum. Determination of the thermal conductivity of a bad conductor using Lee's disc.													×			
199	-									1880			ا باد ا	N 4 - 1 -1			
4.											vibrating tun	ing i	ork (weia	es app	paratus)).
5.					- 9						method.						
6.	-										g Carey Fos			ge.			
7.	Det	termina	ation of t	he band	d gap o	f a give	n semic	onducti	ng mate	erial usi	ng post-office	e bo	(.			1	
8.	Det	termina	ation of t	he thick	iness o	f a thin	film usir	ng air-w	edge ar	rangen	nent.						-
9.	Det	termiņa	ation of t	he parti	icle size	of the	given p	owder u	using las	ser.	II 48						
10.	Wri	iting co	ding for	any on	e of the	above	experin	nents / o	develop	ing a pr	oject / a prod	duct.	0				
REFEI	RENC	CES/ M	ANUAL	/SOFT	WARE	•											
1.	Lab	orator	y Manua	al.					,						-,	_	
COUR On co			MES:	urse, th	ne stud	ents wi	II be ab	le to			-					BT Map	
CO1	det	ermine		ung's m	nodulus				dity mo	dulus o	f a wire and	the	ther	mal		alyzing recision	
CO2	det	ermine		uency o	of an alt		g currer	nt, the c	oefficie	nt of vis	cosity of a li	quid	and	the	Ar	alyzing recision	(K4),
СОЗ	det	ermine		d gap d	of semi	conduc	tor mate	erials, t g / proje	he thick	ness o	f a thin film,	the	part	icle	Ar	nalyzing recision	(K4),
		1				Мар	ping o	f COs v	vith PO	s and F	PSOs ·						
COs/P	POs	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10		PC	011	PS	01	PSO2
CO		3	2	2	3				3	1				2	× ×		
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CO:			derate, 3			BT- BI	nom's T	avonon	181	1		-	-	2	-		

*includes Term Work (TW) & Online / Certification course hours

Signature of the Chairman
Board of Studies - S&H, (Physica)



SWEERING OF

CPC

		·					I BE/BT		ruring, anches)		Ć.			
Programme Branch	&		All BE/	BTech	Branch	es	Se	m. C	ategory	L	ТР	SL*	Total	Credi
Prerequisite	s	-		Nil			. 1.	/2	ES	0	0 90	0	90	3
Preamble			puter-a	ided De					velop a p s, 3D Pri				basic kn tics and	owledge
LIST OF EXF	PERIM	ENTS /	EXER	CISES:		,			· .		* 7			
				PART	A – Ma	nufactı	iring La	borato	ory (30 H	ours)				
1 Selection	n of pr	oduct, fr	ee han	d sketch	ning and	detailir	ng		o A			4		
2 Constru	ction o	f model	using A	rc/TIG/	MIG/Ga	s/Spot	welding	operati	ions				ui)	
3 Enhanci	ng the	model	with she	eet meta	al									
4 Creating	the pa	arts of tl	ne mod	el using	lathe						i			
5 Creating	the pa	arts of tl	ne mod	el using	milling	and dril	ling mad	chines	a ·					
		P	ART B	– Produ	uct Des	ign and	l Develo	pmen	t Labora	tory (30	Hours)			
1 Free ha	nd ske	tching a	nd deta	iling of	the com	ponent	}					r.		
2 3D part	modell	ling of th	ne comp	onent u	using CA	AD softv	vare	7			-	_	7.1	_
3 Enginee	ring A	nalysis	of the c	ompone	ent mode	el			is a					
4 Generat	e the o	compon	ent usir	ıg 3D pr	inter	4.						4.		
				PA	RT C -	Roboti	cs Labo	ratory	(30 Hou	rs)				i i
Design o	of elec	tronic ci	rcuit an	d its de	bugging									
2 Assemb	ly and	interfac	ing of s	ensors,	actuato	ors and	wireless	comm	union mo	odules w	ith audr	no UNC)	-
3 Develop	ment o	of embe	dded p	rogramr	ning and	d interfa	cing for	motion	control	and obs	tacle av	oidance		
4 Demons	stration	and te	sting of	robot in	static e	environn	nent							
				R	EFERE	NCES/	MANUA	AL /SO	FTWARE	: :	24	ž.		1
1 Foundat	tion Er	ngineerii	ng Labo	ratory N	Manual		-			W a				*
2 SOLID	WORK	S 2022	Softwa	re		**						ii e		
COURSE OI			ırse, th	e stude	ents wil	l be abl	e to		R 5	2 4			Γ Mappe thest Lev	
CO1	develo		rototype	model	using m			ations	like weldi	ing,		Ap	plying (Ka	3),
CO2	sketch	3D mo	del and	develo	p the pr	ototype	using 3	D printe	er	*			plying (K ecision (S	
CO3	desigr	and de	evelop t	he auto	nomous	robot fo	or real-ti	me apı	olications	· .			plying (K ecision (S	
					Mappin	g of C	Os with	POs a	nd PSOs	S		, ,	_	
COs/POs /PSOs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO ²	1 - F	PSO2
CO1	3	3	3	2				3	2		2			¥
CO2	3	3	3	3				3	2		2			
CO3	3	3	3	2				3	2		2			

20%

Storm

Signature of the Chairman Board of Studies - Mechanical



				24	MNT21	- QUAN	VITATIT	E AP	TITUDE - II					
9 0			(C	ommon	to all E	nginee	ring and	Techi	nology bra	nches).			_
Progra Branch	mme & 1	All B.	E/B.Tec	h Branc	ches		Se	em.	Category	L	ТР	SL*	Total	Credit
Prereq	uisites	Basic	Mather	natical	skills			2	MC	20	0 0	10	30	0
Preaml	ble	To imp	art prob	olem sol	ving skil	Is and e	enhance a	analytic	cal skills.			1	-	,
Unit – I					s, Time				3					6
Mixture	rule – App nd Work:	olication Concep	s – Pro	blems. ork and v					i – Simple Simple prob		ns on	averag	jes – All	
Time a		ce: Tim	e, spee	d and d				Avera	ige speed -	Relat	ve spe	ed – P	roblems	on boat
Unit – I							bability:		K.					8
	tation and											-,		
TEXT E	pility: Bas	ic Conce	epis – P	фрисац	ons – Si	mpie pri	obiems.							
1.	Dr.R.S.A limited, 2		"Quant	itative A	ptitude 1	for Com	petitive E	xamin	nations", Re	vised	Edition	, S.Ch	and and	compan
		·												•
REFER	RENCES/		L/SOF	TWARE	:									
REFER		MANUA				Compe	titive Exa	minati	on", 7 th Ed	ition, I	/lcGrav	w Hill	Education	on, India
	Abhijit G 2020.	uha,"Qu	ıantitati	ve Aptiti	ude for		titive Exa		on", 7 th Ed	ition, I	/IcGra	w Hill	Educatio	on, India
1.	Abhijit G 2020. https://w	MANUA uha,"Qu ww.india	iantitati	ve Aptitu	ude for le/quest	ions-and		<u>s</u>		ition, I	/lcGra	w Hill	Educatio	on, India
1. 2. 3.	Abhijit G 2020. https://w	MANUA uha,"Qu ww.india ww.geel	uantitativabix.com	ve Aptitud	ude for le/quest aptitude	ions-and	d-answers	<u>s</u>		ition, I	/IcGrav		Education BT Map	pped
1. 2. 3. COURS	Abhijit G 2020. https://w https://w	ww.india ww.geel	antitativabix.con	ve Aptituden/apt	ude for le/quest aptitude	ions-and questio	d-answers	<u>s</u> inswer	<u>s</u>	ition, I	/IcGra	(1	ВТ Мар	ped Level)
1. 2. 3.	Abhijit G 2020. https://ww https://ww SE OUTCO npletion of Solve av	ww.india ww.geel DMES: of the coverages he prob	abix.con ssforges ourse, t , alligation	n/aptitudeks.org/sithe stud	ude for le/quest aptitude lents wi	ions-and -question II be ab	d-answers ons-and-a ole to ond work p	s inswer	<u>s</u>			(1	BT Mar Highest	pped Level)
1. 2. 3. COURS On cor	Abhijit G 2020. https://ww https://ww SE OUTCO mpletion of Solve av Solve t applicat	ww.india ww.geel OMES: of the co	abix.con esforged burse, t , alligation blems oblems.	n/aptitudeks.org/siche stud	ude for de/quest aptitude lents wi mixtures and d	ions-and question II be ab time and istance,	d-answers ons-and-a ole to ond work p upstrea	s nswer problen m and	ns.	eam o		(1)	BT Map Highest Applying	pped Level) (K3)
1. 2. 3. COURS On con CO1	Abhijit G 2020. https://ww https://ww SE OUTCO mpletion of Solve av Solve t applicat	ww.india ww.geel OMES: of the co	abix.con esforged burse, t , alligation blems oblems.	n/aptitudeks.org/sine studions or ron time	de/quest aptitude lents wi nixtures and d utation,	ions-and question II be ab , time and istance, combina	d-answers ons-and-a ole to ond work p upstrea	s inswer problen m and proba	ns. d downstre	eam o		(1)	BT Map Highest Applying Applying	pped Level) (K3)
1. 2. 3. COURSON COT	Abhijit G 2020. https://w https://w SE OUTCO npletion of Solve av Solve t applicat Solve pi	ww.india ww.geel OMES: of the co	abix.con esforged burse, t , alligation blems oblems.	n/aptitudeks.org/sine studions or ron time	de/quest aptitude lents wi nixtures and d utation,	ions-and question II be ab , time and istance, combina	d-answers ons-and-a ole to ond work p one upstrea ation and	s inswer problen m and proba	ns. d downstre	eam o	riented	(1)	BT Map Highest Applying Applying	pped Level) (K3)
1. 2. 3. COURSON COT	Abhijit G 2020. https://ww https://ww SE OUTCO mpletion of Solve av Solve t applicat Solve pi	ww.india ww.geel DMES: of the coverages he problems	abix.con ksforged burse, t , alligation blems of blems. involvir	n/aptitudeks.org/sche stude ions or report time	de/quest aptitude lents wi nixtures and d utation, Mappin	ions-and- question II be ab , time and istance, combinating of CC	d-answers ons-and-a ole to ond work p upstrea ation and Os with P	s nswer problen m and proba	ns. d downstre	eam o	riented	(1)	BT Map Highest Applying Applying	pped Level) (K3) (K3)
1. 2. 3. COURSON CON CON CO1 CO2 CO3	Abhijit G 2020. https://ww https://ww SE OUTCO mpletion of Solve at applicat Solve pi Os PO1 2	ww.india ww.geel OMES: of the co verages he problems roblems	abix.con ksforged burse, t , alligation blems of blems. involvir	n/aptitudeks.org/sche stude ions or report time	de/quest aptitude lents wi nixtures and d utation, Mappin	ions-and- question II be ab , time and istance, combinating of CC	d-answers ons-and-a ole to ond work p upstrea ation and Os with P	s nswer problen m and proba	ns. d downstre	eam o	riented	(1)	BT Map Highest Applying Applying	pped Level) (K3) (K3)

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		30	70	ž.			100
CAT2		30	70			2	100
CAT3	-	30	70		-		100

 * ±3% may be varied (CAT 1, 2 & 3 – 50 marks & ESE – 100 marks)

*includes Term Work (TW) & Online / Certification course hour

Signature of the Chairman Board of Studies - \$4 H





Sermath Are	24VEC11 - YOGA AND VALUES	FOR H	OLISTIC DE	VELO	OPM	ENT			
e. Action	(Common to All Engineering	ng and Te	chnology B	ranch	es)				
rogramme & Branch	All B.E./B.Tech. Branches	Sem.	Category	L	Т	P.	SL*	Total	Credit
Prerequisites	Nil	1	HS	15	0	15	0	30	1
E + 3130m (F) + 1		Maddal	March 1274	-	-171	1.57		e a l	H. 150 H
Preamble	Yoga or yogasanas are considered as is method to bring harmony of body a of the greatest gifts to the world benefitted by learning yoga.	nd mind	for general v	wellbe	ing.	Yoga	is cor	sidered	as one
Unit – I	Introduction:	5 925 15	almen des.	(F = 1 = 5 =	ele i e		No age		2
and Regulatior & Bandhas - Sl	Yoga – Definitions - Concepts - Aims ar as of Asanas – Classifications of Yogasa hatkarma (Cleansing Practice) - Streams	anas – Pa	atanjali's As	htang	a Yo	ga –			Mudras
Unit – II	Yoga and Mind:								2
	Mind - Five Elements and the Mind - M								Role of
Unit – III	ological problems: Mood Disorders, Major Yoga and Values, Diet:	or Depres	Sive Disorde	er, Cy	ciotn	ymic	Disord	ler.	
	- Social Values - Role of Yoga in Person	nality Int	ogration C	00000	oto o	f Nloti	ural Di	t Not	2
	ve Diet – Soothing Diet – Constructive D		egration - C	oncer	วเร บ	ı wall	Irai Die	et - Matt	ıropatny
Unit – IV	Asanas:	1 -			-				2
Prayer - Startin	ng & Closing - Preparatory practices - L	oosening	Practices -	- Mea	ning,	Defi	nitions	and Ob	jectives
of Asanas - Pri	nciples of Practicing Asanas. Asanas: Si	tanding –	Sitting - Pr	one –	Sup	ine –	Surya	namask	ar.
Unit – V	Pranayama and Meditation:								2
Pranayama. P Techniques – N	ctices for awareness - Definitions an ranayama: Nadi Shuddhi - Kapalaba Meditation.								
TEXT BOOK:									
1. Swami 1969.	satyananda saraswathi, "Asana prana	yama mu	dra bandha	a", Bih	nar s	choo	l of yo	oga, 4 th	Edition,
2. Swami	mukthi Bodhanandha, "Hatha yoga prad	ipika", Bi	nar school o	f yoga	a, 4 th	Editi	on, 19	85.	
REFERENCES	S:	> *		7.					
1. B.K.S. I	yenkar, "Yoga the path of holistic health	", DK Lim	ited, 2 nd Ed	ition, 1	1969				
2. Selvara	su, "Kriya cleansing in yoga", Aruvi yoga	a, 3 rd Edit	ion, 2002.	1.5			× , , 2	- f	-
Z. Selvara	isu, "Kriya cleansing in yoga", Aruvi yoga	a, 3° Edit	ion, 2002.	24	-	-		2	-

	SE OUTCOMES: npletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	realize the importance of yoga in physical health.	Applying (K3)
CO2	realize the importance of yoga in mental health.	Applying (K3)
CO3	realize the role of yoga in personality development and diet.	Applying (K3)
CO4	do the loosening practices, Asanas and realize its benefits.	Applying (K3)
CO5	do the practice of Pranayama, meditation and realize its benefits	Applying (K3)

Map	oing of	COs with	POs	and PSOs	
					•

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	4 9 80 1			- , .	6-	3		2	1		
CO2						3		2		4-5	
CO3	1		7			3	a .	3	- / -	Townships	
CO4						3		2	3		
CO5	T ABOUT					3		. 3			

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMENT	PATTERN -	THEORY
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Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzin g (K4) %	Evaluati ng (K5) %	Creating (K6) %	Total %
CAT1	e le mari	- <u>-</u>			r - Emily		=
CAT2	,		-	-		<u>.</u>	
CAT3	20	30	50	-	-		100
ESE		<u>-</u> }			-	-	-

* ±3% may be varied (CAT3 - 100 marks)

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U Unature of the Chairman
Board of Studies - SAH (modfs)



Programme & Branch	B.Tech - Chemical Engineering	Sem.	Category	L	T	Р	SL*	Total	Credit
Prerequisites	Nil	3	ES	45	0	0	45	90	3
Preamble	This course presents the fundamental engineers.	aspects of	mechanical	and e	ectric	al er	ngineer	ing for	chemica
Unit – I	IC Engines		1						9
Timing Diagran System Types	 Components and their Functions - Two Strokens - Injection System Types - MPFI - CRDI - I Pressure Feed Lubricating System and Collution Control Norms and Methods-Catalytic Control 	gnition Systematics on the system of the sys	em Types – E em Types –	attery Liquid	Coil Coo	Ignitio	on Syst	tem – Lu	ıbricatio
Unit – II	Refrigeration and Air Conditioning								9
Vapour Absorp Handling Unit (Vorking Principle of Vapour Compression Refr otion Refrigeration System - NH₃-H₂O and LiB AHU).							_	
	Transformers ransformers – Principle ,Construction and Wor	king of Trar	nsformers, en	nf equa	ation,	Thre	e phas	se transf	9 ormers -
Single phase to Merits, Constru	ransformers – Principle ,Construction and Woruction and Working, Connections of three ph								ormers -
Single phase to Merits, Constru Cooling, mainte Unit – IV	ransformers – Principle ,Construction and Wor uction and Working, Connections of three ph enance. Generators	ase transfor	rmers, Condit	ions fo	or Pa	rallel	Opera	ition, me	ormers dethods of
Single phase to Merits, Constru Cooling, mainte Unit – IV DC Generator emf equation,	ransformers – Principle ,Construction and Wor uction and Working, Connections of three ph enance.	ase transfor	rmers, Condit	ions fo	or Pa	rallel Brush	Opera	xcitation	ormers - ethods o
Merits, Constru Cooling, mainte Unit – IV DC Generator emf equation, operation.	ransformers – Principle ,Construction and Woruction and Working, Connections of three phenance. Generators – Principle, Construction and Working. AC Get	ase transfor	rmers, Condit	ions fo	or Pa	rallel Brush	Opera	xcitation	ormers - ethods o
Single phase to Merits, Construction Cooling, mainted Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – V Working, Single	ransformers – Principle ,Construction and Wor uction and Working, Connections of three ph enance. Generators – Principle, Construction and Working. AC Gen Losses in a Synchronous Machine and Eff	nerator – Coliciency, Por	onstruction and wer Flow Dia	d Work	king, Hur	Brush ting,	Opera	xcitation for	9 System Paralle 9 ction and
Single phase to Merits, Construction Cooling, mainte Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – N Working, Single and Capacitor	ransformers – Principle ,Construction and Working and Working, Connections of three phenance. Generators Principle, Construction and Working. AC Gelevance Losses in a Synchronous Machine and Effective Motors Working Principle, Back emf, types, application of Sing	nerator – Coliciency, Por	onstruction and wer Flow Dia	d Work	king, Hur	Brush ting,	Opera	xcitation for	9 System Paralle
Single phase to Merits, Construction Cooling, mainted Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – Working, Single and Capacitor	ransformers – Principle ,Construction and Working and Working, Connections of three phenance. Generators – Principle, Construction and Working. AC Gel Losses in a Synchronous Machine and Eff Motors Working Principle, Back emf, types, application of Sing Motors. Special Purpose Motor- BLDC motor.	nerator – Co iciency, Po ons.Three P le-phase Mo	onstruction and wer Flow Dia thase Induction otors, Constru	d Worlagram,	king, Hur ors -	Brush ting, - Prin orkin	Opera	xcitation for	9 System Paralle 9 ction and
Single phase to Merits, Construction Cooling, mainted Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – N Working, Single and Capacitor of the Capacitor	ransformers – Principle ,Construction and Working and Working, Connections of three phenance. Generators Principle, Construction and Working. AC Gel Losses in a Synchronous Machine and Eff Motors Working Principle, Back emf, types, application of Sing Motors. Special Purpose Motor- BLDC motor.	nerator – Co iciency, Por ons.Three P le-phase Mo	onstruction and wer Flow Dia chase Induction btors, Construction	d Worlagram,	king, Hur ors -	Brush ting, - Prin orkin	Opera	xcitation for	9 System Paralle 9 ction and
Single phase to Merits, Construction Cooling, mainted Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – N Working, Single and Capacitor of the Capacitor	ransformers – Principle ,Construction and Working and Working, Connections of three phenance. Generators Principle, Construction and Working. AC Generators Principle, Construction and Working. AC Generators Working and Effective and Eff	nerator – Co iciency, Por ons.Three P le-phase Mo	onstruction and wer Flow Dia chase Induction btors, Construction	d Worlagram,	king, Hur ors -	Brush ting, - Prin orkin	Opera	xcitation for	9 System Paralle 9 Ction an
Single phase to Merits, Construction Cooling, mainted Unit – IV DC Generator emf equation, operation. Unit – V DC Motors – V Working. Single and Capacitor TEXT BOOK: 1. Mahes 2. S K Sa REFERENCES	ransformers – Principle ,Construction and Working and Working, Connections of three phenance. Generators Principle, Construction and Working. AC Generators Principle, Construction and Working. AC Generators Working and Effective and Eff	nerator – Co iciency, Por ons.Three P le-phase Mo	onstruction and wer Flow Dia chase Induction btors, Construction and the chase Induction btors, Construction JSA, 2018.	d Work agram, on Mot ction a	or Pa	Brushting, - Prin	Opera	xcitation, me	9 System Paralle 9 ction and the Motor

		UTCON		se, the s	tudent	s will be a	able to					¥	(1	BT Mapp Highest L	
CO1	100000000000000000000000000000000000000	lain the trol met		IC engin	e parts	, ignition, o	cooling, I	ubricatio	n syste	ems and diffe	rent pollu	tion	Un	derstandir	ıg (K2)
CO2		oly the cotem.	oncepts	of refrige	ration a	and air con	ditioning	in estin	nating t	he performan	ce of VCR			Applying (K3)
CO3	illus	strate th	e constr	uction, co	onnecti	on of singl	e and th	ree phas	se trans	formers			7	Applying (K3)
CO4	ехр	lain the	working	of DC an	d AC g	jenerators	*	5 <u>5</u>	63		1		Un	derstandir	ıg (K2)
CO5	des	scribe th	e princip	les of DC	and A	C motors		- * , `		% * s			Un	derstandir	ıg (K2)
V 4						Mappin	g of CO	s with P	Os and	d PSOs					
COs/F	POs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO	11	PSO1	PSO2
СО	1	- 3	2	2	1	4			3	2		2	2	2	
СО	2	3	2	2	1				3	2		2	2	2	. 100 -
СО	3	3	1	-								1		3	
СО	4	3	1									1		3	Ų.
СО	5	3	1								1 10,1	Paragraphy	I	3 .	11 1
1 – SI	ight, 2	2 – Mode	erate, 3 -	- Substar	ntial, B	Γ- Bloom's	Taxono	my			184	No.			
	-	- Carrier of				ASSES	SMENT	PATTE	RN – TI	HEORY					
0.10	st / BI Categ	oom's ory*	Re	member (K1) %	ing	Understa (K2)	-	Appl (K3		Analyzing (K4) %	Evalua (K5)			reating K6) %	Total
5	CAT	Γ1		L.		70		30)	i int				rat di	100
- •	CAT	Γ2				70)	30)			-1		es l'imili	100
F 12	CAT	Г3				70)	30	0			P			100
															Della Santa Sa

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ESE

Signature of the Chairman Board of Studies -

* ±3% may be varied (CAT 1,2,3 - 50 marks & ESE - 100 marks)



	24CHT31 - CHEMICAL	FROCES	3 CALCULA	HON	S				
Programme& Branch	B.Tech. – Chemical Engineering	Sem.	Category	L	Т	Р	SL*	Total	Credit
Prerequisites	Nil	3	PC	45	15	0	60	120	4
Preamble	This course provides basic knowledge industries.	e of mate	erials and ene	ergy b	paland	ce ca	ılculati	on in che	emical
Unit - I	Basics of Process Calculations			1					9+3
mixture calculat Unit II Vapour pressure	ne and temperature using ideal gas la ion. Vapour pressure and Humidity calc e of liquids – Clausius-Clapeyron equati – Henry's law. Humidification and D	ulations	oine equation	ı - va	por p	ressi	ure of	immiscib	9+3
percentage and	saturation humidity; use of Psychrometr	ric chart.	V					, indiai,	rolativo
Unit - III	Material Balance for Unit Operation	าร							9+3
	e calculations- distillation, evaporation, o	crystalliza	ation, drying,	extra	ction	and	mixing	g; Unit of	perations
Unit - IV	cycle and purging. Material Balance for Unit Processe	s				X		A	
Unit - IV Stoichiometric p		nts, conve	ersion, yield d and gaseo	and us fue	selec	tivity	r, Mate	erial bala d analysi	9+3
Unit - IV Stoichiometric preactions, theore Unit - V	Material Balance for Unit Processe orinciples - limiting and excess reactan etical and excess air for combustion of s Energy Balance Calculations	nts, conve colid, liqui	d and gaseo	us fue	els; F	lue g	as and	d analysi	9+3 ance with s. 9+3
Unit - IV Stoichiometric preactions, theore Unit - V Enthalpy chang change of reactions	Material Balance for Unit Processe orinciples - limiting and excess reactan etical and excess air for combustion of s	nts, conve colid, liqui pases usi nixing; Ef	d and gaseo ng molal and fect of temp	d mea	els; F an m re or	olal hea	heat cat of re	d analysicapacity;	9+3 ance with s. 9+3 Enthalov
Unit - IV Stoichiometric preactions, theore Unit - V Enthalpy chang change of reactions flame temperature TEXT BOOK: 1. Himmelt	Material Balance for Unit Processe principles - limiting and excess reactan etical and excess air for combustion of s Energy Balance Calculations e calculations for solids, liquids, and g tion, formation, combustion, solution, m	nts, conve colid, liqui pases usi nixing; Ef ations us	d and gaseong molal and fect of temping MS Exce	d mea eratu	an m re or	olal heass sin	heat cat of renulator	d analysicapacity; eaction;	9+3 ance with s. 9+3 Enthalpy Adiabation
Unit - IV Stoichiometric preactions, theore Unit - V Enthalpy chang change of reactions flame temperature TEXT BOOK: 1. Himmelt	Material Balance for Unit Processe principles - limiting and excess reactangetical and excess air for combustion of second Energy Balance Calculations e calculations for solids, liquids, and getion, formation, combustion, solution, mure. Material and energy balances calculated D.M., "Basic Principles and Calculated Delhi, 2015.	nts, conve colid, liqui pases usi nixing; Ef ations us	d and gaseong molal and fect of temping MS Exce	d mea eratu	an m re or	olal heass sin	heat cat of renulator	d analysicapacity; eaction;	9+3 ance with s. 9+3 Enthalpy Adiabatio
Unit - IV Stoichiometric preactions, theore Unit - V Enthalpy chang change of reactions temperate TEXT BOOK: 1. Himmelt India, New REFERENCES: 1. Narayan	Material Balance for Unit Processe principles - limiting and excess reactangetical and excess air for combustion of second Energy Balance Calculations e calculations for solids, liquids, and getion, formation, combustion, solution, mure. Material and energy balances calculated D.M., "Basic Principles and Calculated Delhi, 2015.	ats, conversely, conversely, liquid asses usinixing; Effactions us	d and gaseo ng molal and fect of temp ing MS Exce	d mea eratu I & P	els; F an m re or roces ring",	olal olal olas sin	heat concluded the conclusion of the conc	apacity; eaction; rs	9+3 ance with s. 9+3 Enthalpy Adiabation
Unit - IV Stoichiometric preactions, theore Unit - V Enthalpy chang change of reactions temperate TEXT BOOK: 1. Himmelt India, New REFERENCES: 1. Narayan India, New 2. Venkata	Material Balance for Unit Processe orinciples - limiting and excess reactant etical and excess air for combustion of second Energy Balance Calculations etical excess air for solids, liquids, and getion, formation, combustion, solution, mare. Material and energy balances calculated Dalay D.M., "Basic Principles and Calculated Delhi, 2015.	ats, conversely, liquidates usinixing; Effactions us	d and gaseo ng molal and fect of temp ing MS Exce Chemical Eng	d mea eratu el & P	an m re or roces ring",	olal heas sin	heat concluded the state of rendered the state of rendered the state of the state o	d analysicapacity; eaction; ars	9+3 ance with s. 9+3 Enthalpy Adiabation e Hall of



	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	apply the basic laws for calculating the compositions of mixtures and solutions	Applying (K3)
CO2	solve material balance equations for vapour pressure and humidity calculations	Applying (K3)
CO3	apply stoichiometric principles to unit operations	Applying (K3)
CO4	solve material balance equations for unit processes with bypass, purge and recycle	Applying (K3)
CO5	perform enthalpy change calculations for chemical reactions	Analyzing (K4)
	Mapping of COs with POs and PSOs	

						9			31.31.31				
COs/POs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	- Q	1				-			. 2	3	2
CO2	3	3	1	2		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					2	3	2
CO3	3	3	1	2							2	3	2
CO4	3	3	1	2						p:	2	3	2
CO5	3	3	1	2	14	5					2	3	2

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSI	MENT	PAT	TERN	- THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		30	70			H	100
CAT2		20	80	(ps	I		100
CAT3		20	60	20			100
ESE		10	70	20			100

±3% may be varied (CAT 1,2,3 - 50 marks & ESE - 100 marks)

Signature of the Chairman d of Studies - Chemical







	24CHT32 - F	LUID MECH	HANICS						11143114
		T_de-	- 1 - 2		-				
Preamble This course provides knowledge on momentum transfer fundamentals, transportation and metering of fluids Unit - I Fluid Statics and Dimensional Analysis Nature of fluids: Liquids and Gases - Properties of fluids - Fluid Statics: Hydrostatic Equilibrium - Application of Fluid Station of Fluid Stations in Dimensions - Dimensions - Dimensional analysis. Similarit dimensionless numbers Unit - II Fluid Flow Phenomena Rewtonian and non-Newtonian fluids - Time dependent and viscoelastic fluids, Types of fluid flow, Boundary layers, Reynonumber and significance. Basic equation of fluid flow: Mass balance equation- Mechanical energy equation Unit - III Flow of incompressible fluids in Pipes Shear stress and Skin friction - Laminar flow- Turbulent flow - Friction factor chart - Friction from changes in velocity: Sude Expansion and Contractions - Fitting losses. Introduction to compressible flow. Isentropic flow through convergent and diverg nozzles and sonic velocity Unit - IV Flow Past Immersed Bodies Drag and Drag coefficients - Flow through packed bed: Determination of pressure drop using Ergun equation - Motion of partic through fluids- Fluidization: Conditions for fluidization- Minimum fluidization velocity - Types of fluidization - Expansion of fluidizations of fluidizations of fluidization eleas- Applications of fluidization beds - Applications eleas- Pumps: Positive displacement and centrifugal pumps- Performance characteristics- Fans, Blowers a Compressors- Measurement of flowing fluids: Venturimeter- Orificemeter- Rotameter- Vortex meters- Turbine meters- Corimeters- Magnetic meters- Pitot tube- notches and weirs. TEXT BOOK: 1. McCabe W.L., Smith J.C. and Harriot P, "Unit Operations of Chemical Engineering", 7th Edition, McGraw Hill Education, United States of America, 2017.						Credit			
Prerequisites	Nil	3	PC	30	15	0	45	90	3
Preamble	This course provides knowledge on mom	entum transf	er fundamenta	als, tra	anspo	rtation	n and m	netering o	f fluids
Unit - I	Fluid Statics and Dimensional Analysi	s						6+3	
Manometers- Co	ontinuous gravity decanter- Centrifugal de								
Unit - II	Fluid Flow Phenomena				54			6+3	
number and sign	ificance. Basic equation of fluid flow: Mass bases	alance equat							Reynolds
Unit - III	Flow of incompressible fluids in Pipes	1	D.					6+3	- 0
Expansion and C	Contractions - Fitting losses. Introduction to								
Unit - IV	Flow Past Immersed Bodies				1		10	6+3	
through fluids- Fl	uidization: Conditions for fluidization- Minim	ermination of num fluidization	pressure drop on velocity - T	using ypes	g Ergu of fluid	ın equ dizatio	uation - on - Exp	Motion o	f particle: f fluidized
Unit - V	Transportation and Metering of Fluids				IN C III			6+3	T. N.
Compressors- M	leasurement of flowing fluids: Venturimeter	d centrifugal - Orificemete	pumps- Perfo er- Rotameter	rmand - Vort	e cha ex m	racte eters-	ristics- Turbir	Fans, Blo ne meters	owers and s- Coriolis
TEXT BOOK:			,						4 /
		ons of Chem	ical Engineeri	ng", 7	th Edit	ion, N	1cGraw	Hill Educ	cation,
REFERENCES:		I **							STORY
1. Noel de	Nevers, "Fluid Mechanics for Chemical Engli	neers", 3 rd Ed	dition, McGraw	/-Hill (Chemi	cal E	ngineer	ing Serie	s, 2004.
2. Yunus C	engel "Fluid Mechanics: Fundamentals and	Applications"	McGraw-Hill I	Highe	r Edu	cation	: 4 edit	ion. 2017	4 4
		1-1-1-1-1-1-1		.50	,		,	,	



CO5

	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	explain characteristics of fluids at rest, and perform dimensional analysis	Applying (K3)
CO2	apply the basic equations of fluid flow	Applying (K3)
CO3	determine the flow behavior for incompressible fluids	Applying (K3)
CO4	analyze the flow characteristics in packed and fluidized bed	Analyzing (K4)
CO5	analyze the performance of pumps, fans, blowers, compressors and flow meters	Analyzing (K4)
-	Mapping of COs with POs and PSOs	The second of th

					Mappin	g of COs	s with P	Us and I	PSUS				ALTER IS
COs/POs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	1			(Colombia)	mbo. 14			i, 1 1 1, 1, 1	3	2
CO2	3	3	2	1							1.	3	2
CO3	3	3	3	2		0			F		1	3	2
CO4	3	3	3	2				. "1	7	, n, n	1	3	2

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

ASSESSMENT	PATTERN -	THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1		80	20	1 0 1		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100
CAT2		70	30	*			100
CAT3		70	20	10			100
ESE		70	20	10			100

* ±3% may be varied (CAT 1,2,3 - 50 marks & ESE - 100 marks)

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Board of Studies -



	24CHT33 - APPLIED	ORGANIC	CHEMISTRY	′		-	4.0 .7		11
Programme& Branch	B.Tech. – Chemical Engineering	Sem.	Category	L	Т	Р	SL*	Total	Credit
Prerequisites	Nil	3	PC	45	0 .	0	45	90	3
Preamble	To gain knowledge about basic organic cororganic reactions	mpounds ar	nd understand	the re	eactio	on me	echanis	m of vario	ous
Unit - I	Basic Principles					_		9	
rearrangements condensation; N	Organic Reactions Electrophilic reaction and applications — ; Mechanism of Nucleophilic reactions and dechanism of Free radical reactions and application.	applicatio	ns -Aldol co	ndens	ation	ı, Pe	rkins i	reaction,	Benzior
Unit - III	oxide, Thermal halogenations reaction. Carbohydrates and Protein							9	
and maltose – aspects. Industr	carbohydrates, Mono saccharides – Glucose and Preparation and Properties-Polysaccharides – ial uses of starch and cellulose. Amino Acids and Cally – The Cally – T	- Starch ar	nd Cellulose -	- Prep	arati	on a	nd Pro	perties, \$	
Unit - IV	Oils, Fats, Soaps and Detergents				d-			9	24.3.3
	ccurrence and Extraction, Physical and chemical biodegradability, mechanism of cleaning action of Synthesis of Dyes and Drugs						ses. So	pap and [Detergen
Classification ba	ased on structure and application, Synthesis and Antimalarial - Chloroquine, Antibiotic-penicillin,	sis and a	oplications of					nylmetha	
TEXT BOOK:									
1. Tiwari k	C.S, Vishnoi N.K, "A text book of organic chemis	try", 4 th Edi	tion, Vikas Pu	blicati	on, lı	ndia,	2014.		
REFERENCES:									
New Yo				## E					

*Includes Term Work (TW) & Online / Certification course hours



	SE OUTCOMES: mpletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	classify organic compounds and explain separation techniques	Understanding (K2)
CO2	utilize knowledge of reaction mechanisms to analyze and predict organic reaction outcomes	Applying (K3)
CO3	categorize carbohydrates, amino acids and explain their characteristics	Understanding (K2)
CO4	employ methods to evaluate the characteristics and synthesis of oils, fats, soaps, and detergents	Applying (K3)
CO5	outline the synthesis of dyes and drugs	Understanding (K2)

	Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PSO1	PSO2		
CO1	3	2	1			1	1		Sec. 18.5	3 4	2	2	1		
CO2	3	3	1			1	1	rij(-			2	3	2		
CO3	3	3	2	F 7 1	5.7	1	1	1 1	-		2	3	2		
CO4	3	2	1			. 1	1	811	Selava		2	2	2		
CO5	3	3	2			_1 -	_ 1 .		= "		2	3	2 -		

1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

	ASSESSMENT PATTERN - THEORY													
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %							
CAT1	-	80	20	=	-	Programme in	100							
CAT2		80	20	- 17 <u>-</u> 4 a	. Dist _a ri s	<u>-</u>	100							
CAT3	-	80	20		_	1 -01 <u>2</u> 1 J. RE	100							
ESE		80	20			' - N	100							

* ±3% may be varied (CAT 1,2,3 – 50 marks & ESE – 100 marks)





Programme &	B TECH Chaminal Family		0-4			_	O1 ±	4	
Branch	B.TECH. – Chemical Engineering	Sem.	Category	L	Т	Р	SL*	Total	Credi
Prerequisites	Nil	3	PC	45	0	30	45	120	4
Preamble	This course introduces the laws and co	ncepts of	f thermodyna	amics	to a	analy	ze ar	nd evalu	ate the
	performance of various systems and proces	ses in the	e field of cher	nical e	engin	eerir	ng		
Unit – I	Laws of Thermodynamics							9	
	s: categorization of systems, propertie law: applications to non-flow and flow process ons. Third law of thermodynamics.		processes and law: heat		nterna nes -		energy not cyc		nthalpy heorem
Unit – II	Properties of Real Gases and Thermody	namics F	ormulations					9	
	of fluids: compressibility factor - two-and three n der Waals, Redlich - Kwong equations. Basi						ng sta	tes. Equ	ation o
Unit – III	Properties of Solutions		* J					9	C .
	perties. Chemical potential. Fugacity and act nergy changes of mixing of ideal solution.	ivity coeff	icients. Gibb	s-Duh	em e	equat	tion. E	nthalpy,	entrop
Unit – IV	Phase Equilibria							9	
systems. Vapour and T-x-y diagra	m and stability. Criteria for equilibrium betw -liquid equilibrium of binary ideal and non-idea ms using Antoine equations.	een phas al solution	ses in single s. Azeotrope	and s. Rad	mult oult's	i- co law	mpone and He	ent non- enry's la	reactin w. P-x-
Unit – V	Chemical Reaction Equilibria							9	
Criteria for chen	nical equilibrium. Standard free energy chang reaction equilibrium constant. Homogeneous	ge and re	action equilit	orium	cons	stant.	Effec	t of tem	peratur
of equilibrium co		Cricinical	reactions. 11	icillio	uyna	iiiic a	ariarys	is and pi	edictio
LIST OF EXPER	RIMENTS / EXERCISES:			,		,	-	1	-4
1. Determ	ination of PVT behavior of gases		- 2 -						4
2. Determ	ination of saturation solubility			1		:	- v.	v * , * * .	
3. Estima	tion of heat of solution		x						a
4. Determ	ination of entropy change of quenching proces	SS	- 1 mg 1 - 11	* 1	7 -				
5. Determ	ination of entropy change of mixing process	- 7	4- 2 4 -				1.		-
6. Determ	nination of specific heat capacity of substances								
7. Estima	tion of calorific value of solids and liquids						-		
8. Determ	nination of reduced pressure and reduced temp	erature of	ffluids						
9. Determ	nination of partial molar properties of liquids		,		Œ			-	*
10 Determ	nination of reaction coordinate of saponification	reaction				i.		NA F	
TEXT BOOK:							0	17952	
	Mauk Smith, Hendrick C. Van Ness, Michael ring Thermodynamics, 8th Edition, McGraw Ed				wiha	rt, In	troduc	tion to C	hemic
REFERENCES/	MANUAL / SOFTWARE:	es ·			n =				6
	Nevers, Physical and Chemical Equilibrium fo sey, 2012.	or Chemic	al Engineers	, 2nd	Editio	on, Jo	ohn W	iley & Sc	ns, Inc
	Koretsky, Engineering and Chemical Thermod	vnamics	2nd Edition	Wilev	201	2			0

^{*}Includes Term Work (TW) & Online / Certification course hours



		UTCO tion of		rse, the	stude	nts will b	e able	to					BT Map (Highest	
CO1	арр	ly the la	aws of th	ermodyn	amics	to praction	cal syste	ems an	d proc	esses		a sa	Applying Manipulation	
CO2	mak	ke use k	of the eq	uations o	of state	e to deter	mine the	e volum	etric p	properties of p	oure fluids		Applying Manipulation	
CO3	арр	ly the s	ummabi	lity relation	on to e	estimate tl	ne mola	r and p	artial r	nolar propert	ies of solu	tions	Applying Manipulation	
CO4	арр	ly phas	e equilib	rium cor	cepts	to system	ns at VL	E _{nte} de				-	Applying Manipulation	
CO5	ana	lyze the	e homog	eneous (chemic	cal reaction	ns and	evaluat	te the	equilibrium c	omposition	1	Applying Manipulation	
						Mapping	g of CO	s with	POs a	nd PSOs				CAN'TY
COs/P	Os	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO1	1 PS01	PSO2
CO	1 .	3	3	2	2				100		2	1	3	2
CO2	2	3	3	2	2			£.				1	3	2
CO	3	3	3	2	2				-			1	3	2
CO	4	3	3	3	2						- ·	1	3	2
CO	5	3	3	3	2						- ,	1	3	2
1 – Sli	ght, 2	2 – Mod	lerate, 3	– Substa	antial,	BT- Bloor	n's Tax	onomy				. 14 11	1 27	
						ASSES	SMENT	PATTI	ERN -	THEORY				
	t / Bloatego	oom's orv*	Rei	nemberi (K1) %	ing	Understa (K2)		Apply (K3)		Analyzing (K4) %	Evalua (K5)	_	Creating (K6) %	Tota
	CAT			1 / / /		40		60			(/	(8.97)		100

* ±3% may be varied (CAT 1,2,3 – 50 marks & ESE – 100 marks)

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40

40

40



60

60

60

CAT2

CAT3

ESE

100

100

	24GET31- UNIV (Common to All Engine					129			
Programme & Branch	All B.E & B.Tech Branches	Sem.	Category	L	T	P	SL*	Total	Credit
Prerequisites	Nil.	3/6	HS	30	0	0	30	60	0
At a series of	on that and other grades.					1 1			
Preamble	To make the student to know what t	they 'rea	ally want to	be' in	their	life a	nd profess	ion, unde	rstand the
	meaning of happiness and prosperit	ty for a	human bein	g. Als	so to f	acilita	te the stud	dents to u	nderstand
	about harmony at all the levels of hu	ıman liv	ing, and live	e acc	ording	gly			
Unit – I	Introduction				-			100	6
Need and Basic	Guidelines of Value Education - Conto	ent and	Process of	Value	e Edu	cation	- Self Ex	ploration	– purpose
of self-Exploration	on - Content and Process of Self explo	oration -	- Natural A	ccept	ance	– Rea	alization a	nd Under	standing -
	Aspirations - Continuous Happiness								
Requirement for	Fulfillment of Human Aspirations – Re	elations	hips – Phys	ical F	aciliti	es -	Right Und	lerstandir	ıg.
Unit – II	Harmony in the Self and Body								6
Human Being a	nd Body – Understanding Myself as C	Co–exist	ence of Se	lf ('l')	and I	Body,	Needs of	the Self	and Body
Activities in the	Self and Body, Self ('I') as the Conscious	us Entity	y, the Body	as th	e Mat	erial E	ntity – Ex	ercise – E	Body as ar
Instrument- Har	mony in the Self ('I) – Understanding N	/lyself –	Harmony w	ith B	ody.				
Instrument- Har Unit - III	mony in the Self ('I) – Understanding N Harmony in the Family and Socie		Harmony w	ith B	ody.	Lilo 1	- 1		6
Unit – III		ty	i my n	1-62		lation	ship from	Family to	
Unit – III Harmony in the	Harmony in the Family and Socie	ty in Huma	an Relations	1-62		lation	ship from	Family to	
Unit – III Harmony in the	Harmony in the Family and Socie Family – Justice – Feelings (Values)	ty in Huma nan Enc	an Relations	1-62		lation	ship from	Family to	
Unit – III Harmony in the Identification of Unit – IV	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum	ty in Huma nan End	an Relations deavour.	ships	– Re		-		Society -
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Confo	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co–	ty in Huma nan Ence eng the F	an Relations deavour.	ships - Inna	- Re	ss – N	Natural Ch	aracterist	Society -
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Conformo-activity – Ex	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence.	ty in Huma nan End e ng the F existend	an Relations deavour. Four order - ce of units o	ships - Inna of Spa	– Re	ss – N Limite	Natural Ch	aracterist	Society – 6 tic – Basic Active and
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Confor No–activity – Ex Unit – V	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence. Implications of the above Holistic Professional Ethics	ty in Huma nan End e ng the F existen c Under	an Relations deavour. Four order - ce of units o	ships Inna of Spa	- Reateneatenea	ss – N Limite	Natural Ched and un	aracterist	Society - 6 iic - Basic Active and
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Conford No-activity – Extended Interval Int	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- cistence is Co-existence. Implications of the above Holistic Professional Ethics Int dimensions of Human Living – Defin	ty in Huma nan End e ng the F existend c Under	an Relations deavour. Four order - ce of units of standing o	ships - Inna of Spa f Har	- Reateneace -	ss - N Limite y on	Natural Ched and un	aracterist	Society - 6 tic - Basic Active and 6
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Confor No-activity – Ex Unit – V Values in different Living – Identification in the III Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the IIII Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in different Living – Identification in the III Values in the III	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence. Implications of the above Holistic Professional Ethics Int dimensions of Human Living – Definication of Comprehensive Human Goal	ty in Huma nan End e ng the F existend c Under	an Relations deavour. Four order - ce of units of standing o	ships - Inna of Spa f Har	- Reateneace -	ss - N Limite y on	Natural Ched and un	aracterist	Society - 6 tic - Basic Active and 6
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Conformo-activity – Ex Unit – V Values in different Living – Identificant Issues in Prince In the III Unit – V	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- cistence is Co-existence. Implications of the above Holistic Professional Ethics Int dimensions of Human Living – Defin	ty in Huma nan End e ng the F existend c Under	an Relations deavour. Four order - ce of units of standing o	ships - Inna of Spa f Har	- Reateneace -	ss - N Limite y on	Natural Ched and un	aracterist	Society - 6 tic - Basic Active and 6
Unit – III Harmony in the Identification of I Unit – IV Order of Nature Activity – Confor No-activity – Ex Unit – V Values in differe Living – Identification and Issues in Pr TEXT BOOK:	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence. Implications of the above Holistic Professional Ethics ent dimensions of Human Living – Definitation of Comprehensive Human Goal - ofessional Ethics.	ty in Huma nan End e ng the F existend c Under itivenes – Huma	an Relations deavour. Four order - ce of units of estanding of ss of Ethical nistic Educa	ships Inna of Spa f Har Hum	- Re atene	ss – N Limite / on onductiversal	Natural Ched and unlessed and u	imited – A	Society - 6 Active and 6 alue based
Unit – III Harmony in the Identification of Unit – IV Order of Nature Activity – Confor No–activity – Ex Unit – V Values in differe Living – Identificand Issues in Pr TEXT BOOK: Gaur	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence. Implications of the above Holistic Professional Ethics Int dimensions of Human Living – Definication of Comprehensive Human Goal	ty in Huma nan End e ng the F existend tunder itivenes - Huma	an Relations deavour. Four order - ce of units of estanding of ss of Ethical nistic Educa	ships Inna of Spa f Har Hum	- Re atene	ss – N Limite / on onductiversal	Natural Ched and unlessed and u	imited – A	Society - 6 Active and 6 alue based
Unit – III Harmony in the Identification of Unit – IV Order of Nature Activity – Confor No–activity – Ex Unit – V Values in differe Living – Identificand Issues in Pr TEXT BOOK: 1. Gaur editic REFERENCES:	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understandir rmance – Introduction to Space – Co- istence is Co-existence. Implications of the above Holistic Professional Ethics ent dimensions of Human Living – Definitation of Comprehensive Human Goal- refessional Ethics. R.R., Sangal R., Bagaria G.P., "A Foundary of Pools of Po	ty in Huma nan End e ng the F existend c Under itivenes – Huma undation	an Relations deavour. Four order - ce of units of estanding of es of Ethical nistic Educa	ships Inna of Spa f Har Hum	- Re atene	ss – N Limite / on onductiversal	Natural Ched and unlessed and u	imited – A	Society - 6 Active and 6 alue based
Unit – III Harmony in the Identification of Unit – IV Order of Nature Activity – Conformo-activity – Ex Unit – V Values in differe Living – Identificand Issues in Pr TEXT BOOK: 1. Gaure edition REFERENCES:	Harmony in the Family and Socie Family – Justice – Feelings (Values) Human Goal – Five dimensions of Hum Harmony in Nature and Existence – Interconnectedness – Understanding remance – Introduction to Space – Co- cistence is Co-existence. Implications of the above Holistic Professional Ethics ent dimensions of Human Living – Definition of Comprehensive Human Goal - crofessional Ethics. R.R., Sangal R., Bagaria G.P., "A Foundary Excel Books Pvt. Ltd., New Delhi, 2	ty in Huma nan End e ng the F existend c Under itivenes – Huma undation	an Relations deavour. Four order - ce of units of estanding of es of Ethical nistic Educa	ships Inna of Spa f Har Hum	- Re atene	ss – N Limite / on onductiversal	Natural Ched and unlessed and u	imited – A	Society - 6 Active and 6 alue based

^{*}includes Term Work(TW) & Online / Certification course hours

	E OUTCOMES: pletion of the course, the students will be able to	BT Mapped (Highest Level)
CO1	identify the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society	Applying (K3)
CO2	interview between the Self and the Body, understand the meaning of Harmony in the Self, the Co–existence of Self and Body	Applying (K3)
CO3	build harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society	Applying (K3)
CO4	experiment with themselves to co-exist with nature by realising interconnectedness and the four orders of nature	Applying (K3)
CO5	identify the differences between ethical and unethical practices, and apply ethical and moral practices for a better living	Applying (K3)

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	L 11 ==	1	2	i k		<i>y</i> 1 -	2	3	2
CO2	3	2	2	2		1	2	LK = TEDES	i i i i i i i i i i i i i i i i i i i	Le sessions	2	3	2
CO3	3	2	2	2		1	2	1	-	- 61	2	3	2
CO4	3	2	2	2		1	2		THE R	- 1	2	3	2
CO5	3	2	2	2	e ence	1	2	-		- Ocsi-	2	3	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN – THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total
CAT1		80	20			टचे अनुनामाः र	100
CAT2	7 41 7 144	80	20	rpigare in right	in the second of the	n 2	100
CAT3		80	20				100
ESE	6		1	۱A			

* ±3% may be varied (CAT 1, 2 & 3 – 50 marks)

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Signature of the Chairman

Board of Studies -







		24CHL31 - FLUID ME	CHANICS L	ABORATO	RY					
Programn	ne & Branch	B.Tech. – Chemical Engineering	Sem.	Cate gory	L	Т.	Р	SL*	Total	Credit
Prere	quisites	Nil	3	PC	0	0	30	0	30	1
Preamble	a	This course provides an experientia students.	al understar	ndingof flow	mete	rs, pı	umps,	valves	and fitting	gs to the
LIST OF E	XPERIMENTS	/ EXERCISES:							•	
1.	Estimate the	discharge coefficient of variable head f	low meters	T					V4	
2.	Investigate t	he flow characteristics of a rotameter							ч	
3.	Estimate the	discharge coefficient of V- notch	(A)							
4.	Measure the	point velocity of air using a pitot tube								e e
5.	Determine th	ne loss coefficient of valves and pipe fitt	ings		-	<u> </u>		-	, ×	
6.	Verify the Me	oody diagram for flow through straight p	ipe and heli	cal coils	9 5 740 CANCERO MELANIA	*			_	
7.	Study the ef	fect of Reynolds number on friction fact	or for flow th	rough conce	entric p	oipes	-	,,		2 4
8.	Verify Berno	ulli's Theorem by Bernoulli's apparatus								
9.	Determine th	ne pressure drop for flow through packe	d bed	×		>	Š.			
10.	Determine th	ne minimum fluidization velocity								
11.	Study the cl	haracteristics of centrifugal and reciproc	ating pumps	S					-	
12.	Study the c	haracteristics of vacuum and gear pump	os							4
REFEREN	CES/ MANUAI	L/SOFTWARE:	â.		10		,	- E		
1.	Laboratory	Manual								
	OUTCOMES: etion of the co	ourse, the students will be able to					(H	BT Ma lighest		* ¥
CO1	channels, ar	he coefficient of discharge for flow the coefficient of discharge for flow the conduited verify Moody chart for closed conduited to the coefficient of the coefficien	s				M		ion (S2)	
CO2	and fluidized			-	ed		M		ion (S2)	
CO3	perform cha	racteristic studies of centrifugal and rec	iprocating p	umps	æ			Applying	g (K3), ion (S2)	

Mapping of	COs wit	h POs ar	nd PSOs	
				Т

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	. 3	2	1			1	1	3	2	*	2	3	2
CO2	3	2	1			1	1	3	2		2	3	2
CO3	3	2	1		-	1	1	3	2	· · · ·	2	3	2

^{1 -} Slight, 2 - Moderate, 3 - Substantial, BT- Bloom's Taxonomy

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^{*}Includes Term Work (TW) & Online / Certification course hours



	ramme & ranch	В.1	Гесh. –	Chemica	al Enginee	ring	Ser	n.	Cate gory	L	Т	Р	SL*	Total	Credit
Prere	equisites	Nil			11		3		PC	0	0	30	0	30	1
Pre	eamble	Thi	is course	e enables	s the stude	nts to	understa	and the a	ınalysis a	ind pre	epara	tion of	organic	compour	ıds.
IST OF	EXPERI	MENTS	EXERC	ISES:			XIAN XIAN							9	
1.	Analysis	of organ	ic comp	ounds –	Carbohydr	ates.		7.			A		19		
2.	Analysis	of organ	nic comp	ounds-E	sters			2					14		K ×
3.	Analysis	of organ	nic comp	oounds-T	hiourea				12						
4.	Analysis	of organ	ic comp	ounds-N	itro compo	unds									ξ-
5.	Analysis	of organ	ic comp	ounds-A	mides, Acid	ds.	e –			Se .		=,	9		
6.	Prepara	tion of m-	dinitro b	enzene	from nitro b	enzer	ne		2		7			K	
7.	Prepara	tion of be	enzoic a	cid from	ethyl benze	oate								x "	
8.	Prepara	tion of be	nzoic ac	cid from l	penzaldehy	/de				_	11				
9.	Estimati	on of phe	nol/anili	ne using	Winkler's	metho	d		16.				-	15	-
10.	Qualitati	ve separ	ation of	acid fron	n hydrocart	oon mi	ixtures		×					8	
11.	Estimati	on of acid	d value,	saponific	catión value	e and i	iodine va	lue of th	e given o	oil					
12.	Determi	nation of	the alka	li conten	t and fatty	acid c	ontent in	the give	n soaps			a)			-
								*,							
REFER	ENCES/ I	//ANUAL	/SOFT	WARE:										E1 (4)	
1.	Labora	itory Man	ual												
															,
	E OUTCO		415			- lala 4	_							BT Mapp	
on com					nts will be ound for al			natic sa	turated o	or line	atura	tod		lighest Le applying (I	
CO1		s and fur			Juliu IOI al	iipriatio	or aron	natio, 30	iturateu (or una	atura	icu,		nipulation	
CO2				organic c	ompounds	and e	estimate	the pher	nol or ani	iline c	onten	t by		Applying (I	
		s method				- d				lomou	of bis			nipulation	
CO3	mixtures		n oli an	u soap s	amples, ar	ia est	ımate tn	e separa	uon enic	iency	OI DII	iary		Applying (I anipulation	
Mannin	g of COs	with PO	s and P	SOs						d				844	
COs/P		PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PC	10	DC.	011	PSO1	PSO2
Os	_		F U 3	F U4	F 05					-	10				
CO1	3	1				2	1	3	2				1	3	1
CO2	3	2	1			2	1	3	2	-			1	3	2
						2	1	3	2	1			1	3	2

*Includes Term Work (TW) & Online / Certification course hours

chemical

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