

# KONGU ENGINEERING COLLEGE

(Autonomous Institution Affiliated to Anna University, Chennai)

PERUNDURAI ERODE – 638 060

TAMILNADU INDIA



Estd : 1984

## 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 ELECTRICAL AND ELECTRONICS ENGINEERING

## DEPARTMENT OF ELECTRONICS ENGINEERING ENGINEERING



**B.E. ELECTRICAL AND ELECTRONICS ENGINEERING CURRICULUM – R2024**  
**(For the students admitted from the academic year 2024-25 onwards)**

SEMESTER – I														
Course Code	Course Title	Hours / Semester						Credit	Maximum Marks			Category	Type	
		CI		LI	TW	SL	TH		CA	ESE	Total			
		L	T	P										
<b>Theory/Theory with Practical</b>														
24EGT11	English for Effective Communication - I	45	0	0	45	0	90	3	40	60	100	HS	C	
24MAC11	Matrices and Ordinary Differential Equations	45	7	16	52	0	120	4	50	50	100	BS	A	
24CYT13	Chemistry For Electronics And Computer Systems	45	0	0	45	0	90	3	40	60	100	BS	C	
24CSC11	Problem Solving and Programming in C	45	0	30	45	0	120	4	100	0	100	ES	OT	
24EET11	Electro Magnetic Fields and Electrical Measurements	45	0	0	45	0	90	3	40	60	100	PC	A	
24TAM01	Heritage of Tamils	15	0	0	15	0	30	1	100	0	100	HS	OT	
<b>Practical / Employability Enhancement</b>														
24CYL13	Chemistry Laboratory for Electronics And Computer Systems	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	20	0	0	10	0	30	0	100	0	100	MC		
24MNT11	Student Induction Program	0	0	90	0	0	90	0	100	0	100	MC		
<b>Total Credits to be earned</b>									<b>22</b>					

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



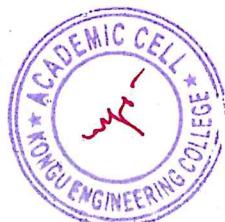
**B.E. ELECTRICAL AND ELECTRONICS ENGINEERING CURRICULUM – R2024**  
 (For the students admitted from the academic year 2024-25 onwards)

SEMESTER – II														
Course Code	Course Title	Hours / Semester						Credit	Maximum Marks			Category	Type	
		CI		LI	TW	SL	TH		CA	ESE	Total			
		L	T	P										
<b>Theory/Theory with Practical</b>														
24EGT21	English for Effective Communication - II	45	0	0	45	0	90	3	40	60	100	HS	C	
24MAC21	Multivariable Calculus and Complex Analysis	45	7	16	52	0	120	4	50	50	100	BS	A	
24PHT23	Physics For Electronics Engineering	45	0	0	45	0	90	3	40	60	100	BS	C	
24MET11	Engineering Drawing	30	15	0	45	0	90	3	40	60	100	ES	A	
24CSC23	Data Structures using C	45	0	30	45	0	120	4	50	50	100	ES	A	
24TAM02	Tamils and Technology	15	0	0	15	0	30	1	100	0	100	HS	OT	
<b>Practical / Employability Enhancement</b>														
24PHL23	Physics Laboratory For Electronics Engineering	0	0	30	0	0	30	1	60	40	100	BS		
24GCL11	Foundation Laboratory – Manufacturing, Design and Robotics	0	0	90	0	0	90	3	100	0	100	ES		
24MNT21	Quantitative Aptitude – II	20	0	0	10	0	30	0	100	0	100	MC		
24VEC11	Yoga and Values for Holistic Development	10	0	10	10	0	30	1	100	0	100	HS		
<b>Total Credits to be earned</b>									<b>23</b>					

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

	
<b>Signature of the Chairman</b> <b>Board of Studies : EEE</b>	



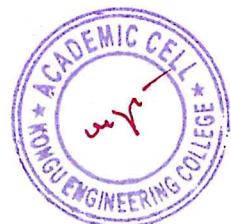
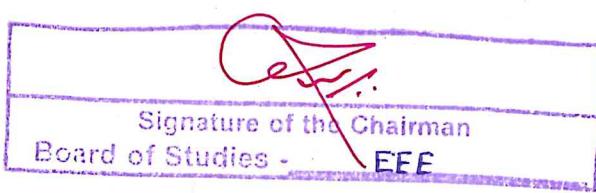
*Dinesh*

**B.E. ELECTRICAL AND ELECTRONICS ENGINEERING CURRICULUM – R2024**  
**(For the students admitted from the academic year 2024-25 onwards)**

SEMESTER – III																
Course Code	Course Title	Hours / Semester						Credit	Maximum Marks			Category	Type			
		CI		LI	TW	SL	TH		CA	ESE	Total					
		L	T													
<b>Theory/Theory with Practical</b>																
24EEC31	Circuits and Networks	45	0	30	45	0	120	4	50	50	100	PC	A			
24ITC33	Programming in Python	45	0	30	45	0	120	4	100	0	100	ES	OT			
24EET31	DC Machines and Transformers	45	0	0	45	0	90	3	40	60	100	PC	A			
24EET32	Analog Electronics	45	0	0	45	0	90	3	40	60	100	PC	D			
24EET33	Digital Electronics	45	15	0	30	30	120	4	40	60	100	PC	OC			
24GET31	Universal Human Values	30	0	0	30	0	60	2	100	0	100	HS	OT			
<b>Practical / Employability Enhancement</b>																
24EEL31	DC Machines and Transformers Laboratory	0	0	30	0	0	30	1	60	40	100	PC				
24EEL32	Analog and Digital Electronics 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				
<b>Total Credits to be earned</b>									<b>23</b>							

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



24EGT11 - ENGLISH FOR EFFECTIVE COMMUNICATION - I																		
(Common to all Engineering and Technology Branches)																		
Programme & Branch	All B.E/B.Tech Branches	Sem	Category	L	T	P	SL*	Total	Credit									
Prerequisites	Nil	1	HS	45	0	0	45	90	3									
Preamble	This course is designed to enhance the communication skills and verbal aptitude in English language required for various workplace communication and social interactions.																	
<b>Unit – I</b>	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>																	
<b>Grammar:</b> Parts of Speech – Articles – Determiners – <b>Verbal Aptitude:</b> Synonyms and Antonyms – Selecting Words – <b>Listening:</b> Listening and Filling in Information – <b>Speaking:</b> Introducing Oneself – Discussion on Social Media Etiquette – <b>Reading:</b> Importance of Good Communication – Comprehension and Inference, Reading for facts and opinions – Building a Positive Attitude: An Excerpt from <i>You Can Win</i> – <b>Writing:</b> Email Etiquette – Email Writing – Responding to Emails																		
<b>Unit – II</b>	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>																	
<b>Grammar:</b> Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory – Question Tags– <b>Verbal Aptitude:</b> Prefixes and Suffixes – Collocations – Idiomatic Expressions – <b>Listening:</b> Identifying main and Secondary Points – <b>Speaking:</b> Asking Questions – Role Play – <b>Reading:</b> Reading for Comprehension – Verbal and Non-Verbal Communication – Winning Strategies: An Excerpt from <i>You Can Win</i> - <b>Writing:</b> Descriptive Writing – Product/Process Description – Letter Writing: Formal Letters – Seeking Permission and Inviting Chief Guest																		
<b>Unit – III</b>	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>																	
<b>Grammar:</b> Tenses – Phrasal Verbs– <b>Verbal Aptitude:</b> Jumbled Sentences – Sentence Formation– <b>Listening:</b> Taking Notes from a Discussion – <b>Speaking:</b> Retelling an Incident – Discussing Tourist Destinations – <b>Reading:</b> Process of Communication–Scanning - Motivating Yourself and Others Every Day: An Excerpt from <i>You Can Win</i> – <b>Writing:</b> Paragraph Writing: Narrative and Compare & Contrast																		
<b>Unit – IV</b>	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>																	
<b>Grammar:</b> Prepositions – Transitional Words/Phrases – Discourse Markers – <b>Verbal Aptitude:</b> One Word Substitution - Sentence Completion – <b>Listening:</b> Listening for Specific Information – <b>Speaking:</b> Small Talk–Telephonic Conversations– <b>Reading:</b> Channels of communication – Building Positive Self-Esteem and Image: An Excerpt from <i>You Can Win</i> – <b>Writing:</b> Instructions – Recommendations and Suggestions																		
<b>Unit – V</b>	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>																	
<b>Grammar:</b> Subject Verb Agreement – Gerunds and Infinitives– <b>Verbal Aptitude:</b> Homonyms, Homophones and Homographs – Cloze Test using Verb Forms, Prepositions and Articles – <b>Listening:</b> Listening and Identifying Parts from a Description – <b>Speaking:</b> Agreeing and Disagreeing – <b>Reading:</b> Skimming – Reading to Summarize – Setting and Achieving your Goals: An Excerpt from <i>You Can Win</i> – <b>Writing:</b> Transcoding: Identifying Trends and Patterns in Graphs and Expressing with Graph Specific Vocabulary																		
<b>TEXT BOOK:</b>																		
1.	Sudharshana N P and Savitha C, <i>English for Technical Communication</i> , 2 <sup>nd</sup> Edition, Cambridge University Press, New Delhi, 2016.																	
<b>REFERENCES:</b>																		
1.	Ashraf Rizvi. <i>Effective Technical Communication</i> , 2 <sup>nd</sup> Edition, McGraw-Hill India, 2017.																	
2.	S. P. Dhanavel. <i>English and Communication Skills for Students of Science and Engineering</i> , Orient Black Swan Publishers, Hyderabad, 2009.																	
3.	Shiv Khera. <i>You Can Win: A Step-by-Step Tool for Top Achievers</i> . Bloomsbury Publishing, 2018.																	

\* includes Term Work (TW) & Assignments, Tutorials and Case Studies

COURSE OUTCOMES: On completion 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										
CO2	listen and understand different spoken discourses										
CO3	present ideas clearly and confidently in formal and informal conversations and discussions										
CO4	comprehend the given text and respond appropriately for technical and professional purposes										
CO5	select appropriate words , phrases and grammatical units and apply them in both spoken and written communication										

#### Mapping of COs with POs and PSOs

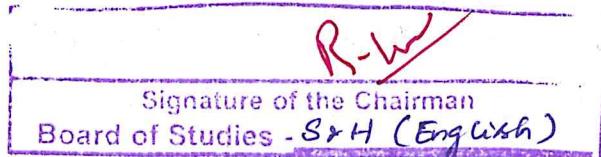
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						1		1	3	1	1		
CO2									1	3		1	
CO3									2	3	1	2	
CO4						1				3	1	2	
CO5										3		2	

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	-	-	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)



J-Rejair



24MAC11 - MATRICES AND ORDINARY DIFFERENTIAL EQUATIONS										
(Common to all Engineering and Technology branches)										
Programme & Branch	All B.E/B.Tech Branches	Sem.	Category	L	T	P	SL*	Total	Credit	
Prerequisites	Nil	1	BS	45	7	16	52	120	4	
Preamble	To provide the skills to the students for solving different real time problems by applying matrices and ordinary differential equations.									
Unit - I	<b>Matrices:</b>									
	Introduction – Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) – Cayley – Hamilton theorem (Statement and applications only) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Nature of Quadratic forms - Reduction of quadratic form to canonical form by orthogonal transformation.									
Unit - II	<b>Ordinary Differential Equations:</b>									
	Introduction – Solution of First order differential equations: Exact differential equations – Leibnitz's Linear Equation – Bernoulli's equation – Clairaut's equation - Applications: Law of natural growth and decay.									
Unit - III	<b>Ordinary Differential Equations of Higher Order:</b>									
	Linear differential equations of second and higher order with constant coefficients - Particular Integrals for the types: $e^{ax}$ – $\cos ax / \sin ax$ – $x^n - e^{ax}x^n$ , $e^{ax} \sin bx$ and $e^{ax} \cos bx$ – Differential Equations with variable coefficients: Euler-Cauchy's equation – Legendre's equation.									
Unit - IV	<b>Applications of Ordinary Differential Equations:</b>									
	Method of variation of parameters – Simultaneous first order linear equations with constant coefficients – Applications of differential equations: Simple harmonic motion – Electric circuits (Differential equations and associated conditions need to be given).									
Unit - V	<b>Laplace Transform:</b>									
	Introduction – Conditions for existence – Laplace transform of elementary functions – Basic properties – Derivatives and integrals of transforms – Transform of periodic functions - Inverse Laplace transform: Inverse Laplace transform of elementary functions – Partial fraction method – Convolution Theorem – Applications: Solution of linear ODE of second order with constant coefficients.									
<b>LIST OF EXPERIMENTS / EXERCISES:</b>										
1.	Introduction to MATLAB									
2.	Computation of eigen values and eigen vectors									
3.	Solving first order ordinary differential equations									
4.	Solving higher order ordinary differential equations									
5.	Solution of Simultaneous first order ODEs									
6.	Solving second order ODE by variation of parameters									
7.	Determining Laplace and inverse Laplace transform of basic functions									
8.	Solution of Second order ODE by employing Laplace transforms									
<b>TEXT BOOK:</b>										
1.	Kandasamy P., Thilagavathy K. and Gunavathy K., "Engineering Mathematics For First Year B.E/B.Tech", Reprint Edition 2016, S.Chand and Co., New Delhi.									
<b>REFERENCES/ MANUAL / SOFTWARE:</b>										
1.	Kreyszig E, "Advanced Engineering Mathematics ", 10 <sup>th</sup> Edition, John Wiley, New Delhi, India, 2016.									
2.	Ramana B V, "Higher Engineering Mathematics", 1 <sup>st</sup> Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2018.									
3.	Duraisamy C., Vengataasalam S., Arun Prakash K. and Suresh M., "Engineering Mathematics - I", 2 <sup>nd</sup> Edition, Pearson India Education, New Delhi, 2018.									
4.	Grewal B.S., "Higher Engineering Mathematics" 44th Edition, Khanna Publishers, New Delhi, 2018.									
5.	Matrices and Ordinary Differential Equations Laboratory Manual.									

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

COURSE OUTCOMES: On completion 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.										
CO2	Identify the appropriate method for solving first order ordinary differential equations.										
CO3	Solve higher order linear differential equations with constant and variable coefficients.										
CO4	Apply the concept of ordinary differential equations for modeling and finding solutions to engineering problems.										
CO5	Apply Laplace Transform to solve complex engineering problems.										

#### Mapping of COs with POs and PSOs

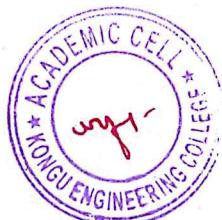
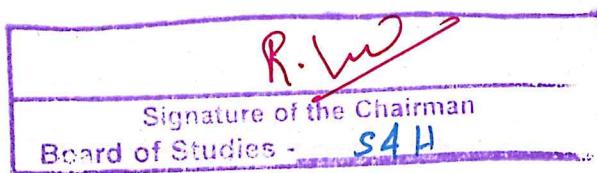
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2		3								
CO2	3	3	2		3								
CO3	3	3	2		3								
CO4	3	3	2		3								
CO5	3	3	3		3								

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		30	70				100
ESE		30	70				100

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



24CYT13 - CHEMISTRY FOR ELECTRONICS AND COMPUTER SYSTEMS																	
(Common to EEE, EIE, ECE, CSE, CSD, IT, AIDS & AIML branches)																	
Programme & Branch	B.E - EEE, EIE, ECE, CSE, CSD, B.Tech - IT, AIDS & AIML branches	Sem.#	Category	L	T	P	SL*	Total	Credit								
Prerequisites	Nil	1 / 2	BS	45	0	0	45	90	3								
Preamble	This course aims to emphasize the engineering students to realize the importance of water technology, energy storage devices, organic electronic materials, fabrication of PCBs, insulating materials and the need for e-waste management. It aims to impart the fundamentals of chemistry towards innovations in engineering and also for societal applications.																
<b>Unit – I</b>	<b>WATER TECHNOLOGY</b>								<b>9</b>								
Introduction - types of water - hardness of water- expression of hardness - units of hardness –water quality parameters-estimation of hardness of water by EDTA method – determination of alkalinity - DO, BOD and COD (Definition and Significance only) - disadvantages of using hard water in industry: scale, sludge and boiler corrosion - softening of water: Internal treatment process - carbonate and calgon conditioning - External treatment method - demineralization process and reverse osmosis.																	
<b>Unit – II</b>	<b>ENERGY STORAGE DEVICES</b>								<b>9</b>								
<b>Batteries:</b> Introduction - discharging and charging of battery - characteristics of battery - types of batteries – primary battery: silver button cell - secondary battery: Ni-Cd battery -modern battery: lithium-ion battery - choice of batteries for electric vehicles. <b>Fuel Cells:</b> Introduction - Importance and classification of fuel cells - description, principle, components and working of fuel cells: alkaline fuel cell, phosphoric acid fuel cell and direct methanol fuel cell - comparison of batteries with fuel cells.																	
<b>Unit – III</b>	<b>ORGANIC ELECTRONIC MATERIALS</b>								<b>9</b>								
<b>Organic Electronic Materials:</b> Introduction – types of organic semiconducting materials – comparison of organic with inorganic semiconducting materials – organic light emitting diodes – construction and working mechanism – comparison of LCD vs OLED. Fabrication of PCB: Introduction – electroplating (copper) process - electroless plating (nickel) process – printed circuit board (PCB) fabrication.																	
<b>Unit – IV</b>	<b>INSULATING MATERIALS</b>								<b>9</b>								
Introduction - requirements - classification (solid, liquid & gas) - preparation, properties and applications of solid inorganic insulator: ceramic materials - solid organic insulator: epoxy resin - liquid insulator: transformer oil - gas insulator: SF <sub>6</sub> - electrical resistivity - factors influencing electrical resistivity of materials - composition, properties and applications of high resistivity materials: Nichrome - polymers as electrical insulator.																	
<b>Unit – V</b>	<b>E-WASTE AND ITS MANAGEMENT</b>								<b>9</b>								
Introduction - E- Waste definition - sources of e-waste – hazardous substances in e-waste - effects of e-waste on environment and human health - need for e-waste management - waste minimization techniques for managing e-waste – chemistry of recycling of e-waste (magnetic separation, eddy current, density separation - recovery of metals using acid leaching process) - disposal treatment methods of e- waste - Incineration, pyrolysis, land fill - global scenario of e-waste – e-waste in India- case studies.																	
<b>TEXT BOOK:</b>																	
1.	Roussak , O.V. Gesser, H. D. " Applied Chemistry: A Textbook for Engineers and Technologists", 2 <sup>nd</sup> Edition ,Springer, 2013, for Unit I, II.																
2.	Palanisamy P.N., Manikandan P., Geetha A., Manjula Rani K., Kowshalya V.N., "Chemistry for Engineering", Revised Edition, Pearson Education, New Delhi, 2024,for Units III, IV, V.																
<b>REFERENCES:</b>																	
1.	Payal B. Joshi, Shashank Deep, "Engineering Chemistry", Oxford University Press, New Delhi, 2019.																
2.	Shuichiro Ogawa, "Organic Electronics Materials and Devices", 1 <sup>st</sup> Edition, Springer, 2015.																

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

# 1st sem for EEE, EIE, ECE & 2nd sem for CSE, CSD, IT, AIDS & AIML

COURSE OUTCOMES:											BT Mapped (Highest Level)	
On completion of the course, the students will be able to												
CO1	analyze the water quality parameters for suitability of industrial and domestic applications.											Analysing (K4)
CO2	examine the chemistry of energy storing devices and meeting the future prospectus of energy storage.											Analysing (K4)
CO3	simplify the working mechanism of organic electronic materials and apply the concept of plating techniques in PCBs fabrication.											Analysing (K4)
CO4	identify the suitable insulating materials for industrial applications.											Analysing (K4)
CO5	categorize the e-waste and reduce its impacts on future environment.											Analysing (K4)

#### 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	1		1							
CO2	3	2	1	1									
CO3	3	2	1	1									
CO4	3	2	1	1									
CO5	3	2	3	1		2	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	50	10			100
CAT2		40	50	10			100
CAT3		40	50	10			100
ESE		40	50	10			100

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

*Bhavya*

	<i>R.Ind</i>
Signature of the Chairman Board of Studies - <i>Selvi</i>	



**24CSC11 - PROBLEM SOLVING AND PROGRAMMING IN C**

<b>Programme &amp; Branch</b>	All BE/BTech Engineering & Technology branches, except CSE, IT,CSD, AI&ML, AI&DS	<b>Sem</b>	<b>Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>SL*</b>	<b>Total</b>	<b>Credit</b>
<b>Prerequisites</b>	Nil	1	ES	45	0	30	45	120	4
<b>Preamble</b>	The course is designed for use by freshmen students taking their first course in programming. It deals with the techniques needed to practice computational thinking, the art of using computers to solve problems and the ways the computers can be used to solve problems. This course also focuses on developing programming skills using C language.								
<b>Unit – I</b>	<b>Introduction to Computer and Problem Solving:</b> Overview of computers: Types, Generations, Characteristics, Basic computer Organization – Problem solving techniques: Algorithms - Flowcharts – Pseudo codes – Structuring the logic: Sequential, selection and repetitive structure								
<b>Unit – II</b>	<b>Introduction to C and Control Statements:</b> The structure of a C program – Compiling and executing C program – C Tokens – Character set in C – Keywords – identifiers- Basic data Types – Variables – constants – Input / Output statements – operators - decision making and looping statements								
<b>Unit – III</b>	<b>Arrays and Functions:</b> Declaring, initializing and accessing arrays – operations on arrays – Two dimensional arrays and their operations. Functions : Introduction- Using functions, function declaration and definition – function call – return statement – passing parameters to functions: basic data types and arrays – storage classes – recursive functions								
<b>Unit – IV</b>	<b>Strings and Pointers:</b> Strings :Introduction – operations on strings : finding length, concatenation, comparing and copying – string and character manipulation functions, Arrays of strings. Pointers: declaring pointer variables – pointer expression and arithmetic, pointers and 1D arrays , pointers and strings								
<b>Unit – V</b>	<b>User-defined Data Types and File Handling:</b> User-defined data types: Structure: Introduction – nested structures– arrays of structure – structure and functions - unions – enumerated data type. File Handling: Introduction - opening and closing files – reading and writing data to files -Manipulating file position indicator : fseek(), ftell() and rewind()								
<b>LIST OF EXPERIMENTS / EXERCISES:</b>									
1.	Writing algorithms and drawing flowcharts using Raptor Tool for problems involving sequential, Selection and repetition structures								
2.	Programs for demonstrating the use of different types of format Specifiers								
3.	Programs for demonstrating the use of different types of operators like arithmetic, logical, relational and ternary operators								
4.	Programs for demonstrating using decision making statements								
5.	Programs for demonstrating using repetitive statements								
6.	Programs for demonstrating one-dimensional array								
7.	Programs for demonstrating two-dimensional array								
8.	Programs to demonstrate modular programming concepts using functions								
9.	Programs to demonstrate strings (Using built-in and user-defined functions)								
10.	Programs to illustrate the use of pointers								
11.	Programs to illustrate the use of structures and unions								
12.	Programs to implement file Handling								

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

TEXT BOOK:																										
1.	Reema Thareja, "Programming in C ", 2nd Edition, Oxford University Press, New Delhi, 2018																									
REFERENCES/ MANUAL / SOFTWARE:																										
1.	Yashavant Kanetkar, "Let us C", 16th Edition, BPB Publications, 2018.																									
2.	Sumitabha Das, "Computer Fundamentals and C Programming", 1st Edition, McGraw Hill, 2018.																									
3.	Balagurusamy E., "Programming in ANSI C", 7th Edition, McGraw Hill Education, 2017.																									
4.	Behrouz A. Forouzan & Richard F.Gilberg, "Computer Science A Structured Programming Approach Using C", 3 <sup>rd</sup> Edition, Cengage,2017.																									
5.	<a href="https://www.cprogramming.com/tutorial/c-tutorial.html">https://www.cprogramming.com/tutorial/c-tutorial.html</a>																									
COURSE OUTCOMES:																										
On completion of the course, the students will be able to																										
CO1	apply problem-solving techniques to express the solutions for the real world problems.																									
CO2	develop simple C programs using appropriate looping and control statements																									
CO3	develop simple C programs using the concepts of arrays and modular programming																									
CO4	apply the concepts of pointers and develop C programs using strings and pointers																									
CO5	make use of user-defined data types and file concepts to solve real world problems																									
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	1	1					1	1	1															
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															

R.B. ✓

Signature of the Chairman  
Board of Studies - CSE



P.M.I.  
P.Kalaivani

24EET11 – ELECTRO MAGNETIC FIELDS AND ELECTRICAL MEASUREMENTS										
Programme & Branch	BE – Electrical and Electronics Engineering	Sem.	Category	L	T	P	SL*	Total	Credit	
Prerequisites	Nil	1	PC	30	15	0	45	90	3	
Preamble	This course explores the concepts of static electric, static magnetic fields and the concepts of instruments used for measuring electrical parameters.									
Unit – I	<b>Vectors and Electric Fields:</b>									
	<b>Vectors:</b> Scalar and Vector Fields – Coordinates Systems – Conversion of co-ordinate system-Vector calculus- Divergence Theorem -Stoke's Theorem. <b>Coulomb's law and Electric field intensity:</b> Coulomb's Law -Types of Charge Distribution — Electric Field Intensity due to Point Charge, Infinite Line Charge.									
Unit – II	<b>Electrostatics:</b>									
	<b>Electric Flux Density, Gauss's Law and Potential:</b> Electric Flux Density – Gauss's Law (E due to infinite sheet) – Potential Difference – Conservative Property – Potential Gradient- Convection, Conduction Current density. <b>Conductors, Dielectrics and Capacitors:</b> Poisson's and Laplace's Equations-Terminologies: dipole, dipole moment, Polarization–Boundary Condition: Dielectric-Dielectric and Conductor-Dielectric – Capacitance of Parallel Plate –simple problems									
Unit – III	<b>Steady Magnetic Fields:</b>									
	<b>Magneto static Field:</b> Biot-Savart's Law- Magnetic Field due Straight Conductors, Circular Loop – Ampere's Circuital Law– Magnetic Flux Density- Maxwell's Equations. <b>Force and Inductance:</b> Lorentz Force – Force due to magnetic fields – Magnetic torque and moment – Self and Mutual Inductance – Inductance of Solenoid.									
Unit – IV	<b>Basics of measurements:</b>									
	<b>Characteristics and Errors:</b> Methods of Measurement – Functional blocks of a Measurement System- Static Characteristics-Types of Errors- Calibration <b>MI &amp; MC meters:</b> Permanent Magnet Moving Coil (PMMC): Construction and Working – Torque Equation -Moving Iron Instruments: Classification – Construction and working.									
Unit – V	<b>Measuring Instruments:</b>									
	<b>Electrodynamometer and Induction Type Meters:</b> Construction and working of electrodynamometer Wattmeter. Single Phase Induction Type Energy Meters: Construction – Theory of Operation – Digital meters. <b>Bridges:</b> Wheatstone Bridge – Maxwell's Inductance Bridge – Schering capacitance Bridge.									
<b>TEXT BOOK:</b>										
1.	Sadiku Matthew N.O., "Principles of Electromagnetics", 7 <sup>th</sup> Edition, Oxford University Press, New Delhi, 2018.									
2.	Sawhney A.K., "Electrical and Electronic Measurements and Instrumentation", 19 <sup>th</sup> Revised Edition, Dhanpath Rai & Co., New Delhi, 2023									
<b>REFERENCES:</b>										
1.	HayJr W.H., Buck J.A., Jaleel Akhtar M., "Engineering Electromagnetics" 9 <sup>th</sup> Edition McGraw Hill Education, India, 2020.									
2.	Gupta J.B., "A Course in Electronic and Electrical Measurements and Instrumentation", 6 <sup>th</sup> Edition, S.K.Kataria & Sons, New Delhi, reprint 2020.									

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

COURSE OUTCOMES: On completion of the course, the students will be able to											BT Mapped (Highest Level)
CO1	Apply the concepts of vector algebra and evaluate the electric field intensity for simple configurations										
CO2	Apply Gauss's law for the evaluation of EFI for different configurations and its application in capacitor										
CO3	Explain the concepts of MFI and derive the force, inductance for simple configurations.										
CO4	Explain the concepts of functional blocks, characteristics and measurement of voltage and current.										
CO5	Describe the construction and operation of Wattmeter, Energy meter and the bridges.										

#### Mapping of Cos with Pos and PSOs

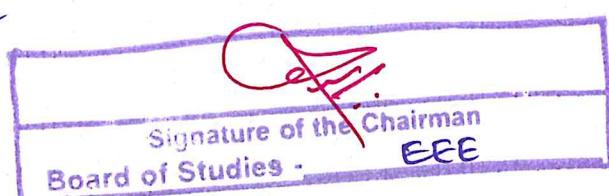
Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2						1			1	2	3
CO2	3	2	1					1			1	2	3
CO3	3	2	1					1			1	2	3
CO4	3	2						1			1	2	3
CO5	3	2						1			1	2	3

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		60	40				100
CAT2		70	30				100
CAT3		100	-				100
ESE		70	30				100

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



<b>24TAM01- HERITAGE OF TAMILS</b>																	
(Common to All Engineering and Technology Branches)																	
<b>Programme &amp; Branch</b>	<b>All B.E/B.Tech Branches</b>	<b>Sem.</b>	<b>Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>SL*</b>	<b>Total</b>	<b>Credit</b>								
<b>Prerequisites</b>	<b>NIL</b>	<b>1</b>	<b>HS</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>30</b>	<b>1</b>								
<b>Preamble</b>	The objective of this course is to impart knowledge about Tamil language, literature, paintings, sculptures, folk arts, heroic games, doctrines, contribution of Tamils to Indian culture.																
<b>UNIT I</b>	<b>Language and Literature</b>								<b>3</b>								
Language families in india - dravidian languages – tamil as a classical language - classical literature in tamil – secular nature of sangam literature – distributive justice in sangam literature - management principles in thirukural - tamil epics and impact of buddhism & Jainism in tamil land - Bakthi literature azhwars and nayanmars - forms of minor poetry - development of modern literature in tamil - contribution of bharathiya and bharathidhasan.																	
<b>UNIT II</b>	<b>Heritage - Rock Art Paintings to Modern Art – Sculpture</b>								<b>3</b>								
Hero stone to modern sculpture - bronze icons - tribes and their handicrafts - art of temple car making - massive terracotta sculptures, village deities, Thiruvalluvar statue at Kanyakumari, making of musical instruments - mridhangam, parai, veenai, yazh and nadhaswaram - role of temples in social and economic life of tamils.																	
<b>UNIT III</b>	<b>Folk and Martial Arts</b>								<b>3</b>								
Therukoothu – karagattam - villu pattu - kaniyan koothu – oyillattam - leather puppetry – silambattam – valari - tiger dance - sports and games of tamils.																	
<b>UNIT IV</b>	<b>Thinai Concept of Tamils</b>								<b>3</b>								
Flora and fauna of tamils & aham and puram concept from tholkappiyam and sangam literature - aram concept of tamils - education and literacy during sangam age - ancient cities and ports of sangam age - export and import during sangam age - overseas conquest of cholas.																	
<b>UNIT V</b>	<b>Contribution of Tamils to Indian National Movement and Indian Culture</b>								<b>3</b>								
Contribution of tamils to Indian freedom struggle - the cultural influence of tamils over the other parts of India – self-respect movement - role of Siddha medicine in indigenous systems of medicine – inscriptions & manuscripts – print history of Tamil books.																	
<b>TEXT BOOK:</b>																	
1.	S.Muthuramalingam, M.Saravanakumar, Heritage of Tamils, Yes Dee Publishing Pvt Ltd, 2023, for Units I,II,III,IV,V.																
<b>REFERENCES:</b>																	
1.	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.Thirunavukarasu) (Published by : International Institute of Tamil Studies).																
2.	The Contribution of Tamil of the Tamils to Indian Culture(Dr.M.Valarmathi)(Published by International Institute of Tamil Studies).																
3.	Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu).																

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

COURSE OUTCOMES:		BT Mapped (Highest Level)
படிப்பை முடித்தவுடன், மாணவர்கள்		
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)

#### Mapping of COs with POs and PSOs

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

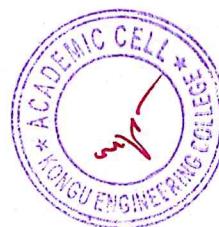
#### ASSESSMENT PATTERN – THEORY

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	40	60					100
ESE				NA			

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

R. Vel

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



24TAM01-தமிழர் மரபு											
(Common to All Engineering and Technology Branches)											
Programme & Branch	All B.E/B.Tech Branches	Sem.	Category	L	T	P	SL*	Total	Credit		
Prerequisites	NIL	1	HS	15	0	0	15	30	1		
Preamble	தமிழர்களின் மொழி, இலக்கியம், ஓவியங்கள், சிற்பக்கலைகள், நாட்டுப்புறக் கலைகள், வீர வினாயாட்டுக்கள், தினைக் கோட்பாடுகள், இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பைப் பற்றிய அறிவை வழங்குவதே இந்த பாடத்தின் நோக்கமாகும்.										
அலகு - I	மொழி மற்றும் இலக்கியம்										3
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற் தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.											
அலகு - II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை										3
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஜம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.											
அலகு - III	நாட்டுப்புறக் கலைகள் மற்றும் வீர வினாயாட்டுக்கள்										3
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் வினாயாட்டுகள்.											
அலகு - IV	தமிழர்களின் தினைக் கோட்பாடுகள்										3
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.											
அலகு - V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு										3
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறபகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.											
<b>TEXT BOOK:</b>											
1.	ஆ. பூபாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022,அலகு I,II,III,IV,V.										
<b>REFERENCES:</b>											
1.	தமிழக வரலாறு- மக்களும் பண்பாடும்- கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)										
2.	கணினித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)										
3.	சீழை - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம். (தொல்லியல் துறை வெளியீடு)										
4.	பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)										

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

COURSE OUTCOMES:			BT Mapped (Highest Level)
படிப்பை முடித்தவுடன், மாணவர்கள்			
CO1	தமிழ் மொழி மற்றும் இலக்கியத்தில் மதிப்புமிக்க கருத்துக்களை விளக்க முடியும்.	Understanding (K2)	
CO2	தமிழர்களின் சிற்பம் மற்றும் அவர்களின் ஒவியங்கள் பற்றி விளக்க முடியும்.	Understanding (K2)	
CO3	தமிழர்களின் நாட்டுப்புற மற்றும் தற்காப்புக் கலைகளைப் பற்றி சுருக்கமாகக் கூற முடியும்.	Understanding (K2)	
CO4	தமிழர்களின் திணைக் கோட்பாடுகளைப் பற்றி விளக்க முடியும்.	Understanding (K2)	
CO5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு பற்றி விளக்க முடியும்.	Understanding (K2)	

**Mapping of COs with POs and PSOs**

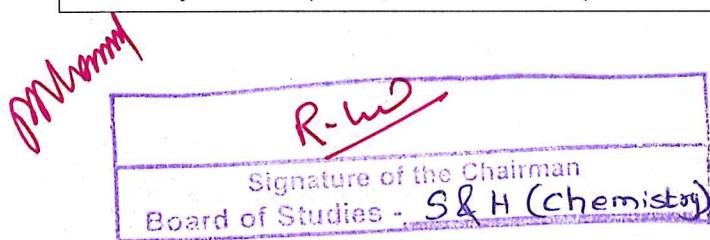
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						2	3	2	2		3		
CO2						2	3	2	2		3		
CO3						2	3	2	2		3		
CO4						2	3	2	2		3		
CO5						2	3	2	2		3		

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

**ASSESSMENT PATTERN – THEORY**

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	40	60					100
ESE	NA						

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



### 24CYL13 – CHEMISTRY LABORATORY FOR ELECTRONICS AND COMPUTER SYSTEMS

(Common to EEE, EIE, ECE, CSE, CSD, IT, AIDS & AIML branches)

<b>Programme &amp; Branch</b>	B.E & EEE, EIE, ECE, CSE, CSD, B.Tech & IT, AIDS & AIML branches	Sem.#	Category	L	T	P	SL*	Total	Credit
<b>Prerequisites</b>	Nil	1 / 2	BS	0	0	30	0	30	1

**Preamble** This course aims to impart the basic concepts of volumetric, conductometric, spectrophotometric and pHmetry experiments for the estimation of given samples and thereby, to improve the analytical skills. This course also aims to impart the knowledge on hardness, DO, COD, alkalinity,  $\text{Fe}^{2+}$ ,  $\text{Cu}^{2+}$  and  $\text{Cr}^{6+}$  in computer systems.

#### **LIST OF EXPERIMENTS / EXERCISES:**

1. Assessment of the given water sample for the suitability of drinking / industrial purpose by estimating the carbonate, non-carbonate and total hardness by EDTA method.
2. Estimation of type and amount of alkalinity present in the given river/bore well water sample.
3. Perform Winkler's method for the determination of dissolved oxygen in the given wastewater sample.
4. Determination of COD in the given water sample.
5. Estimation of strength and amount of acid in a given solution using pH meter.
6. Determination of strength and amount of mixture of acids present in the given solution using Conductivity meter.
7. Determination of concentration of Nickel by Spectrophotometric method.
8. Estimation of copper content from discarded PCB's by Iodometric method.
9. Determination of iron present in the given sample by permanganometric method.
10. Volumetric estimation of chromium from electroplating sludge using permanganometric method.
11. Electroplating process (Demonstration).
12. Report preparation -based on the data received from the analysed water quality parameters (Demonstration).

#### **REFERENCES/ MANUAL /SOFTWARE:**

1. Palanisamy P.N., Manikandan P., Geetha A. and Manjula Rani K., "Chemistry Laboratory Manual", 1 st Edition, Rajaganapathy Publishers, Erode, 2024.

#### **COURSE OUTCOMES:**

**On completion of the course, the students will be able to**

**BT Mapped  
(Highest Level)**

CO1	estimate the amount of hardness, alkalinity, DO and COD present in the given sample.	Analyzing (K4), Precision (S3)
CO2	interpret the experimental results obtained from conductivity meter and pH meter.	Analyzing (K4), Precision (S3)
CO3	demonstrate the determination of Nickel by Spectrophotometer, Copper by Iodometry, Iron and Chromium by Permanganometry.	Analyzing (K4), Precision (S3)

#### Mapping of COs with POs and PSOs

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

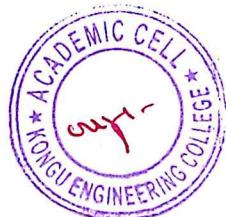
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

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

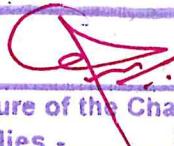
# 1st sem for EEE, EIE, ECE & 2nd sem for CSE, CSD, IT, AIDS & AIML

R.W

Signature of the Chairman
End of Studies - 2024



24GCL12 - FOUNDATION LABORATORY – ELECTRICAL, IOT AND WEB TECHNOLOGIES																						
(Common to all BE/BTech branches)																						
Programme & Branch		All BE/BTech Branches			Sem.	Category	L	T	P	SL*	Total	Credit										
Prerequisites		Nil			1/2	ES	0	0	90	0	90	3										
Preamble		This course is designed to provide a foundational knowledge on engineering with hands-on experience on the house wiring, Internet of Things and Web Technologies.																				
<b>LIST OF EXPERIMENTS / EXERCISES:</b>																						
<b>PART A – Electrical Installation (30 Hours)</b>																						
1.	Determination of load currents and select suitable components for Protection																					
2.	Develop a wiring circuit for incandescent lamp and fluorescent lamp using Simple and Staircase Wiring																					
3.	Develop and Investigate wiring circuits for Calling Bell System and Dimmable Light																					
4.	Create wiring circuit for single phase motor																					
5.	Development of IOT based energy monitoring and control																					
6.	Measurement and analysis of electrical parameters for Photovoltaic Solar Panel																					
<b>PART B – Internet of Things (30 Hours)</b>																						
1.	Design a Single layer PCB layout designing																					
2.	Fabricate Single layer PCB printing																					
3.	Assembling, soldering and desoldering practice on single layer PCB																					
4.	Sensor and actuator interfacing with internet enabled microcontroller																					
5.	Sensor and actuator calibration																					
6.	Integration of microcontroller based system with Cloud platform																					
<b>PART C – Web Technologies (30 Hours)</b>																						
1.	Design a simple web page using basic HTML tags and CSS properties																					
2.	Design a responsive webpage using Bootstrap framework																					
3.	Design a webpage for signup and login validation form using Javascript and PHP																					
4.	Create a database connectivity using PHP, MySQL and host the website in the server.																					
<b>REFERENCES/ MANUAL /SOFTWARE:</b>																						
1.	Laboratory Manual																					
2.	Eric T.Freeman,Elisabeth Robson, "Head First JavaScript Programming A Brain-Friendly Guide", 1st Edition, O'Reilly , 2014.																					
3.	Eric T.Freeman,Elisabeth Robson, "Head First HTML and CSS",2nd Edition, O'Reilly , 2012																					
4.	Lynn Beighley,"Head First SQL",1st Edition, O'Reilly,2007.																					
<b>COURSE OUTCOMES:</b>																						
<b>On completion of the course, the students will be able to</b>																						
CO1	Design electrical wiring circuits for buildings based on their requirement										BT Mapped (Highest Level)											
CO2	Develop IoT based solutions and PCB for real world use cases.										Applying(K3), Precision (S3)											
CO3	Design and host an interactive dynamic website.										Applying(K3), Precision (S3)											
<b>Mapping of COs with POs and PSOs</b>																						
COs/POs /PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2									
CO1	3	3	3	2	3			1	3	2	2	2										
CO2	3	3	3	2	3			1	3	2	2	2										
CO3	3	2	1	1				3	3	2	2	3										
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy																						

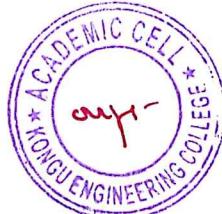
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Board of Studies - <b>EEE</b>	



24MNT12 - QUANTITATIVE APTITUDE - I																						
(Common to all Engineering and Technology branches)																						
Programme & Branch	All B.E/B.Tech Branches			Sem.	Category	L	T	P	SL*	Total	Credit											
Prerequisites	Basic Mathematical skills			1	MC	20	0	0	10	30	0											
Preamble	To impart problem solving skills and enhance analytical skills.																					
Unit - I	<b>Number system and Equations:</b> <span style="float: right;">6</span>																					
<b>Number systems:</b> Classification of numbers – Rules of divisibility – BODMAS Rule – HCF and LCM – Decimal fractions – Simplification – Problems.																						
<b>Equations:</b> Solving equations with one variable – Solving simultaneous linear equations with two variables – Applications of simultaneous linear equations – Problems on ages – Simple problems.																						
Unit - II	<b>Ratio, Proportion and Percentage:</b> <span style="float: right;">6</span>																					
<b>Ratio and Proportion:</b> Third, Fourth and mean proportional – Comparison of ratios – Compound ratio – Duplicate ratio – Sub duplicate ratio – Triplicate ratio – Sub triplicate ratio – Chain rule – Simple problems.																						
<b>Percentages:</b> Basic Concepts – Problems on percentages – Problems on population – Problems on depreciation.																						
Unit - III	<b>Profit and Loss, Interest:</b> <span style="float: right;">8</span>																					
<b>Profit and Loss:</b> Basic concepts – Cost price – Selling price – Profit and Loss – Simple problems.																						
<b>Simple and Compound interest:</b> Concepts – Percentage of interest – Difference between simple interest and compound interest – Simple problems.																						
<b>TEXT BOOK:</b>																						
1.	Dr R.S.Agarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S.Chand and company limited, 2022.																					
<b>REFERENCES/ MANUAL / SOFTWARE:</b>																						
1.	Abhijit Guha,"Quantitative Aptitude for Competitive Examination", 7 <sup>th</sup> Edition, McGraw Hill Education, India, 2020.																					
2.	<a href="https://www.indiabix.com/aptitude/questions-and-answers">https://www.indiabix.com/aptitude/questions-and-answers</a>																					
3.	<a href="https://www.geeksforgeeks.org/aptitude-questions-and-answers">https://www.geeksforgeeks.org/aptitude-questions-and-answers</a>																					
<b>COURSE OUTCOMES:</b> <b>On completion of the course, the students will be able to</b>											<b>BT Mapped (Highest Level)</b>											
CO1	Solve equations with one and two variables.										Applying (K3)											
CO2	Solve ratio, proportion and percentage problems.										Applying (K3)											
CO3	Solve profit and loss, simple interest and compound interest problems.										Applying (K3)											
<b>Mapping of COs with POs and PSOs</b>																						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2									
CO1	2	2																				
CO2	2	2																				
CO3	3	3																				
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy																						
<b>ASSESSMENT PATTERN - THEORY</b>																						
Test / Bloom's Category*	Remembering (K1) %		Understanding (K2) %		Applying (K3) %		Analyzing (K4) %		Evaluating (K5) %		Creating (K6) %	Total %										
CAT1			30		70							100										
CAT2			30		70							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 hours																						

*R.W*

Signature of the Chairman  
Board of Studies - S4H



24EGT21 - ENGLISH FOR EFFECTIVE COMMUNICATION - II																		
(Common to all Engineering and Technology branches)																		
Programme & Branch	All B.E/B.Tech Branches	Sem	Category	L	T	P	SL*	Total	Credit									
Prerequisites	Nil	2	HS	45	0	0	45	90	3									
Preamble	This course aims at up skilling the learners to listen, speak, read, and write as well as to facilitate the students in practicing the language skills to acquire verbal and communicative proficiency in professional and academic contexts.																	
sUnit – I	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>								9									
<b>Grammar:</b> Simple, Compound, and Complex Sentences – <b>Verbal Aptitude:</b> Odd Words – Paired words – <b>Listening:</b> Listening to a Match Commentary and Filling in a Table – Listening to TED talks - <b>Speaking:</b> Apologizing – Talking about Manners and Etiquette – <b>Reading:</b> Scanning a Text, Power Point Presentations – The Best Way to Start a New Habit : An Excerpt from <i>Atomic Habits</i> <b>Writing:</b> Business Letters: Enquiry and Complaint																		
Unit – II	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>								9									
<b>Grammar:</b> Direct and Indirect Speech – <b>Verbal Aptitude:</b> Words often Confused – Verbal Analogy – <b>Listening:</b> Listening to a Lecture and Sorting Information – Career Related Conversation – <b>Speaking:</b> Group Discussion – Speaking about Career Choices and Professional Skills – <b>Reading:</b> Reading for Local and Global Comprehension – How to Find and Fix the Causes of Your Bad Habits: An Excerpt from <i>Atomic Habits</i> - <b>Writing:</b> Job Application: Cover Letter and Resume – Student Portfolio																		
Unit – III	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>								9									
<b>Grammar:</b> Active and Passive Voice – <b>Verbal Aptitude:</b> Error Spotting – Sentence Improvement – Abbreviations and Acronyms – <b>Listening:</b> Listening to Podcast Interviews and News/Motivational Speeches – <b>Speaking:</b> Presenting a Point of View – Giving Opinions about Podcast – <b>Reading:</b> Reading a Procedure – Cross Cultural Communication - How to Make Good Habits Inevitable and Bad Habits Impossible: An Excerpt from <i>Atomic Habits</i> – <b>Writing:</b> Types of Essays: Argumentative and Opinion based Essays																		
Unit – IV	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>								9									
<b>Grammar:</b> If/Conditional Clause – Modals Verbs – Conversational Devices - <b>Verbal Aptitude:</b> Sentence Correction – Sentence Selection – <b>Listening:</b> Listening and Filling a Mind Map – Listening to Interviews, Celebrity talks – <b>Speaking:</b> Giving Advice and Suggestions – Interviewing Classmates - <b>Reading:</b> Reading for Information, Researching for Supporting Evidence – Technical Communication: Modes of Technology-based Communication – How to Stick with Good Habits Every Day : An Excerpt from <i>Atomic Habits</i> <b>Writing:</b> Dialogue Writing – Writing Reviews: Product and Documentary films/Web Series																		
Unit – V	<b>Grammar, Verbal Aptitude, Listening, Speaking, Reading &amp; Writing</b>								9									
<b>Grammar:</b> Common Errors in Tenses – Verb - Preposition combinations – <b>Verbal Aptitude:</b> Coding and Decoding – <b>Listening:</b> Listening for key points – Speeches of New Inventions – <b>Speaking:</b> Asking for and Giving Permission – Talking about Gadgets, Inventions and Technology – <b>Reading:</b> Categorizing Information – Technical Communication: Effective use of Technology-based Communication – The Goldilocks Rule: How to Stay Motivated in Life and Work: An Excerpt from <i>Atomic Habits</i> – <b>Writing:</b> Report Writing: IV Report and Case Study Report																		
<b>TEXT BOOK:</b>																		
1.	Sudharshana N P and Savitha C, <i>English for Technical Communication</i> , 2 <sup>nd</sup> Edition, Cambridge University Press, New Delhi, 2016.																	
<b>REFERENCES:</b>																		
1.	Ashraf Rizvi. Effective Technical Communication, 2 <sup>nd</sup> Edition, McGraw-Hill India, 2017.																	
2.	S. P. Dhanavel. English and Communication Skills for Students of Science and Engineering, Orient Black Swan Publishers, Hyderabad, 2009.																	
3.	James Clear. <i>Atomic Habits</i> By James Clear. Dharman, 2023.																	

\* includes Term Work (TW) & Assignments, Tutorials and Case Studies

COURSE OUTCOMES:											BT Mapped (Highest Level)	
On completion of the course, the students will be able to												
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)

**Mapping of COs with POs and PSOs**

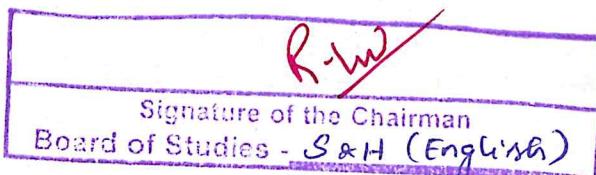
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						1		1	3	1	1		
CO2								2	3		1		
CO3								2	3	1	2		
CO4						1			3	1	2		
CO5									3		2		

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	-	-	-	100
CAT2	-	30	35	-	-	35	100
CAT3	-	20	45	35	-	-	100
ESE	-	20	55	10	-	15	100

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



J. Rajai



24MAC21 - MULTIVARIABLE CALCULUS AND COMPLEX ANALYSIS									
(Common to CIVIL, MECH, MTS, ECE, EEE, EIE & FT branches)									
Programme & Branch	B.E – CIVIL, MECH, MTS, ECE, EEE, EIE & B.Tech - FT	Sem.	Category	L	T	P	SL*	Total	Credit
Prerequisites	Nil	2	BS	45	7	16	52	120	4
<b>Preamble</b>	To impart the knowledge of partial derivatives, evaluation of real and complex integrals, vector calculus and analytic functions to the students for solving the problems related to various engineering disciplines.								
<b>Unit – I</b>	<b>Functions of Several Variables:</b> Functions of two or more variables – Partial derivatives – Total differential – Applications: Maxima and minima – Constrained maxima and minima – Lagrange's multiplier method.								
<b>Unit – II</b>	<b>Multiple Integrals:</b> Double integration in cartesian coordinates – Change of order of integration – Application: Area between two curves – Triple integration in cartesian coordinates – Volume as triple integrals.								
<b>Unit – III</b>	<b>Vector Calculus:</b> Directional derivative – Gradient of a scalar point function – Divergence of a vector point function – Curl of a vector – Solenoidal and Irrotational vectors – Vector Integration: Introduction – Green's and Gauss divergence theorems (without proof) – Verification of the above theorems and evaluation of integrals using them.								
<b>Unit – IV</b>	<b>Analytic Functions:</b> Functions of a complex variable – Analytic functions – Necessary and sufficient conditions (excluding proof) – Cauchy–Riemann equations (Statement only) – Properties of analytic function (Statement only) – Harmonic function – Construction of analytic function – Conformal mapping: $w = z + a, az, 1/z$ – Bilinear transformation.								
<b>Unit – V</b>	<b>Complex Integration:</b> Introduction – Cauchy's theorem (without proof) – Cauchy's integral formula – Singularities – Classification – Cauchy's residue theorem (without proof) – Applications: Evaluation of definite integrals involving sine and cosine functions over the circular contour.								
<b>LIST OF EXPERIMENTS / EXERCISES:</b>									
1.	Finding ordinary and partial derivatives								
2.	Computing extreme values of function of two variables								
3.	Evaluating double and triple integrals								
4.	Finding the area between two curves								
5.	Computing gradient, divergence and curl of point functions								
6.	Applying Milne-Thomson method for constructing analytic function								
7.	Determination of Möbius transformation for the given set of points								
8.	Finding poles and residues of an analytic function								
<b>TEXT BOOK:</b>									
1.	Kandasamy P., Thilagavathy K. and Gunavathy K., "Engineering Mathematics For First Year B.E/B.Tech", Reprint Edition 2016, S.Chand and Co., New Delhi.								
<b>REFERENCES/ MANUAL / SOFTWARE:</b>									
1.	Kreyszig E, "Advanced Engineering Mathematics ", 10 <sup>th</sup> Edition, John Wiley, New Delhi, India, 2016.								
2.	Ramana B V, "Higher Engineering Mathematics", 1 <sup>st</sup> Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2018.								
3.	Duraisamy C., Vengatasalam S., Arun Prakash K. and Suresh M., "Engineering Mathematics - II", 2 <sup>nd</sup> Edition, Pearson India Education, New Delhi, 2018.								
4.	Grewal B.S, "Higher Engineering Mathematics" 44th Edition, Khanna Publishers, New Delhi, 2018.								
5.	Multivariable Calculus and Complex Analysis Laboratory Manual.								

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

COURSE OUTCOMES:										BT Mapped (Highest Level)
On completion of the course, the students will be able to										
CO1	Compute the total derivatives and extreme values of multivariable functions.									
CO2	Apply multiple integrals to compute the area and volume of the regions.									
CO3	Apply the concepts of derivatives and line integrals of point functions in engineering problems.									
CO4	Construct analytic functions and bilinear transformations and determine the image of given region under the given conformal mapping.									
CO5	Apply the techniques of complex integration to evaluate real and complex integrals over closed curves.									

#### Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2		3								
CO2	3	3	2		3								
CO3	3	3			3								
CO4	3	3			3								
CO5	3	3	3		3								

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				100
ESE		30	70				100

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

J

	<i>R. M</i>
	Signature of the Chairman B.Tech. of Studies - <i>S A H</i>



24PHT23- PHYSICS FOR ELECTRONICS ENGINEERING																		
(Common to ECE, EEE and EIE branches)																		
Programme& Branch	BE - ECE, EEE and EIE branches	Sem.	Category	L	T	P	SL*	Total	Credit									
Prerequisites	Nil	2	BS	45	0	0	45	90	3									
Preamble	This course aims to impart the knowledge on crystal physics, quantum physics, conductors, superconductors, semiconductors and dielectric materials. It also describes the applications of aforementioned topics in electronics engineering.																	
<b>Unit – I</b>	<b>Crystal Physics:</b>																	
Classification of solids – Space lattice – Unit cell – Crystal structure – Bravais lattice – Single and polycrystalline materials – Lattice 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 – Crystal imperfections: line, surface and volume imperfections.																		
<b>Unit – II</b>	<b>Quantum Physics and Applications:</b>																	
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 one-dimensional box.																		
<b>Unit – III</b>	<b>Conducting and Superconducting Materials:</b>																	
Classical free electron theory of metals – Electrical conductivity – Merits and demerits of classical free electron theory – Quantum free electron theory (qualitative) – Fermi distribution function – Effect of temperature on Fermi function – Superconductivity – Temperature dependence of resistivity – Critical field – Meissner effect – Critical current – Isotope effect – Type-I superconductors and Type-II superconductors – Cryotron.																		
<b>Unit – IV</b>	<b>Semiconducting Materials:</b>																	
Intrinsic semiconductor – Carrier concentration – Fermi level – Variation of conductivity with temperature – Determination of band gap – Extrinsic semiconductors – Carrier concentration in n-type and p-type semiconductors – Hall effect – Determination of Hall coefficient – Applications – Solar Cell: Principle, construction and working.																		
<b>Unit – V</b>	<b>Dielectric Materials:</b>																	
Dielectrics – Dielectric constant – Polarization – Displacement vector – Electric susceptibility – Types of polarization mechanisms: Electronic, ionic, orientational and space-charge – Frequency and temperature dependence – Internal field – Clausius-Mosotti relation – Dielectric loss – Dielectric breakdown – Uses of dielectric materials in capacitors.																		
<b>TEXT BOOK:</b>																		
1.	Katiyar A.K, Pandey C.K, "Engineering Physics: Theory and Practical", 2 <sup>nd</sup> edition, Wiley, 2015 (Unit I, II).																	
2.	Tamilarasan K and Prabu K, "Physics for Engineering I", 1 <sup>st</sup> Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023 (Unit III, IV, V).																	
<b>REFERENCES:</b>																		
1.	Malik H.K and Singh A.K, "Engineering Physics", 2 <sup>nd</sup> Edition McGraw-Hill Education, New Delhi, 2022.																	
2.	Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11 <sup>th</sup> edition, S Chand, 2021.																	

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

COURSE OUTCOMES:											BT Mapped (Highest Level)
On completion of the course, the students will be able to											
CO1	analyze seven crystal systems, interplanar spacing in cubic lattice, BCC, FCC, HCP crystal systems and the types of crystal imperfections and their impacts.										
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.										
CO3	examine the concepts of classical and quantum free electron theories of metals to compute the electrical conductivity and to comprehend the effect of temperature on Fermi function for conducting materials and also to apply the concept of Cooper pair to comprehend the properties, types and application of superconductors.										
CO4	Inspect the concept of density of states to compute the carrier concentration, electrical conductivity and band gap of intrinsic semiconductors and to compute the carrier concentration of extrinsic semiconductors, and also to explain the phenomenon related to Hall Effect and the working of solar cells.										
CO5	explore the concept of electric dipole moment and electric polarization to comprehend the different polarization mechanisms in dielectrics, Clausius-Mosotti relation, dielectric loss, dielectric breakdown and to describe its uses in capacitors.										

#### Mapping of COs with POs and PSOs

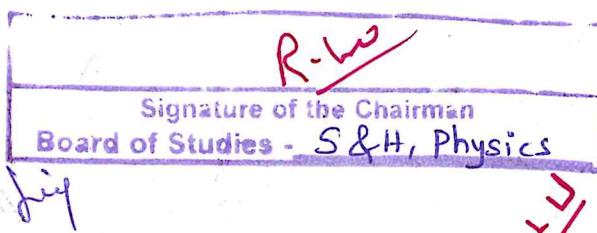
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2					1	1		1		
CO2	3	2	2					1	1		1		
CO3	3	2	2					1	1		1		
CO4	3	2	2					1	1		1		
CO5	3	2	2					1	1		1		

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	50	10			100
CAT2		40	50	10			100
CAT3		40	50	10			100
ESE		40	50	10			100

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



24MET11 – ENGINEERING DRAWING																	
(Common to Civil, Mech, MTS, Auto, Chem, ECE, EEE, EIE, FT branches)																	
Programme & Branch	BE / BTech – Civil, Mech, MTS, Auto, Chem, ECE, EEE, EIE, FT branches	Sem.	Category	L	T	P	SL*	Total	Credit								
Prerequisites	Nil	1 / 2 <sup>#</sup>	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.																
<b>Unit – I</b>	<b>Introduction to Engineering drawing and Engineering Curves</b>								<b>6+3</b>								
Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering and dimensioning. Projection of points in different quadrants. Engineering Curves: Conic section- Ellipse, Parabola, Hyperbola (Eccentricity method). Cycloidal Curves- Cycloids and Involutes of circle and Hexagon.																	
<b>Unit – II</b>	<b>Projection of planes and Solids</b>								<b>6+3</b>								
Projection of polygonal surface and circular lamina inclined to both reference planes. Projections of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.																	
<b>Unit – III</b>	<b>Sectioning of Solids and Development of Surfaces</b>								<b>6+3</b>								
Sectioning of prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to HP and perpendicular to VP - Obtaining true shape of section. Development of Lateral Surfaces of Simple and truncated Solids Like Prisms, Pyramids, Cylinders and Cones(Cutting planes inclined to HP and perpendicular to VP only).																	
<b>Unit – IV</b>	<b>Isometric Projection</b>								<b>6+3</b>								
Principles of isometric projection - Isometric scale - Isometric projections of simple and truncated solids like prisms, pyramids and cylinders. Conversion of orthographic in to isometric views																	
<b>Unit – V</b>	<b>Orthographic Projection and Introduction to AutoCAD</b>								<b>6+3</b>								
Conversion of isometric projection into orthographic projection (Freehand sketching only). Introduction to Computer Aided Drawing: Role of CAD in design and development of new products. Creating two-dimensional drawing with dimensions using suitable software (Minimum 2 exercises mandatory). Introduction to Solid Modelling: Creating 3D models of various components using suitable modelling software. (Minimum 2 exercises mandatory).																	
<b>TEXT BOOK:</b>																	
1.	Basant Agrawal, Agrawal C.M., "Engineering Drawing", 3rd Edition, McGraw Hill Education, 2019.																
<b>REFERENCES:</b>																	
1.	Lakh winder pal singh, Harwinder Singh., "Engineering Drawing and Principles and Applications", 1 <sup>st</sup> Edition, Cambridge University Press, 2021																

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

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

COURSE OUTCOMES:											BT Mapped (Highest Level)	
On completion of the course, the students will be able to												
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 PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1			2					3			
CO2	3	1	1		2					3			
CO3	3	1	1		2					3			
CO4	3	1	1		2					3			
CO5	3	1	1		2					3			

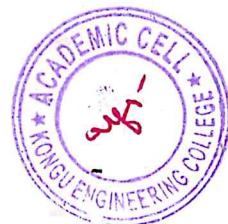
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

#### ASSESSMENT PATTERN - THEORY

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

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

<i>Chairman</i> Signature of the Chairman of Studies - Mechanical



*K-V-J*  
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24CSC23– DATA STRUCTURES USING C									
Common to ECE, EEE, E & I Branches									
Programme & Branch	Common to ECE, EEE, E & I Branches	Sem.	Category	L	T	P	SL*	Total	Credit
Prerequisites	Programming in C	2	ES	45	0	30	45	120	4
Preamble	This course is intended to introduce the concept of elementary data structures and notion of algorithms to novice learner from cross disciplines in Engineering and Technology.								
Unit – I	<b>List:</b> Data Structures - Abstract Data Types (ADT) - List ADT and Array Implementation - Linked List - Doubly Linked List - Application: Polynomial Addition								
Unit – II	<b>Stack and Queues:</b> Stack ADT – Array and Linked List implementation of Stacks - Application: Infix to Postfix Conversion - Postfix Expression Evaluation - Queue ADT – Array and Linked List implementation of Queues - Applications								
Unit – III	<b>Trees:</b> Trees-Preliminaries – Binary Trees –Binary Tree Traversals - The Search Tree ADT – Binary Search Trees–Priority Queues (Binary Heap)- Application: Expression Tree								
Unit – IV	<b>Graphs:</b> Graphs – Definitions – Elementary Graph Operations- Traversals – Shortest-Path Algorithms: Dijkstra's Algorithm – Minimum Spanning Tree: Prim's Algorithm- Kruskal's Algorithm								
Unit – V	<b>Sorting and Hashing:</b> Sorting - Preliminaries – Insertion Sort – Quicksort – Merge sort – Hashing – General Idea – Hash Function – Separate Chaining – Open addressing.								
<b>LIST OF EXPERIMENTS / EXERCISES:</b>									
1.	Implementation of C programs using pointers								
2.	implementation of singly linked list and its operations								
3.	Implementation of doubly linked list and its operations								
4.	Implementation of Stack and its operations								
5.	Implementation of Queue and its operations								
6.	Implementation of Stack and Queue using Singly Linked List								
7.	Convert a given In-fix Expression into Post-fix Expression using Stack ADT								
8.	Implementation of Binary Search Tree traversals								
9.	Implementation of Graph traversals								
10.	Implementation of sorting algorithms: Insertion and Merge sort								
<b>TEXT BOOK:</b>									
1.	Weiss M. A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, New Delhi, 2016.								
<b>REFERENCES/ MANUAL / SOFTWARE:</b>									
1.	Horowitz Sahni, Andeson Freed, "Fundamentals of Data Structures in C", 2nd Edition, Universities Press, Hyderabad, 2011.								
2.	Langsam Y.M., Augenstein J. and Tenenbaum A. M., "Data Structures using C and C++", 2nd Edition, Pearson Education, 2015.								

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

COURSE OUTCOMES:												BT Mapped (Highest Level)
On completion of the course, the students will be able to												
CO1	apply List ADT for solving the given problems											Applying (K3) Precision (S3)
CO2	make use of arrays and linked lists to create Stack and Queue ADTs.											Applying (K3) Precision (S3)
CO3	utilize Tree ADT to develop simple application											Applying (K3) Precision (S3)
CO4	make use of Graph ADT for standard problems											Applying (K3) Precision (S3)
CO5	illustrate the use of standard sorting and Hashing Techniques											Applying (K3) Precision (S3)

#### Mapping of COs with POs and PSOs

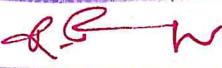
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1						1	1		
CO2	3	2	1	1						1	1		
CO3	3	2	1	1						1	1		
CO4	3	2	1	1						1	1		
CO5	3	2	1	1						1	1		

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		45	55				100
CAT2		35	65				100
ESE		35	65				100

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

  
 Signature of the Chairman  
 Board of Studies - CSE



*hally*

*S. Ramya*  
 21/7/25  
 [S. RAMYA]

## 24TAM02 - TAMILS AND TECHNOLOGY

## (Common to All Engineering and Technology Branches)

Programme & Branch	All BE/BTech Branches	Sem.	Category	L	T	P	SL*	TOT	Credit
Prerequisites	Nil	2	HS	15	0	0	15	30	1

Preamble	This course aims to impart the essential knowledge on the tamil culture and related technology	
UNIT – I	WEAVING AND CERAMIC TECHNOLOGY	3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.		
UNIT – II	DESIGN AND CONSTRUCTION TECHNOLOGY	3
Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – Thirumalai Nayakar Mahal – Chetti Nadu Houses, Indo – Saracenic architecture at Madras during British Period.		
UNIT – III	MANUFACTURING TECHNOLOGY	3
Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel – Copper and gold – Coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads –Terracotta beads –Shell beads/ bone beats – Archeological evidences – Gem stone types described in Silappathikaram.		
UNIT – IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – Conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society.		
UNIT – V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3
Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.		

**TEXT BOOK:**

1. Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2. Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

**REFERENCES:**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்), உலகத் தமிழராய்ச்சி நிறுவனம், சென்னை, 2002
2. கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசரம், 2016
3. சீழை வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
6. The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi)(Published by International Institute of Tamil Studies).
7. Keeladi – 'Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
8. Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by : The Author)
9. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu)
10. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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

COURSE OUTCOMES: On completion 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)	

#### Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						3		3	2	2			
CO2						3		3	2	2			
CO3						3		3	2	2			
CO4						3		3	2	2			
CO5						3		3	2	2			

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

#### ASSESSMENT PATTERN – THEORY

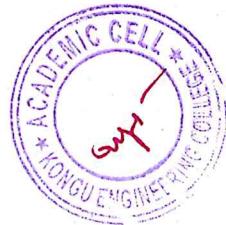
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	40	60					100
CAT2	40	60					100
CAT3	40	60					100
ESE	NA						

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

R-W
Signature of the Chairman
Board of Studies - S & H (Physics)

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Programme & Branch	All BE/BTech Branches	Sem.	Category	L	T	P	SL*	TOT	Credit
Prerequisites	Nil	2	HS	15	0	0	15	30	1
முன்னுரை	தமிழ் கலாச்சாரத்தோடு ஒன்றிய தொழில் நுட்பங்களைப் பற்றிப் படுத்துவதற்காக								
அலகு - I	நெசவு மற்றும் பானை தொழில்நுட்பம்								3
சங்க காலத்தில் நெசவு தொழில் - பானைத் தொழில்நுட்பம் கருப்பு சிவப்பு பாண்டங்கள் - பாண்டகளில் கீறல் குறியீடுகள்									
அலகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்								3
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர் காலத்து பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரிகட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டில் காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடத்துக்கூடம்.									
அலகு - III	உற்பத்தித் தொழில்நுட்பம்								3
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள் - கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.									
அலகு - IV	வேளாண்மை மற்றும் நிர்ப்பாசனத் தொழில்நுட்பம்								3
அணை, ஏரி, குளங்கள், மதகு - சோழர்கால குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.									
அலகு - V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்								3
அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத் திட்டம்.									

## TEXT BOOK:

- தமிழக வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002
- கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016

## REFERENCES:

- கீழடிவைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
- பொருநை-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
- Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
- Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
- Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
- The Contribution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Published by International Institute of Tamil Studies).
- Keeladi – Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
- Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)
- Porunai Civilization (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu)
- Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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

COURSE OUTCOMES:			BT Mapped (Highest Level)
படிப்பை முடித்தவுடன், மாணவர்கள்			
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.		Understanding (K2)
CO3	தமிழர்களின் உற்பத்தித் தொழில்நுட்பம் பற்றி சுருக்கமாகக் கூற முடியும்.		Understanding (K2)
CO4	தமிழர்களின் வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம் பற்றி விளக்க முடியும்.		Understanding (K2)
CO5	தமிழர்களின் அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் பற்றி விளக்க முடியும்.		Understanding (K2)

#### Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						3		3	2	2			
CO2						3		3	2	2			
CO3						3		3	2	2			
CO4						3		3	2	2			
CO5						3		3	2	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	40	60					100
CAT2	40	60					100
CAT3	40	60					100
ESE	NA						

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

<i>R-W</i>
Signature of the Chairman
Board of Studies - <i>S &amp; H (Physics)</i>

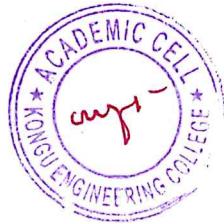
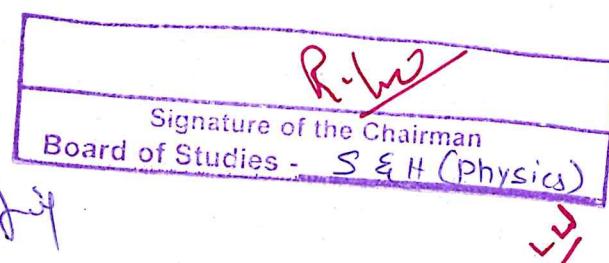


*Jyj*

24PHL23 - PHYSICS LABORATORY FOR ELECTRONICS ENGINEERING													
(Common to ECE, EEE and EIE branches)													
Programme& Branch	BE - ECE, EEE and EIE branches				Sem.	Category	L	T	P	SL*	TOT	Credit	
Prerequisites	Nil				2	BS	0	0	30	0	30	1	
Preamble	This course aims to impart hands on training in the determination of the physical parameters such as wavelength of laser, particle size, acceptance angle and numerical aperture of an optical fiber, AC frequency, specific resistance, band gap, thickness of a thin film and knowledge on the working of p-n diode and UJT and also to impart skills on writing coding / developing project / product related to societal requirement.												
<b>LIST OF EXPERIMENTS / EXERCISES:</b>													
1.	Determination of the wavelength of the given semiconductor laser.												
2.	Determination of the particle size of the given powder using laser.												
3.	Determination of the acceptance angle and numerical aperture of the given optical fiber.												
4.	Observation of the I-V characteristics of a p-n junction diode.												
5.	Observation of the I-V characteristics of a uni junction transistor.												
6.	Determination of the frequency of alternating current using electrically vibrating tuning fork (Milde's apparatus).												
7.	Determination of the specific resistance of the given metallic wire using Carey Foster's bridge.												
8.	Determination of the band gap of a given semiconducting material using post-office box.												
9.	Determination of the thickness of a thin film using air-wedge arrangement.												
10.	Writing coding for any one of the above experiments / developing a project / a product.												
<b>REFERENCES/ MANUAL /SOFTWARE:</b>													
1.	Physics Laboratory Manual / Record, Department of Physics, 1 <sup>st</sup> Edition, 2024.												
<b>COURSE OUTCOMES:</b>													
<b>On completion of the course, the students will be able to</b>											<b>BT Mapped (Highest Level)</b>		
CO1	determine the wavelength of a semiconductor laser, the particle size of a powder material, and the acceptance angle and numerical aperture of an optical fiber.										Analyzing (K4), Precision (S3)		
CO2	determine the I-V characteristics of a p-n diode, the I-V characteristics of a UJT and the frequency of an alternating current.										Analyzing (K4), Precision (S3)		
CO3	determine the specific resistance of a metallic wire, the band gap of semiconducting material, the thickness of a thin film and develop a coding / project / product.										Analyzing (K4), Precision (S3)		
<b>Mapping of COs with POs and PSOs</b>													
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	3				3	1		2		
CO2	3	2	2	3				3	1		2		
CO3	3	2	2	3				3	1		2		

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

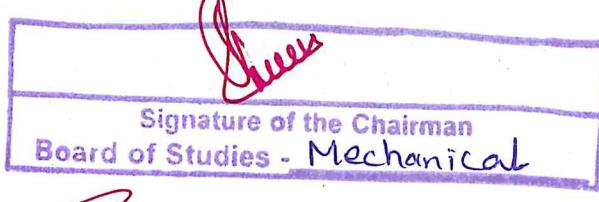
\*includes Term Work (TW) & Online / Certification course hours



CDC

24GCL11 – FOUNDATION LABORATORY - MANUFACTURING, DESIGN AND ROBOTICS (Common to all BE/BTech branches)													
Programme & Branch		All BE/BTech Branches			Sem.	Category	L	T	P	SL*	Total	Credit	
Prerequisites		Nil			1/2	ES	0	0	90	0	90	3	
Preamble		This course provides the hands-on experience to develop a prototype model with the basic knowledge of Computer-aided Design, Manufacturing Processes, 3D Printing Technology, Robotics and Embedded Control.											
<b>LIST OF EXPERIMENTS / EXERCISES:</b>													
<b>PART A – Manufacturing Laboratory (30 Hours)</b>													
1	Selection of product, free hand sketching and detailing												
2	Construction of model using Arc/TIG/MIG/Gas/Spot welding operations												
3	Enhancing the model with sheet metal												
4	Creating the parts of the model using lathe												
5	Creating the parts of the model using milling and drilling machines												
<b>PART B – Product Design and Development Laboratory (30 Hours)</b>													
1	Free hand sketching and detailing of the component												
2	3D part modelling of the component using CAD software												
3	Engineering Analysis of the component model												
4	Generate the component using 3D printer												
<b>PART C – Robotics Laboratory (30 Hours)</b>													
1	Design of electronic circuit and its debugging												
2	Assembly and interfacing of sensors, actuators and wireless communion modules with audrino UNO												
3	Development of embedded programming and interfacing for motion control and obstacle avoidance												
4	Demonstration and testing of robot in static environment												
<b>REFERENCES/ MANUAL /SOFTWARE:</b>													
1	Foundation Engineering Laboratory Manual												
2	SOLID WORKS 2022 Software												
<b>COURSE OUTCOMES:</b> On completion of the course, the students will be able to													
CO1	develop the prototype model using mechanical operations like welding, forming and machining processes												
CO2	sketch 3D model and develop the prototype using 3D printer												
CO3	design and develop the autonomous robot for real-time applications												
<b>Mapping of COs with POs and PSOs</b>													
COs/POs /PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	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		

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



24MNT21 - QUANTITATIVE APTITUDE - II																								
(Common to all Engineering and Technology branches)																								
Programme & Branch		All B.E/B.Tech Branches			Sem.	Category	L	T	P	SL*	Total	Credit												
Prerequisites	Basic Mathematical skills			2	MC	20	0	0	10	30	0													
Preamble	To impart problem solving skills and enhance analytical skills.																							
Unit – I	<b>Averages, Alligations, Time and Work:</b>																							
<b>Averages, Alligations or Mixtures:</b> Concepts – Definition – Formula – Simple problems on averages – Alligation or Mixture rule – Applications – Problems.																								
<b>Time and Work:</b> Concepts – Work and wages – Pipes and Cisterns – Simple problems.																								
Unit – II	<b>Time and Distance:</b>																							
<b>Time and Distance:</b> Time, speed and distance – Conversions – Average speed – Relative speed – Problems on boats and streams – Upstream and downstream – Simple problems.																								
Unit – III	<b>Permutation and Combination, Probability:</b>																							
<b>Permutation and Combination:</b> Concepts – Simple problems.																								
<b>Probability:</b> Basic Concepts – Applications – Simple problems.																								
<b>TEXT BOOK:</b>																								
1.	Dr.R.S.Agarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S.Chand and company limited, 2022.																							
<b>REFERENCES/ MANUAL / SOFTWARE:</b>																								
1.	Abhijit Guha,"Quantitative Aptitude for Competitive Examination", 7 <sup>th</sup> Edition, McGraw Hill Education, India, 2020.																							
2.	<a href="https://www.indiabix.com/aptitude/questions-and-answers">https://www.indiabix.com/aptitude/questions-and-answers</a>																							
3.	<a href="https://www.geeksforgeeks.org/aptitude-questions-and-answers">https://www.geeksforgeeks.org/aptitude-questions-and-answers</a>																							
<b>COURSE OUTCOMES:</b> On completion of the course, the students will be able to										<b>BT Mapped (Highest Level)</b>														
CO1	Solve averages, alligations or mixtures, time and work problems.										Applying (K3)													
CO2	Solve the problems on time and distance, upstream and downstream oriented applications problems.										Applying (K3)													
CO3	Solve problems involving permutation, combination and probability concepts.										Applying (K3)													
<b>Mapping of COs with POs and PSOs</b>																								
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2											
CO1	2	2																						
CO2	2	3																						
CO3	3	2																						
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy																								
<b>ASSESSMENT PATTERN - THEORY</b>																								
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %																	
CAT1		30	70				100																	
CAT2		30	70				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 - <b>S4H</b>	





24EEC31 – CIRCUITS AND NETWORKS																				
Programme & Branch	BE – Electrical and Electronics Engineering	Sem.	Category	L	T	P	SL*	Total	Credit											
Prerequisites	Nil	III	PC	45	0	30	45	120	4											
Preamble	This course aims to impart knowledge on analysis of electric AC and DC circuits. And helps the students to demonstrate current and voltage in electric circuits through simulation as well as discrete components.																			
Unit – I	<b>DC Circuits</b>																			
<b>DC Circuits:</b> Types of sources- Dependent and Independent sources – Source transformation – Current and Voltage division rule – Mesh and nodal analysis. Introduction to Graph Theory: Terminologies- Tree – Co-tree – Twigs and links –Incidence matrix and its properties.																				
Unit – II	<b>AC Circuits</b>																			
<b>AC Circuits:</b> Power, power factor, impedance triangle, voltage triangle and power triangle of RL and RC circuits – Mesh and nodal analysis. Star-Delta transformation – Star and Delta systems – Line and Phase Quantities – Three Phase Power – Balanced Circuit.																				
Unit – III	<b>Network Theorems</b>																			
<b>DC and AC Circuits:</b> Superposition Theorem – Thevenin's Theorem – Norton's Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem –Application to DC and AC circuits																				
Unit – IV	<b>Resonance and DC Transients</b>																			
<b>Resonance circuits:</b> Resonant Frequency, Current and Voltage Variations, Bandwidth, Q factor for series resonance circuits. <b>DC Transients:</b> natural and forced response of RL, RC and RLC circuits.																				
Unit – V	<b>Two-Port Networks and Coupled Circuits</b>																			
<b>Two-Port Networks:</b> Impedance Parameter –Admittance Parameter –ABCD Parameters – T and $\pi$ Representation. <b>Coupled Circuits:</b> Mutual inductance – Dot Convention – Coefficient of Coupling – Analysis of Simple Coupled Circuits.																				
<b>List of Experiments:</b>																				
1.	Determination of loop currents in mesh analysis.																			
2.	Simulation of nodal analysis using dependent sources.																			
3.	Verification of superposition theorem.																			
4.	Verification of maximum power transfer theorem.																			
5.	Design and simulation of series resonance circuit for a given frequency.																			
6.	Simulation of RL DC transient circuits.																			
7.	Simulation of RC DC transient circuits.																			
8.	Determination of Z parameter for the T and $\pi$ networks. (Discrete Components/Simulation Software).																			
9.	Determination of Y parameter for the T and $\pi$ networks. (Discrete Components/Simulation Software).																			
10.	Measurement of self-inductance, mutual inductance and coefficient of coupling.																			
<b>TEXT BOOK:</b>																				
1.	Sudhakar A. and Shyam mohan S. Palli, "Circuits and networks- Analysis and Synthesis", 5th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017.																			
<b>REFERENCES:</b>																				
1.	Charles K. Alexander, Matthew N.O. Sadiku, "Fundamentals of Electric Circuits", 7 <sup>th</sup> Edition, Tata McGraw Hill Publishing Company, New Delhi, 2022																			
2.	Laboratory Manual																			
3.	Multisim software																			

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



COURSE OUTCOMES: On completion of the course, the students will be able to												BT Mapped (Highest Level)
CO1	evaluate DC electric circuits using dependent and independent sources.											
CO2	analyse power and power factor in single phase and three phase AC circuits.											
CO3	demonstrate the verification of network theorems.											
CO4	design and simulate series resonance and DC transients using R, L, C elements.											
CO5	interpret the concept of coupled circuits and two port networks.											

#### Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	1	3	1		1			1	3	2
CO2	3	3	2	1	3	1		1			1	3	2
CO3	3	3	2	2	3			1			1	3	2
CO4	3	3	2	1	3			1			1	3	2
CO5	3	2	1		3			1			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	-	30	70	-	-	-	100
CAT2	-	30	50	20	-	-	100
CAT3	-	50	50	-	-	-	100
ESE	-	26	56	18	-	-	100

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

Signature of the Chairman
Board of Studies -



**24ITC33 – PROGRAMMING IN PYTHON**

**(Common to ECE, EEE & EIE branches )**

<b>Programme&amp; Branch</b>	<b>BE-ECE,EEE &amp; EIE BRANCHES</b>	<b>Sem.</b>	<b>Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>SL*</b>	<b>TOTAL</b>	<b>C</b>
<b>Prerequisites</b>	<b>Programming in C</b>	<b>3</b>	<b>ES</b>	<b>45</b>	<b>0</b>	<b>30</b>	<b>45</b>	<b>120</b>	<b>4</b>
<b>Preamble</b>	This course introduces the core Python programming. It emphasizes developing Python programs with all data types, functions, classes ,objects and NumPy								
<b>Unit – I</b>	<b>Introduction:</b>								<b>9</b>

Problem-solving strategies–program design tools–Types of errors–Testing and Debugging–Basics: Literals–variables and identifiers–data types–input operation–comments–reserved words–indentation–Operators and Expressions–Decision Control Statements- Introduction–conditional statement–iterative statements–Nested Loops–break ,continue and pass statements–else in loops.

<b>Unit – II</b>	<b>Lists, Tuples and Dictionary:</b>	<b>9</b>
Lists: Access, update, nested, cloning, operations, methods, comprehensions, looping- Tuple:Create, utility, access, update, delete, operations, assignments, returning multiple values, nested tuples, index, and count method - Dictionary: Create, access, add and modify, delete, sort, looping, nested, built-in methods—list vs tuple vs dictionary.		

<b>Unit – III</b>	<b>Strings and Regular Expressions:</b>	<b>9</b>
Strings: Concatenation, append, multiply on strings–Immutable–formatting operator–Built-in string methods and functions–slice operation–functions–operators–comparing –iterating –string module–Regular Expressions–match, search, sub, find all and find iterative functions–flag options.		

<b>Unit – IV</b>	<b>Functions and Modules:</b>	<b>9</b>
Functions: Introduction–definition–call–variable scope and lifetime –return statement–function arguments–lambda function–documentation strings–programming practices recursive function–Modules: Modules–packages–standard library methods–function redefinition.		

<b>Unit – V</b>	<b>Object Orientation:</b>	<b>9</b>
Class and Objects: Class and objects–class methods and self–constructor–class and object variables–destructor–public and private data member- NumPy: NumPy Arrays–Computation on NumPy Arrays .Matplotlib: Line plots–Scatter Plots		

**LIST OF EXPERIMENTS / EXERCISES:**

1.	Programs using conditional and looping statements
2.	Implementation of list and tuple operations
3.	Implementation of dictionary operations
4.	Perform various string operations
5.	Use regular expressions for validating inputs
6.	Demonstration of different types of functions and parameter passing
7.	Develop programs using classes and objects
8.	Perform computation on NumPy arrays
9.	Draw different types of plots using Matplotlib

**TEXT BOOK:**

1.	Reema Thareja., "Python Programming using problem solving approach", 3 <sup>rd</sup> impression, Oxford University Press., New Delhi, 2017.
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**REFERENCES/ MANUAL / SOFTWARE:**

1.	Nageswara Rao, "Core Python Programming", 2 <sup>nd</sup> Edition, Dream Tech Press, New Delhi, 2018.
2.	Jake VanderPlas, "Python Data Science Hand book Essential Tools for Working with Data", O'Reilly publishers, 1 <sup>st</sup> Edition, 2016.

COURSE OUTCOMES:											BT Mapped (Highest Level)
On completion of the course, the students will be able to											
CO1	use basic Python constructs to build simple programs										
CO2	apply list, tuple, and dictionary to handle a variety of data.										
CO3	apply strings and regular expressions for searching and retrieval										
CO4	solve the problems using functions and modules.										
CO5	apply object-oriented concepts and perform basic data science operations using Python										

#### Mapping of COs with POs and PSOs

COs/POs /PSOS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	3	1	2	3	3	2	2	3	2
CO2	3	2	2	2	3	1	2	3	3	2	2	3	2
CO3	3	2	2	2	3	1	2	3	3	2	2	3	2
CO4	3	2	2	2	3	1	2	3	3	2	2	3	2
CO5	3	2	2	2	3	1	2	3	3	2	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		25	75				100
CAT2		25	75				100
CAT3		25	75				100
ESE		25	75				100

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


<b>Signature of the Chairman</b> Board of Studies - IT





24EET31 – DC MACHINES AND TRANSFORMERS																				
Programme & Branch	BE – Electrical and Electronics Engineering	Sem.	Category	L	T	P	SL*	Total	Credit											
Prerequisites	Nil	III	PC	45	0	0	45	90	3											
Preamble	This course aims in imparting knowledge on electromechanical conversion concepts and concepts of principle of operation of DC machines and Transformers. It also aims at understanding testing concepts of DC machines and transformers which is very much essential for electrical engineers.																			
<b>Unit – I</b>	<b>Principles of Electromechanical Energy Conversion:</b>																			
Review of Magnetic Circuit definitions – Electric and Magnetic circuits – Series and Parallel Magnetic circuits – Magnetic Circuit Calculations and Magnetization Curves – Energy in Magnetic field System: Energy and Co-energy – Singly excited and doubly excited system – Static and Dynamically induced EMF.																				
<b>Unit – II</b>	<b>DC Generators:</b>																			
<b>DC Machines:</b> Constructional Details – Types of Armature Winding and Configurations – Short Circuit Coil – Methods of Excitation. <b>DC Generators:</b> Working Principle – EMF Equation– Characteristics of Series and Shunt Generators – Armature Reaction and Commutation – Testing Standards – IEC, NEMA.																				
<b>Unit – III</b>	<b>DC Motors:</b>																			
Principle of Operation – Back EMF and Torque Equations – Characteristics of Series, Shunt and Compound Motors –Starters: Three and four point starters – Speed Control Methods: Armature and field control – Testing of DC Machines –Brake test and Swinburne's test. DC Machines: Losses, Efficiency and Power Stages in DC machine – Condition for Maximum Efficiency – Applications.																				
<b>Unit – IV</b>	<b>Transformers:</b>																			
Constructional Details – Types – Principle of Operation – EMF Equation and Transformation Ratio – Phasor Diagram – Transformer on No Load and Load – Equivalent Circuit – OC and SC Test – Regulation and Efficiency – Parallel Operation – Auto Transformer – Saving of Copper																				
<b>Unit – V</b>	<b>Transformer Testing and Practice:</b>																			
Regulation, Losses and Efficiency in Transformers – Condition for Maximum Efficiency – All day Efficiency – Polarity Test, Load Test – Phasing out Test – Sumpner's Test – IEC/IEEE Standard Practices of Testing transformers – Instrument Transformers – Three Phase Transformers – Types of Connections – Star/Delta – T and Open Delta																				
<b>TEXT BOOK:</b>																				
1.	Rajput R.K., "Electrical Machines", 6th Edition, Laxmi Publications, New Delhi, 2018.																			
<b>REFERENCES:</b>																				
1.	Kothari D.P. and Nagrath I.J., "Electric Machines", 5th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2018																			
2.	Bimbhra P.S., "Electrical Machinery", 7th Edition, Khanna Publishers, New Delhi, 2021																			

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



COURSE OUTCOMES: On completion of the course, the students will be able to											BT Mapped (Highest Level)	
CO1	relate the concepts of magnetic circuits and electromechanical energy conversion											Understanding (K2)
CO2	demonstrate the construction and working principle of DC machines											Applying (K3)
CO3	identify suitable starters, speed control and testing methods applicable to DC motors											Understanding (K2)
CO4	examine the performance of transformers											Analyzing (K4)
CO5	evaluate the losses and efficiency of transformer by applying various testing methods and select the instrument transformers for relevant power measurement needs											Analyzing (K4)

#### Mapping of Cos with Pos and PSOs

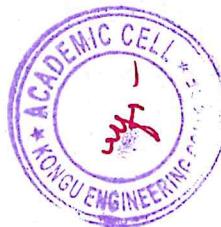
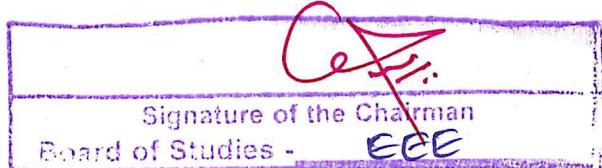
Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1								1	1	2
CO2	3	2				1		1			1	2	3
CO3	3	1	1			1		1			1	1	2
CO4	3	2	1	2							1	2	3
CO5	3	3		2	1						1	3	2

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	-	70	30				100
CAT2	-	70	30				100
CAT3	-	60	20	20			100
ESE	-	60	20	20			100

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



26/1



## 24EET32 – ANALOG ELECTRONICS

Programme & Branch	BE – Electrical and Electronics Engineering	Sem.	Category	L	T	P	SL*	Total	Credit									
Prerequisites	Physics	III	PC	45	0	0	45	90	3									
Preamble	To examine the basic and design knowledge about electronic circuit analysis using Semiconductor devices which involves rectifiers, high power and Feedback amplifiers, Sinusoidal and non sinusoidal oscillators																	
Unit – I	Diodes and Thyristors																	
Construction of PN junction diodes – VI characteristics – Zener diode – Characteristics of Zener diode – Half wave and Full wave bridge rectifiers using diodes – Peak Inverse Voltage – Ripple Factor – Efficiency – Clipper – Clamper – Zener diode regulator – Line Regulation an-d Load Regulation – SCR – UJT.																		
Unit – II	BJT and Biasing Circuits																	
BJT – Construction and Principle of Operation CE,CB and CC configurations – Transistor biasing: Need, Operating point, Concept of DC load line, Fixed Bias, Voltage Divider Bias, Emitter Bias – Stability factors – Method of stabilizing the Q point(Derivation of S only) – Bias Compensation Techniques.																		
Unit – III	Differential, Tuned and Power Amplifiers:																	
Differential, Tuned and Power Amplifiers: Differential Amplifier using BJT – Differential and Common Mode Gain, CMRR – Characteristics of Tuned Amplifiers – Frequency Response of Single and Double Tuned Amplifier – Power Amplifiers: Class B Push Pull Amplifier.																		
Unit – IV	Feedback Amplifiers and Oscillators:																	
Feedback Amplifiers and Oscillators: Principle, Advantages of Negative Feedback Amplifiers – Types of Feedback Connections: Voltage / Current, Series/ Shunt Feedback – Classification of Oscillators – Stability of Feedback Circuits using Barkhausen Criteria – Phase Shift – Hartley Oscillator – Colpitts Oscillator																		
Unit – V	Multivibrators and Time Base Generators:																	
Collector coupled Astable Multivibrator – Collector coupled Monostable Multivibrator – Bistable Multivibrator – Schmitt trigger – Introduction to Voltage time base generator – Errors of generation of sweep waveform- UJT relaxation oscillator																		
<b>TEXT BOOK:</b>																		
1.	Sedha R.S., "A Textbook of Applied Electronics ", Revised Edition, S.Chand & Co. Ltd., New Delhi, 2022.																	
<b>REFERENCES:</b>																		
1.	Balaram Saha & Indranil Saha, " Analog Electronic Circuits ", First Edition, New Age International Pvt Ltd, New Delhi, 2017.																	
2.	Salivahanan S & Sureshkumar N , "Electronic Devices and Circuits ", 4th Edition, McGraw Hill, New Delhi, 2022																	
3.	Millman and Halkias , " Integrated Electronics: Analog and Digital Circuits and Systems", 2 <sup>nd</sup> Edition, Tata McGraw Hill, New Delhi.																	

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



COURSE OUTCOMES: On completion of the course, the students will be able to											BT Mapped (Highest Level)
CO1	Describe the Construction , Characteristics and Applications of Semiconductor devices										
CO2	Apply various biasing techniques for stable operation of transistors										
CO3	Illustrate the operation of Tuned, Power ,Feedback amplifiers and Oscillators										
CO4	Examine performance metrics of Feedback amplifiers , Sinusoidal oscillators and Non Sinusoidal Oscillators										
CO5	Design real time applications using Semiconductor Devices										

#### 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	1	1							1	2	1
CO2	3	2	1	1	2			1			1	2	1
CO3	3	2	1	1	2			1			1	2	1
CO4	2	3	2	1	2			1			1	3	2
CO5	2	3	2	1	2			1			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	-	70	30				100
CAT2	-	70	30				100
CAT3	-	50	50				100
ESE	-	50	50				100

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

Signature of the Chairman Board of Studies - <u>ECE</u>



M.Sanl



24EET33 – DIGITAL ELECTRONICS																				
Programme & Branch	BE – Electrical and Electronics Engineering	Sem.	Category	L	T	P	SL*	Total	Credit											
Prerequisites	Nil	III	PC	45	15	0	60	120	4											
Preamble	To develop proficiency in the principles of Boolean algebra and to effectively design both combinational and sequential logic circuits																			
<b>Unit – I</b>	<b>Binary Numbers and Minimization Techniques:</b>																			
Number systems and conversions - Boolean postulates and laws - De-Morgan's theorem - Boolean expression- Minimization of Boolean expressions- realization of logic functions using logic gates - Sum of Products (SOP), Product of Sums(POS)- Karnaugh map minimization – Introduction to TTL and CMOS logic.																				
<b>Unit – II</b>	<b>Design of Combinational Circuits:</b>																			
Procedure for the Design of Combinational circuits- Half adder and subtractor – Full adder and subtractor - Multiplexer-Demultiplexer - Decoder – Encoder – Code converters: BCD-to-Binary converters, Binary-to-Gray code converters- Single bit Magnitude comparator																				
<b>Unit – III</b>	<b>Hardware Description Language:</b>																			
Verilog Basics - Overview of Verilog HDL - Modules and ports-Gate level modeling- design of combinational circuits using Verilog HDL - Introduction to Field Programmable Gate Arrays (FPGAs) and their architecture.																				
<b>Unit – IV</b>	<b>Design of Sequential Circuits:</b>																			
Introduction, Flipflops: SR, JK, D and T – Level and Edge triggering - Realization of one flip flop using other flip flops – Analysis of Synchronous sequential circuits: State Table, State Diagram, State Equation – Design procedure of Synchronous sequential circuits – Design of synchronous counters: up/down counter- decade counter.																				
<b>Unit – V</b>	<b>Asynchronous Sequential Circuits:</b>																			
Introduction of Asynchronous sequential circuits – Fundamental mode sequential circuits – Design Procedure for Fundamental mode Asynchronous sequential circuits– Hazards: Static Hazards - Dynamic Hazards – Hazard free Realization – Essential Hazards – Introduction to Races and Cycles.																				
<b>TEXT BOOK:</b>																				
1.	Soumithra Kumar Mandal, "Digital Electronics Principles and Applications, 11 <sup>th</sup> Edition, Tata Mc Graw Hill, New Delhi, 2017																			
<b>REFERENCES:</b>																				
1.	Palnitkar Samir, "Verilog HDL: Guide to Digital Design and Synthesis", 2nd Edition, Pearson Education, New Delhi, 2017																			
2.	Salivahanan S. & Arivazhagan S., "Digital Circuits and Design", 5th Edition, Oxford University Press, New Delhi, 2018																			

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



COURSE OUTCOMES: On completion of the course, the students will be able to											BT Mapped (Highest Level)	
CO1	discuss number systems, Boolean rules & laws, logic families and Reduce the Boolean expression.											Understanding (K2)
CO2	illustrate combinational logic circuits using logic gates.											Applying (K3)
CO3	develop Verilog model of combinational circuits using Gate level modelling.											Applying (K3)
CO4	design synchronous sequential circuits using flip-flops.											Analyzing (K4)
CO5	implement asynchronous logic circuits and demonstrate hazards.											Applying (K3)

#### Mapping of Cos with Pos and PSOs

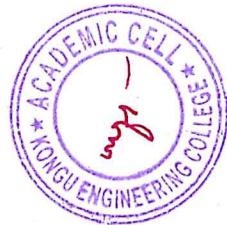
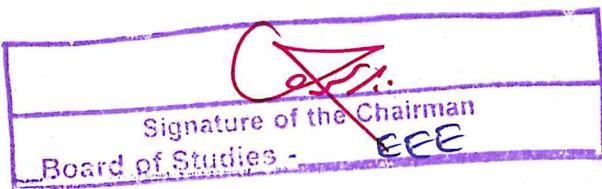
Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2						1			1	2	3
CO2	3	2	1					1			1	2	3
CO3	3	2	1					1			1	2	3
CO4	3	2	1					1			1	2	3
CO5	3	2						1			1	2	3

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				100
CAT2		40	60				100
CAT3		20	60	20			100
ESE		35	45	20			100

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



**24GET31- UNIVERSAL HUMAN VALUES**

(Common to All Engineering and Technology Branches)

<b>Programme &amp; Branch</b>	All B.E & B.Tech Branches	Sem.	Category	L	T	P	SL*	Total	Credit									
<b>Prerequisites</b>	Nil.	3 / 6	HS	30	0	0	30	60	0									
Preamble	To make the student to know what they 'really want to be' in their life and profession, understand the meaning of happiness and prosperity for a human being. Also to facilitate the students to understand about harmony at all the levels of human living, and live accordingly																	
<b>Unit – I</b>	<b>Introduction</b>																	
Need and Basic Guidelines of Value Education – Content and Process of Value Education – Self Exploration – purpose of self-Exploration – Content and Process of Self exploration – Natural Acceptance – Realization and Understanding – Basic Human Aspirations – Continuous Happiness and Prosperity – Exploring Happiness and Prosperity – Basic Requirement for Fulfillment of Human Aspirations – Relationships – Physical Facilities – Right Understanding.																		
<b>Unit – II</b>	<b>Harmony in the Self and Body</b>																	
Human Being and Body – Understanding Myself as Co-existence of Self ('I') and Body, Needs of the Self and Body, Activities in the Self and Body, Self ('I') as the Conscious Entity, the Body as the Material Entity – Exercise – Body as an Instrument– Harmony in the Self ('I') – Understanding Myself – Harmony with Body.																		
<b>Unit – III</b>	<b>Harmony in the Family and Society</b>																	
Harmony in the Family – Justice – Feelings (Values) in Human Relationships – Relationship from Family to Society – Identification of Human Goal – Five dimensions of Human Endeavour.																		
<b>Unit – IV</b>	<b>Harmony in Nature and Existence</b>																	
Order of Nature – Interconnectedness – Understanding the Four order – Innateness – Natural Characteristic – Basic Activity – Conformance – Introduction to Space – Co-existence of units of Space – Limited and unlimited – Active and No-activity – Existence is Co-existence.																		
<b>Unit – V</b>	<b>Implications of the above Holistic Understanding of Harmony on Professional Ethics</b>																	
Values in different dimensions of Human Living – Definitiveness of Ethical Human Conduct –Implications of Value based Living – Identification of Comprehensive Human Goal – Humanistic Education – Universal Human Order – Competence and Issues in Professional Ethics.																		
<b>TEXT BOOK:</b>																		
1.	Gaur R.R., Sangal R., Bagaria G.P., "A Foundation Course in Human Values and Professional Ethics", 1 <sup>st</sup> edition, Excel Books Pvt. Ltd., New Delhi, 2009.																	
<b>REFERENCES:</b>																		
1.	Ivan Illich, "Energy & Equity", The Trinity Press, USA, 1974.																	
2.	Schumacher E.F., "Small is Beautiful: a study of economics as if people mattered", 1 <sup>st</sup> Edition, Britain, 1973.																	

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

<b>COURSE OUTCOMES:</b> <b>On completion of the course, the students will be able to</b>		<b>BT Mapped (Highest Level)</b>
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

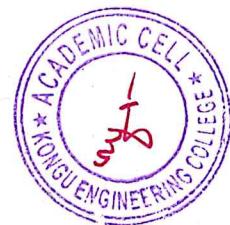
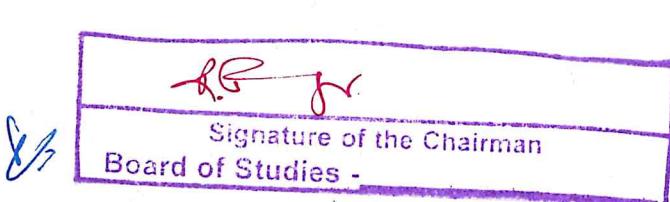
<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	2	2	2		1	2				2	3	2
CO2	3	2	2	2		1	2				2	3	2
CO3	3	2	2	2		1	2				2	3	2
CO4	3	2	2	2		1	2				2	3	2
CO5	3	2	2	2		1	2				2	3	2

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

#### ASSESSMENT PATTERN – THEORY

<b>Test / Bloom's Category*</b>	<b>Remembering (K1) %</b>	<b>Understanding (K2) %</b>	<b>Applying (K3) %</b>	<b>Analyzing (K4) %</b>	<b>Evaluating (K5) %</b>	<b>Creating (K6) %</b>	<b>Total %</b>
CAT1		80	20				100
CAT2		80	20				100
CAT3		80	20				100
ESE	NA						

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





24EEL31 – DC MACHINES AND TRANSFORMERS LABORATORY																						
Programme & Branch	BE – Electrical and Electronics Engineering			Sem.	Category	L	T	P	SL*	Total	Credit											
Prerequisites	Nil			III	PC	0	0	30	0	30	1											
Preamble	This laboratory course gives a practical exposure to the students to learn the characteristics of transformers and DC machines that are used nowadays in electrical systems. The students also learn to select the suitable electrical machines for an application based on its characteristics and they can able to apply the standard testing procedures of DC machines and transformers																					
<b>LIST OF EXPERIMENTS / EXERCISES:</b>																						
1.	Open circuit and load characteristics of DC shunt generator.																					
2.	Load characteristics of DC series motor.																					
3.	Speed control of DC shunt motor.																					
4.	Performance evaluation test on DC Shunt/Compound motor.																					
5.	Swinburne's test.																					
6.	Economic tests on 1-phase transformer.																					
7.	Sumpner's test.																					
8.	Load test on 1-phase Transformer.																					
9.	Load test on Three phase transformer.																					
10.	Computer aided analysis of electrical machines.																					
<b>REFERENCES/ MANUAL /SOFTWARE:</b>																						
1.	Laboratory Manual																					
2.	ANSYS software																					
<b>COURSE OUTCOMES:</b> On completion of the course, the students will be able to										<b>BT Mapped (Highest Level)</b>												
CO1	execute the suitable methods of speed control in DC machines									Applying(K3), Precision (S3)												
CO2	perform suitable tests and evaluate the actual performance of rotating machines and transformers									Applying (K3), Manipulation (S2)												
CO3	evaluate and analyse the performance of rotating machines and transformers through the use of conventional methods and modern tools									Applying (K3), Manipulation (S2)												
<b>Mapping of Cos with POs and PSOs</b>																						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2									
CO1	3	2	1	1				1			1	3	2									
CO2	2	3	2	2	1			1			1	3	2									
CO3	2	3	2	2	1			1			1	3	2									
CO4	2	3	2	2	1			1			1	3	2									

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

  
 Signature of the Chairman  
 Board of Studies

B.E.,-Electrical and Electronics Engineering Curriculum - R2024





24EEL32 – ANALOG AND DIGITAL ELECTRONICS LABORATORY											
Programme & Branch	BE – Electrical and Electronics Engineering			Sem.	Category	L	T	P	SL*	Total	Credit
Prerequisites	Nil			III	PC	0	0	30	0	30	1
Preamble	This laboratory gives a practical exposure to the students to design, implement and analyze the characteristics and applications of analog and digital circuits.										

#### LIST OF EXPERIMENTS / EXERCISES:

1.	Design and implementation of clipper and clamper circuit using PN junction diode (Discrete components)
2.	Design of Class B Push pull amplifier using BJT (Discrete components)
3.	Design and implementation of RC phase shift oscillators using BJT.
4.	Design and implementation of an astable multivibrator using BJT.
5.	Design and implementation of adders and subtractors (Discrete components/Verilog HDL).
6.	Simulation of code converters using Verilog HDL.
7.	Simulation of multiplexer and demultiplexer using Verilog HDL.
8.	Design and implementation of synchronous up and down counters.
9.	Design and implement real time application in analog and digital circuits
10.	Study of implementation of combinational/sequential circuit using FPGA.

#### REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual
2.	Xilinx vivado design tool

#### COURSE OUTCOMES:

On completion of the course, the students will be able to

		BT Mapped (Highest Level)
CO1	build and execute amplifier circuits using BJT.	
CO2	build and execute oscillators circuits using BJT.	
CO3	design and simulate the combinational and sequential circuits using Logic gates and Verilog HDL.	

#### 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	1	1	1			3	1		1	3	2
CO2	3	2	1	1	1			3	1		1	3	2
CO3	3	2	1	1	2			3	1		1	3	2

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

Signature of the Chairman
Board of Studies -

M. Srinivasan

