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 COMPUTER SCIENCE AND DESIGN

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

KONGU
Assuring the Best

B.E. COMPUTER SCIENCE AND DESIGN 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									
Theory/Theory with Practical													
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
24PHT11	Physics for Computer Systems	45	0	0	45	0	90	3	40	60	100	BS	C
24CSC12	Programming in C	45	0	30	45	0	120	4	100	0	100	ES	OT
24CDT11	Human Computer Interaction	45	0	0	45	0	90	3	40	60	100	PC	C
24TAM01	Heritage of Tamils	15	0	0	15	0	30	1	100	0	100	HS	OT
Practical / Employability Enhancement													
24PHL11	Physics Laboratory for Computer Systems	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	
24MNT12	Quantitative Aptitude - I	30	0	0	0	0	30	0	100	0	100	MC	
24VEC11	Yoga and Values for Holistic Education	15	0	15	0	0	30	1	100	0	100	HS	
24MNT11	Student Induction Program	0	0	90	0	0	90	0	100	0	100	MC	
Total Credits to be earned								**23**					

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

Signature of the Chairman
Board of Studies - CSD

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

B.E. COMPUTER SCIENCE AND DESIGN 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									
Theory/Theory with Practical													
24EGT21	English For Effective Communication - II	45	0	0	45	0	90	3	40	60	100	HS	C
24MAC23	Probability and Statistics	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
24CDC21	Programming and Linear Data Structures	45	0	30	45	0	120	4	100	0	100	ES	OT
24CDT21	Digital Logic Design	45	0	0	45	0	90	3	40	60	100	ES	A
24TAM02	Tamils and Technology	15	0	0	15	0	30	1	100	0	100	HS	OT
Practical / Employability Enhancement													
22GCL12	Foundation Laboratory - Electrical, IoT and Web Technologies	0	0	90	0	0	90	3	100	0	100	ES	
24CYL13	Chemistry Laboratory for Electronics and Computer Systems	0	0	30	0	0	30	1	60	40	100	BS	
24MNT21	Quantitative Aptitude - II	30	0	0	0	0	30	0	100	0	100	MC	
Total Credits to be earned								**22**					

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

Signature of the Chairman
Board of Studies - CSD

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

B.E. COMPUTER SCIENCE AND DESIGN 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	P									
Theory/Theory with Practical													
24MAT31	Discrete Mathematical Structures	45	15	0	60	0	120	4	40	60	100	BS	A
24CDC31	Python Programming and Frameworks	45	0	30	45	0	120	4	100	0	100	ES	OT
24CDC32	Data Structures	45	0	30	45	0	120	4	100	0	100	ES	A
24CDT31	UX and UI Design	45	0	0	45	0	90	3	40	60	100	PC	C
24CDT32	Computer Organization	45	15	0	60	0	120	4	40	60	100	PC	A
24MNT31	Environmental Science	30	0	0	0	0	30	0	100	0	100	MC	OT
Practical / Employability Enhancement													
24CDL31	UX and UI Design Laboratory	0	0	30	0	0	30	1	60	40	100	PC	
24CDL32	Design Tools Laboratory	0	0	30	0	0	30	1	60	40	100	PC	
24GEP31	Mini Project - I	0	0	30	0	0	30	1	100	0	100	EC	
Total Credits to be earned								**22**					

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

Signature of the Chairman
Board of Studies - CSD

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

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.	
Unit – I	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Parts of Speech – Articles – Determiners – **Verbal Aptitude:** Synonyms and Antonyms – Selecting Words – **Listening:** Listening and Filling in Information – Speech Units – **Speaking:** Introducing Oneself – Discussion on Social Media Etiquette – **Reading:** Importance of Good Communication – Comprehension and Inference, Reading for facts and opinions – Building a Positive Attitude: An Excerpt from *You Can Win* – **Writing:** Email Etiquette – Email Writing – Responding to Emails		
Unit – II	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory – Question Tags– **Verbal Aptitude:** Prefixes and Suffixes – Collocations – Idiomatic Expressions – **Listening:** Identifying main and Secondary Points – **Speaking:** Asking Questions – Role Play – **Reading:** Reading for Comprehension – Verbal and Non-Verbal Communication – Winning Strategies: An Excerpt from *You Can Win*- **Writing:** Descriptive Writing – Product/Process Description – Letter Writing: Formal Letters – Seeking Permission and Inviting Chief Guest		
Unit – III	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Tenses – Phrasal Verbs– **Verbal Aptitude:** Jumbled Sentences – Sentence Formation– **Listening:** Taking Notes from a Discussion – **Speaking:** Retelling an Incident – Discussing Tourist Destinations – **Reading:** Process of Communication–Scanning - Motivating Yourself and Others Every Day: An Excerpt from *You Can Win* – **Writing:** Paragraph Writing: Narrative and Compare & Contrast		
Unit – IV	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Prepositions – Transitional Words/Phrases – Discourse Markers – **Verbal Aptitude:** One Word Substitution - Sentence Completion – **Listening:** Listening for Specific Information – **Speaking:** Small Talk–Telephonic Conversations– **Reading:** Channels of communication – Building Positive Self-Esteem and Image: An Excerpt from *You Can Win* – **Writing:** Instructions – Recommendations and Suggestions		
Unit – V	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Subject Verb Agreement – Gerunds and Infinitives– **Verbal Aptitude:** Homonyms, Homophones and Homographs – Cloze Test using Verb Forms, Prepositions and Articles – **Listening:** Listening and Identifying Parts from a Description – **Speaking:** Agreeing and Disagreeing – **Reading:** Skimming – Reading to Summarize – Setting and Achieving your Goals: An Excerpt from *You Can Win* – **Writing:** Transcoding: Identifying Trends and Patterns in Graphs and Expressing with Graph Specific Vocabulary		

TEXT BOOK:

1.	Sudharshana N P and Savitha C, *English for Technical Communication*, 2nd Edition, Cambridge University Press, New Delhi, 2016.

REFERENCES:

1.	Ashraf Rizvi. Effective Technical Communication, 2nd 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.	Shiv Khera. You Can Win: A Step-by-Step Tool for Top Achievers. 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	Applying (K3)
CO2	listen and understand different spoken discourses	Applying (K3)
CO3	present ideas clearly and confidently in formal and informal conversations and discussions	Creating (K6)
CO4	comprehend the given text and respond appropriately for technical and professional purposes	Understanding (K2)
CO5	select appropriate words , phrases and grammatical units and apply them in both spoken and written communication	Analyzing (K4)

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) %	Understanding (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)

R-W

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

J-Rajesh

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

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	**Matrices:**	**9**

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	**Ordinary Differential Equations:**	**9**

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	**Ordinary Differential Equations of Higher Order:**	**9**

Linear differential equations of second and higher order with constant coefficients - Particular Integrals for the types: e^{ax} – cosax / sinax – x^n – $e^{ax}x^n$, e^{ax} sinbx and e^{ax} cosbx – Differential Equations with variable coefficients: Euler-Cauchy's equation – Legendre's equation.

Unit – IV	**Applications of Ordinary Differential Equations:**	**9**

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	**Laplace Transform:**	**9**

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.

LIST OF EXPERIMENTS / EXERCISES:

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

TEXT BOOK:

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.

REFERENCES/ MANUAL / SOFTWARE:

1.	Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2016.
2.	Ramana B V, "Higher Engineering Mathematics", 1st Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2018.
3.	Duraisamy C., Vengataasalam S., Arun Prakash K. and Suresh M., "Engineering Mathematics - I", 2nd Edition, Pearson India Education, New Delhi, 2018.
4.	Grewal B.S., "Higher Engineering Mathematics" 44thEdition, 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.	Applying (K3) Manipulation (S2)
CO2	Identify the appropriate method for solving first order ordinary differential equations.	Applying (K3) Manipulation (S2)
CO3	Solve higher order linear differential equations with constant and variable coefficients.	Applying (K3) Manipulation (S2)
CO4	Apply the concept of ordinary differential equations for modeling and finding solutions to engineering problems.	Applying (K3) Manipulation (S2)
CO5	Apply Laplace Transform to solve complex engineering problems.	Applying (K3) Manipulation (S2)

Mapping of 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)

Signature of the Chairman
Board of Studies - S4 H

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24PHT11 - PHYSICS FOR COMPUTER SYSTEMS									
(Common to CSE, IT, CSD, AIDS & AIML branches)									
Programme& Branch	**BE/B.Tech - CSE, IT, CSD, AIDS and AIML branches**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**1**	**BS**	**45**	**0**	**0**	**45**	**90**	**3**

Preamble	This course aims to impart the knowledge on crystal physics, quantum physics, acoustics, ultrasonics, laser, fiber optics, and semiconductors. It also describes the applications of aforementioned topics in computer systems.	
Unit – I	**Crystal Physics:**	**9**
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.		
Unit – II	**Quantum Physics and Applications:**	**9**
Blackbody radiation – Planck's theory – Compton scattering – Matter waves – Properties – Heisenberg uncertainty principle – Schrodinger's time-independent and time-dependent wave equations – Physical significance of wave function – Particle in a one-dimensional box.		
Unit – III	**Acoustics and Ultrasonics:**	**9**
Classification of sound – Characteristics of sound – Reverberation and reverberation time – Growth and decay of sound – Sabine's formula for reverberation time – Determination of sound absorption coefficient – Factors affecting acoustics of buildings and their remedies – Ultrasonics – Properties of ultrasonic waves – Generation of ultrasonic waves – Magnetostrictive generator and Piezoelectric generator – Non-destructive testing – Flaw detection.		
Unit – IV	**Laser and Fiber optics:**	**9**
Stimulated absorption – Spontaneous emission – Stimulated emission – Einstein's coefficients and their relations – Population inversion – Pumping – CO_2 laser – Holography – Fiber optics – Numerical aperture and acceptance angle – Classification of optical fibers based on refractive index, modes and materials – Fiber optic communication system – Temperature and displacement sensors.		
Unit – V	**Semiconducting Materials:**	**9**
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.		

TEXT BOOK:

1.	Katiyar A.K, Pandey C.K, "Engineering Physics: Theory and Practical", 2nd Edition, Wiley, 2015 (Unit I, II).
2.	Tamilarasan K and Prabu K, "Physics for Engineering I", 1st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023 (Unit III, IV, V).

REFERENCES:

1.	Avadhanulu M.N, Kshirsagar P.G and Arun Murthy T.V.S, "A Textbook of Engineering Physics", 11th Edition, S Chand, 2021.
2.	Malik H.K and Singh A.K., "Engineering Physics", 2nd Edition McGraw-Hill Education, New Delhi, 2022.

*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	analyze seven crystal systems, interplanar spacing in cubic lattice, BCC, FCC, HCP crystal systems and the types of crystal imperfections and their impacts.	Analyzing (K4)
CO2	investigate the concepts of quantum mechanics to describe Planck's theory, Compton effect and the behavior of electrons in a metal by solving Schrodinger's wave equations.	Analyzing (K4)
CO3	explore the concepts of growth and decay of sound energy in a hall to compute Sabine's formula and to recognize the requirements of acoustically good buildings and also to describe the production of ultrasonic wave and testing of materials by non-destructive method.	Analyzing (K4)
CO4	examine the concepts of stimulated emission of radiation to explain the working and the applications of laser in engineering and technology. To apply the principle of propagation of light through optical fiber to compute acceptance angle and numerical aperture and also to explain fiber optic communication system and the working of fiber optic sensors.	Analyzing (K4)
CO5	Inspect the concept of density of states to compute the carrier concentration 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 cell.	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	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)

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

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

PKV

24CSC12- PROGRAMMING IN C									
(Common to CSE, IT, CSD, AIDS & AIML branches)									
Programme & Branch	**B BE/B.Tech - CSE, IT, CSD, AIDS and AIML branches**	**Sem**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**1**	**ES**	**45**	**0**	**30**	**45**	**120**	**4**

Preamble	The course aims to provide exposure to problem-solving through programming. It introduces all the fundamental concepts of C Programming. This course provides adequate knowledge to solve problems in various domains	
Unit – I	**Introduction to C and Control Statements**	**9**
The structure of a C program - Data - Variables – Declaring, assigning, and printing variables – Data Types – Constants – Enumeration Constants – Keywords – Operators: Precedence and Associativity – Expressions – Input/Output statements, - Control Structure: Decision-making statements		
Unit – II	**Arrays**	**9**
Control Structure: Repetitive statements – for loop, while loop, and do-while loop-Arrays: Declaring and initializing 1D array – Two-dimensional arrays –Array Operations and Manipulations.		
Unit – III	**Strings and Pointers**	**9**
Strings: Basics, declaring and initializing strings – string handling functions: standard and user-defined functions – character-oriented functions, Two-dimensional array of strings **Pointers:** Memory access and pointers, pointer basics, declaring, initializing, and dereferencing a pointer, parameter passing mechanisms, operations on pointers		
Unit – IV	**Functions**	**9**
Functions: Basics, The anatomy of a function – Types of functions based on arguments and return types – Passing 1D and 2Darrays as arguments to functions – Calling function from another function – recursive functions -Variable scope and lifetime - Storage classes- Pre-processor directives: #define: macros with and without arguments		
Unit – V	**User Defined data types**	**9**
Structure basics –declaring and defining a structure – nested structures –Union-typedef– File Handling: Introduction – File operations: File opening and closing files – reading and writing data to files		

LIST OF EXPERIMENTS / EXERCISES:

1	Programs for demonstrating the use of different types of operators like arithmetic, logical, relational, and ternary operators (Sequential structures)
2	Programs to Illustrate the different formatting options for input and output
3	Programs using decision-making statements like 'if', 'else if', 'switch', and conditional, unconditional 'goto' (Selective structures)
4	Programs for demonstrating repetitive control statements like 'for', 'while', and 'do-while' (Iterative structures)
5	Programs for demonstrating one- and two dimensional arrays
6	Programs to implement various character and string operations with and without built-in library functions.
7	Programs to demonstrate the use of pointers
8	Programs to demonstrate modular programming concepts using built-in and user-defined functions
9	Programs to illustrate the use of user-defined data types
10	Programs to implement file handling

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

TEXT BOOKS	
1.	Sumitabha Das, Computer Fundamentals and C Programming, 1st Edition, McGraw Hill, 2018
REFERENCES/ MANUAL / SOFTWARE:	
1.	YashavantKanetkar,"LetusC",16th, BPBpublications,2018.
2.	ReemaThareja.,"ProgramminginC",2ndEdition,OxfordUniversityPress,NewDelhi,2018
3.	E.Balagurusamy,"ProgramminginANSIC",seventhedition,McGrawHillEducation,2017.
4	https://nptel.ac.in/courses/106/105/106105171/

COURSE OUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	make use of control and iterative statements to develop simple applications	Applying(K3), Precision(S3)
CO2	develop simple C programs using the concepts of arrays and modular programming	Applying(K3), Precision(S3)
CO3	demonstrate the concepts of strings and pointers	Applying(K3), Precision(S3)
CO4	apply user-defined data types to solve given problems	Applying(K3), Precision(S3)
CO5	implement functions and structures with pointer	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	2	2	1				1	1	1	3	1
CO2	3	2	2	2	1				1	1	1	3	1
CO3	3	2	2	2	1				1	1	1	3	1
CO4	3	2	2	2	1				1	1	1	3	1
CO5	3	2	2	2	1				1	1	1	3	1

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

Signature of the Chairman
Board of Studies - CSE

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

P. Kalaivani

24CDT11 - HUMAN COMPUTER INTERACTION									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**1**	**PC**	**45**	**0**	**0**	**45**	**90**	**3**

Preamble	This course enables to design user interfaces for system based on the capabilities of computer technologyand the needs of human factors.	
Unit – I	**The Human and Computer:**	**9**
The Human: Introduction – Input – output Channels – Human memory– The computer: Introduction – Text entry devices – Positioning – pointing and drawing – Display devices – Devices for VR and 3D interactive - Paper: printing and scanning – Memory – Processing and networks.		
Unit – II	**Interaction and Interfaces:**	**9**
The Interaction: Introduction – Models of interaction – Frameworks and HCI – Ergonomics – Interaction styles – Elements of theWIMP interface– Experience, Engagement and fun –Paradigm for interaction.		
Unit – III	**Design Process:**	**9**
Interaction design basics: Introduction – The process of design – User focus – Scenarios – Navigation design – Screen design andlayout – Iteration and Prototyping – HCI in the software process: Introduction – The software life cycle – Usability engineering – Iterative design and prototyping – Design rationale –Golden rules and heuristics – HCI patterns.		
Unit – IV	**Design Models:**	**9**
Cognitive models: Introduction – Goal and task hierarchies – Linguistics models – Physical and device models – Communication and collaboration model: Introduction – Face-to-face communication — Conversation — Text-based communication.		
Unit – V	**Task Analysis, Dialog Notations and Design:**	**9**
Task Analysis: Introduction - Task Decomposition - Knowledge-Based Analysis - Entity–Relationship-based Techniques - Dialog Notations and Design: What is Dialog? - Dialog Design Notations - Diagrammatic Notations.		

TEXT BOOK:

1. Alan Dix, Janet Finlay, Gregory D.Abowd and Russell Beale, "Human-Computer Interaction", Pearson Education , 3rd Edition, 2009.

REFERENCES:

1. Andrew Sears, Julie A. Jacko, "The Human-Computer Interaction Handbook Fundamentals, Evolving Technologies, and Emerging Applications", 2nd Edition, Taylor & Francis Group, 2008.
2. J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland and T. Carey, "Human-Computer Interaction", Addison Wesley, 1994.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	organize capabilities of both humans and computers from the viewpoint of human information processing.	Applying (K3)
CO2	Build typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.	Applying (K3)
CO3	apply interactive design process, standards, guidelines and universal design principles to designing HCI systems.	Applying (K3)
CO4	identify user models, user support, design models and requirements of HCI systems.	Applying (K3)
CO5	analyze the communication between user and system by using task analysis and dialog description techniques	Applying (K3)

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	1	1			1	1	1	3	1
CO2	3	2	2	2	1	1			1	1	1	3	1
CO3	3	2	2	2	1	1			1	1	1	3	1
CO4	3	2	2	2	1	1			1	1	1	3	1
CO5	3	2	2	2	1	1			1	1	1	3	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
CAT3		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 - CSD

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

N

24TAM01- HERITAGE OF TAMILS									
(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	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.	
UNIT I	**Language and Literature**	**3**
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 bharathiyar and bharathidhasan.		
UNIT II	**Heritage - Rock Art Paintings to Modern Art – Sculpture**	**3**
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.		
UNIT III	**Folk and Martial Arts**	**3**
Therukoothu – karagattam - villu pattu - kaniyan koothu – oyillattam - leather puppetry – silambattam – valari - tiger dance - sports and games of tamils.		
UNIT IV	**Thinai Concept of Tamils**	**3**
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.		
UNIT V	**Contribution of Tamils to Indian National Movement and Indian Culture**	**3**
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.		

TEXT BOOK:

1.	S.Muthuramalingam, M.Saravanakumar, Heritage of Tamils, Yes Dee Publishing Pvt Ltd, 2023, for Units I,II,III,IV,V.

REFERENCES:

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)(Puplished by International Institute of Tamil Studies).
3.	Keeladi – 'Sangam City C ivilzation 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: படிப்பை முடித்தவுடன், மாணவர்கள்		BT Mapped (Highest Level)
CO1	explain valuable concepts in language and literature of tamils.	Understanding (K2)
CO2	illustrate about the tamils sculpture and their paintings.	Understanding (K2)
CO3	summarize about the tamils folk and martial arts.	Understanding (K2)
CO4	explain the thinai concept of tamils.	Understanding (K2)
CO5	explain the contribution of Tamils to the Indian National Movement and Indian culture.	Understanding (K2)

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.W2

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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

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 விளையாட்டுக்கள், திணைக் 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 சார்பற்ற 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 - ஐம்பொன் 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 விளையாட்டுக்கள்**	3
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.		
அலகு - IV	**தமிழர்களின் திணைக் 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 புத்தகங்கள்களின் அச்சு வரலாறு.		

TEXT BOOK:

1.	ஆ. பூபாலன், தமிழர் மரபு, VRB Publishers Pvt Ltd, 2022,அலகு I,II,III,IV,V.

REFERENCES:

1.	தமிழக வரலாறு- மக்களும் பண்பாடும்- கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2.	கணினித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - 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: படிப்பை முடித்தவுடன், மாணவர்கள்		BT Mapped (Highest Level)
CO1	தமிழ் மொழி மற்றும் இலக்கியத்தில் மதிப்புமிக்க கருத்துக்களை விளக்க முடியும்.	Understanding (K2)
CO2	தமிழர்களின் சிற்பம் மற்றும் அவர்களின் ஓவியங்கள் 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)

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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24PHL11 - PHYSICS LABORATORY FOR COMPUTER SYSTEMS									
(Common to CSE, IT, CSD, AIDS & AIML branches)									
Programme& Branch	**BE/B.Tech - CSE, IT, CSD, AIDS and AIML branches**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**TOT**	**Credit**
Prerequisites	**Nil**	**1**	**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 AC frequency, compressibility of a liquid, wavelength of laser, particle size, acceptance angle and numerical aperture of an optical fiber, 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.

LIST OF EXPERIMENTS / EXERCISES:

1.	Determination of the frequency of alternating current using electrically vibrating tuning fork (Melde's apparatus).
2.	Determination of the wavelength of the given semiconductor laser.
3.	Determination of the particle size of the given powder using laser.
4.	Determination of the acceptance angle and numerical aperture of the given optical fiber.
5.	Observation of the I-V characteristics of a p-n junction diode.
6.	Observation of the I-V characteristics of a uni junction transistor.
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.

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	determinethe frequency of an alternating current, the wavelength of a semiconductor laser and the particle size of a powder material,	Analyzing (K4), Precision (S3)
CO2	determinethe acceptance angle and numerical aperture of an optical fiber, the I-V characteristics of a p-n diode and the I-V characteristics of a UJT.	Analyzing (K4), Precision (S3)
CO3	determine the specific resistance of a metallic wire, the band gap of semiconducting materials, the thickness of a thin film and develop a coding / project / product.	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	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

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

ACADEMIC CELL ★ KONGU ENGINEERING COLLEGE ★

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.

LIST OF EXPERIMENTS / EXERCISES:

	PART A – Manufacturing Laboratory (30 Hours)
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
	PART B – Product Design and Development Laboratory (30 Hours)
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
	PART C – Robotics Laboratory (30 Hours)
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
	REFERENCES/ MANUAL /SOFTWARE:
1.	Foundation Engineering Laboratory Manual
2.	SOLID WORKS 2022 Software

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	develop the prototype model using mechanical operations like welding, forming and machining processes	Applying (K3), Precision (S3)
CO2	sketch 3D model and develop the prototype using 3D printer	Applying (K3), Precision (S3)
CO3	design and develop the autonomous robot for real-time applications	Applying (K3), Precision (S3)

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	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

Signature of the Chairman
Board of Studies - Mechanical

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

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	**Number system and Equations:**	**6**

Number systems: Classification of numbers – Rules of divisibility – BODMAS Rule – HCF and LCM – Decimal fractions –Simplification – Problems.
Equations: Solving equations with one variable – Solving simultaneous linear equations with two variables – Applications of simultaneous linear equations – Problems on ages – Simple problems.

Unit – II	**Ratio, Proportion and Percentage:**	**6**

Ratio and Proportion: Third, Fourth and mean proportional – Comparison of ratios – Compound ratio – Duplicate ratio – Sub duplicate ratio – Triplicate ratio – Sub triplicate ratio – Chain rule – Simple problems.
Percentages: Basic Concepts – Problems on percentages – Problems on population – Problems on depreciation.

Unit – III	**Profit and Loss, Interest:**	**8**

Profit and Loss: Basic concepts – Cost price – Selling price – Profit and Loss – Simple problems.
Simple and Compound interest: Concepts – Percentage of interest – Difference between simple interest and compound interest – Simple problems.

TEXT BOOK:

1.	Dr R.S.Agarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S.Chand and company limited, 2022.

REFERENCES/ MANUAL / SOFTWARE:

1.	Abhijit Guha,"Quantitative Aptitude for Competitive Examination", 7th Edition, McGraw Hill Education, India, 2020.
2.	https://www.indiabix.com/aptitude/questions-and-answers
3.	https://www.geeksforgeeks.org/aptitude-questions-and-answers

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

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											
CO2	2	2											
CO3	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		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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24VEC11 - YOGA AND VALUES FOR HOLISTIC DEVELOPMENT									
(Common to All Engineering and Technology Branches)									
rogramme & Branch	**All B.E./B.Tech. Branches**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**1**	**HS**	**15**	**0**	**15**	**0**	**30**	**1**

Preamble	Yoga or yogasanas are considered as art and science of healthy living by our ancient gurus. It is method to bring harmony of body and mind for general wellbeing. Yoga is considered as one of the greatest gifts to the world by Indians for healthy living. Students in particular are benefitted by learning yoga.	
Unit – I	**Introduction:**	**2**
The Origins of Yoga – Definitions - Concepts - Aims and objectives of Yoga – Yoga is a Science and Art – Rules and Regulations of Asanas – Classifications of Yogasanas – Patanjali's Ashtanga Yoga – Pranayama – Mudras & Bandhas - Shatkarma (Cleansing Practice) - Streams of Yoga – Modern Trends in yoga.		
Unit – II	**Yoga and Mind:**	**2**
The Nature of Mind - Five Elements and the Mind - Meditation and the Mind - Functions of the Mind - Role of Yoga in Psychological problems: Mood Disorders, Major Depressive Disorder, Cyclothymic Disorder.		
Unit – III	**Yoga and Values, Diet:**	**2**
Human Values – Social Values – Role of Yoga in Personality Integration - Concepts of Natural Diet - Naturopathy Diet – Eliminative Diet – Soothing Diet – Constructive Diet.		
Unit – IV	**Asanas:**	**2**
Prayer - Starting & Closing - Preparatory practices – Loosening Practices – Meaning, Definitions and Objectives of Asanas - Principles of Practicing Asanas. Asanas: Standing – Sitting – Prone – Supine – Suryanamaskar.		
Unit – V	**Pranayama and Meditation:**	**2**
Breathing Practices for awareness - Definitions and Objectives of Pranayama - Principles of Practicing Pranayama. Pranayama: Nadi Shuddhi - Kapalabathi – Sitali – Sitkari – Bhranari – Ujjayi – Relaxation Techniques – Meditation.		

TEXT BOOK:

1.	Swami satyananda saraswathi, "Asana pranayama mudra bandha", Bihar school of yoga, 4th Edition, 1969.
2.	Swami mukthi Bodhanandha, "Hatha yoga pradipika", Bihar school of yoga, 4th Edition, 1985.

REFERENCES:

1.	B.K.S. Iyenkar, "Yoga the path of holistic health", DK Limited, 2nd Edition, 1969.
2.	Selvarasu, "Kriya cleansing in yoga", Aruvi yoga, 3rd Edition, 2002.

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

Mapping of COs with POs and PSOs

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

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

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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

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	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Simple, Compound, and Complex Sentences – **Verbal Aptitude:** Odd Words – Paired words – **Listening:** Listening to a Match Commentary and Filling in a Table – Listening to TED talks - **Speaking:** Apologizing – Talking about Manners and Etiquette – **Reading:** Scanning a Text, Power Point Presentations – The Best Way to Start a New Habit : An Excerpt from *Atomic Habits* **Writing:** Business Letters: Enquiry and Complaint		
Unit – II	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Direct and Indirect Speech – **Verbal Aptitude:** Words often Confused – Verbal Analogy – **Listening:** Listening to a Lecture and Sorting Information – Career Related Conversation – **Speaking:** Group Discussion – Speaking about Career Choices and Professional Skills – **Reading:** Reading for Local and Global Comprehension – How to Find and Fix the Causes of Your Bad Habits: An Excerpt from *Atomic Habits* - **Writing: Job Application:** Cover Letter and Resume – Student Portfolio		
Unit – III	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Active and Passive Voice – **Verbal Aptitude:** Error Spotting – Sentence Improvement – Abbreviations and Acronyms – **Listening:** Listening to Podcast Interviews and News/Motivational Speeches – **Speaking:** Presenting a Point of View – Giving Opinions about Podcast – **Reading:** Reading a Procedure – Cross Cultural Communication - How to Make Good Habits Inevitable and Bad Habits Impossible: An Excerpt from *Atomic Habits* – **Writing:** Types of Essays: Argumentative and Opinion based Essays		
Unit – IV	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: If/Conditional Clause – Modals Verbs – Conversational Devices - **Verbal Aptitude:** Sentence Correction – Sentence Selection – **Listening:** Listening and Filling a Mind Map – Listening to Interviews, Celebrity talks – **Speaking:** Giving Advice and Suggestions – Interviewing Classmates - **Reading:** 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 *Atomic Habits* **Writing:** Dialogue Writing – Writing Reviews: Product and Documentary films/Web Series		
Unit – V	**Grammar, Verbal Aptitude, Listening, Speaking, Reading & Writing**	**9**
Grammar: Common Errors in Tenses – Verb - Preposition combinations – **Verbal Aptitude:** Coding and Decoding – **Listening:** Listening for key points – Speeches of New Inventions – **Speaking:** Asking for and Giving Permission – Talking about Gadgets, Inventions and Technology – **Reading:** Categorizing Information – Technical Communication: Effective use of Technology-based Communication – The Goldilocks Rule: How to Stay Motivated in Life and Work: An Excerpt from *Atomic Habits* – **Writing:** Report Writing: IV Report and Case Study Report		

TEXT BOOK:

1.	Sudharshana N P and Savitha C, *English for Technical Communication*, 2nd Edition, Cambridge University Press, New Delhi, 2016.

REFERENCES:

1.	Ashraf Rizvi. Effective Technical Communication, 2nd 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. Atomic Habits By James Clear. Dharman, 2023.

* 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	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) %	Understanding (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)

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

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

24MAC23 – PROBABILITY AND STATISTICS									
(Common to CSE, IT & CSD branches)									
Programme & Branch	**B.E & Computer Science Engineering B.E – Computer Science and Design & B.Tech – Information Technology**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**2**	**BS**	**45**	**7**	**16**	**52**	**120**	**4**

Preamble	To provide an in-depth knowledge in random variables, correlation, sampling theory and promote the ability to use probability distributions and analysis of variance to experimental data.	
Unit – I	**Random Variables:**	**9**
Discrete and Continuous random variables – Probability Mass and Probability density functions – Mathematical expectation and Variance – Moments – Moment generating function.		
Unit – II	**Standard Probability Distributions:**	**9**
Discrete Distributions: Binomial distribution – Poisson distribution – Geometric distribution – Continuous Distributions: Uniform distribution – Exponential distribution – Normal distribution.		
Unit – III	**Two Dimensional Random Variables:**	**9**
Introduction – Joint probability distributions – Marginal and conditional distributions – Covariance – Correlation and regression.		
Unit – IV	**Testing of Hypothesis:**	**9**
Introduction – Critical region and level of significance – Types of Errors – Large sample tests: Z-test for single mean and difference of means – Small sample tests: Student's t-test for testing significance of single mean and difference of means – F-test for comparison of variances – Chi-square test for independence of attributes.		
Unit – V	**Design of Experiments:**	**9**
Analysis of variance – One way classification: Completely Randomized Design – Two way classification: Randomized Block Design – Three way classification: Latin Square Design.		

LIST OF EXPERIMENTS / EXERCISES:	
1.	Introduction to R studio.
2.	Identifying Mean and Variance for discrete and continuous random variables.
3.	Computation of probability using Binomial, Poisson and Normal distributions.
4.	Finding the Marginal and conditional distributions of two-dimensional random variable.
5.	Computation of correlation coefficient for the given data.
6.	Testing significance of means by student's t – test.
7.	Testing the independence of attributes by Chi-square test.
8.	Analyze whether the difference in means is statistically significant by completely randomized design.

TEXT BOOK:	
1.	Veerarajan, T, "Probability and Statistics, Random Processes and Queuing Theory", 1st Edition, McGraw-Hill Education, Chennai, 2019.

REFERENCES/ MANUAL / SOFTWARE:	
1.	William Mendenhall, Robert J. Beaver and Barbara M. Beaver, "Introduction to Probability and Statistics", 14th Edition, Cengage Learning, USA, 2013.
2.	Jay L. Devore., "Probability and Statistics for Engineering and the Sciences", 9th Edition, Cengage Learning, USA, 2016.
3.	Johnson. R.A., Miller. I and Freund. J., "Miller and Freund's Probability and Statistics for Engineers", 9th Edition, Pearson Education, India, 2018.
4.	Douglas C. Montgomery & George C. Runger, "Applied Statistics and Probability for Engineers ", 7th Edition, John Wiley and Sons, USA, 2018.
5.	Probability and Statistics 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	Interpret the concept of random variables and know the basics of R studio.	Applying (K3) Manipulation (S2)
CO2	Apply the standard probability distributions in real time situations.	Applying (K3) Manipulation (S2)
CO3	Apply the concepts of two dimensional random variables and regression in engineering problems.	Applying (K3) Manipulation (S2)
CO4	Apply statistical tests for solving engineering problems involving small and large samples.	Applying (K3) Manipulation (S2)
CO5	Apply the concepts of analysis of variance to experimental data.	Applying (K3) Manipulation (S2)

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

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

Signature of the Chairman
Board of Studies - S4H

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

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.	
Unit – I	**WATER TECHNOLOGY**	**9**
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.		
Unit – II	**ENERGY STORAGE DEVICES**	**9**
Batteries: 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. **Fuel Cells:** 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.		
Unit – III	**ORGANIC ELECTRONIC MATERIALS**	**9**
Organic Electronic Materials: 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.		
Unit – IV	**INSULATING MATERIALS**	**9**
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_6 - electrical resistivity - factors influencing electrical resistivity of materials - composition, properties and applications of high resistivity materials: Nichrome - polymers as electrical insulator.		
Unit – V	**E-WASTE AND ITS MANAGEMENT**	**9**
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.		

TEXT BOOK:

1. Roussak , O.V. Gesser, H. D. " Applied Chemistry: A Textbook for Engineers and Technologists", 2nd 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.

REFERENCES:

1. Payal B. Joshi, Shashank Deep, "Engineering Chemistry", Oxford University Press, New Delhi, 2019.
2. Shuichiro Ogawa, "Organic Electronics Materials and Devices", 1st 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: On completion of the course, the students will be able to		BT Mapped (Highest Level)
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)

Signature of the Chairman
Board of Studies -

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

24CDC21-PROGRAMMING AND LINEAR DATA STRUCTURES									
Programme& Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Programming in C**	**2**	**ES**	**45**	**0**	**30**	**0**	**120**	**4**
Preamble	This course helps the students to learn the advanced concepts of C language, and apply the basic concepts of Linear data structures such as linked list, stack and queue to simple applications.								
Unit – I	**Pointers Introduction, Pointers and Functions Dynamic memory allocation:**								**9**
Pointers: Introduction – Pointer-to-pointer– NULL pointers- Generic pointers –Dangling Pointer-- Using pointer as a function argument- Function pointers: calling a function using a function pointer- Dynamic memory allocation- malloc, calloc,realloc and free.									
Unit – II	**Pointers and Arrays, Pointers and structures:**								**9**
Array of pointers -Pointers and 1D array– passing and an array from function – Pointers and 2D array -Using Pointers for 1D string - pointers to 2D strings. Pointers to structures- Accessing structure members using pointer - Array of structures – self-referential structures.									
Unit – III	**File Handling and Preprocessor Directives:**								**9**
File Handling Basics – opening and closing files – Detecting the end-of-file -File pointer and file buffer – File read/write functions – formatted functions fscanf() and fprintf() –Text and Binary files- Reading and writing binary files –Manipulating file position indicator - Renaming and Removing a file - Command line Arguments. Preprocessor - #define macros with and without arguments - #include directive-Conditional Compilation.									
Unit – IV	**Data structures and Linked List:**								**9**
Introduction to Data Structures – Classification – Introduction to linked lists - Linked lists vs Arrays – Singly linked list-Creating a list - Traversing a list-Adding a node-Deleting a node-Sorting a list-Destroying a list-printing linked list in reverse order-Reverse a singly list - copy a singly linked list.									
Unit – V	**Stack and Queue:**								**9**
Introduction – Stack – Implementation of stack using array and linked list – Applications of stack - Infix to Postfix expression conversion - Postfix expression evaluation – Queue – Implementation of Queue using array and linked list– Other variations of Queue – Applications of Queue.									
LIST OF EXPERIMENTS / EXERCISES:									
1.	Program to access an array(1D and 2D) using pointers								
2.	Program to manipulate strings using pointers								
3.	Program to demonstrate dynamic memory allocation for 1D and 2D array								
4.	Program to pass an array as an argument to function and access the array using pointers								
5.	Program using pointers and structures								
6.	Program to perform operations on files								
7.	Program using conditional preprocessor directives								
8.	Program to implement singly linked list								
9.	Program to implement Stack and Queue using array and linked list								
10.	Program to implement application of stack and queue								
TEXT BOOK:									
1.	Sumitabha Das, "Computer Fundamentals &C Programming", McGraw Hill Education(India) Private Limited, 1st Edition, 2018, for Unit I,II,III.								
2.	Weiss M. A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2016 for Unit IV and V.								
REFERENCES/ MANUAL / SOFTWARE:									
1.	http://surl.li/tvzlm								
2.	YashavantKanetkar, "Pointers in C", BPP Publications, 4th Edition, 2017.								
3.	PradipDey, Manas Ghosh, "Programming in C", Oxford Higher education, 2nd Edition, 2016.								
4.	Neo colab/ C compiler								

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	solve problems using pointers to arrays and strings	Applying (K3) Precision(s3)
CO2	make use functions and structures with pointers to solve problems	Applying (K3) Precision(s3)
CO3	utilize file operations and preprocessor directives to solve advanced problems	Applying (K3) Precision(s3)
CO4	describe the different operations on singly linked list and make use of it for developing simple applications	Applying (K3) Precision(s3)
CO5	build applications using stacks and queues	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				1	3	2
CO2	3	2	1	1	1		1				1	3	2
CO3	3	2	1	1	1		1				1	3	2
CO4	3	2	1	1	1		1				1	3	2
CO5	3	2	1	1	1		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		40	60				100
CAT2		40	60				100
CAT3		40	60				100
ESE		40	60				100

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

Signature of the Chairman
Board of Studies - CSD

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

24CDT21– DIGITAL LOGIC DESIGN									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**2**	**ES**	**45**	**0**	**0**	**0**	**90**	**3**

Preamble	This course enables the students to understand the basic principles of number system, Binary Codes, Boolean algebra, digital logic gates, combinational and sequential circuits. It also focuses on registers, counters and programmable logic devices.

Unit – I	**Number Systems and Boolean Algebra**	**9**

Number Systems and their conversions – Complements – Signed Binary Numbers – Binary Codes – Binary Logic – Boolean Algebra: Definitions – Basic and Axiomatic –Theorems of Boolean Algebra – Boolean functions: Realization of functions using Logic gates

Unit – II	**Gate Level Minimization**	**9**

Canonical and Standard Forms of Boolean functions – Minimization of functions using Karnaugh Map – Don't–Care Conditions – NAND and NOR Implementation– Exclusive-OR function – Minimization of functions using Quine-McCluskey method.

Unit – III	**Combinational Logic**	**9**

Analysis procedure – Design procedure – Half Adder – Full Adder – Half Subtractor – Full Subtractor – Binary Adder – Subtractor – Magnitude Comparator – Decoders – Encoders – Multiplexers – Demultiplexers – Boolean Functions implementation using Multiplexers and Decoders.

Unit – IV	**Sequential Logic**	**9**

Introduction – Latches and Flip-flops – Triggering – Analysis of clocked sequential circuits: State Equations – State Table – State Diagram – State Reduction and Assignment– Mealy and Moore machines and their circuit design procedure. Introduction to Asynchronous Sequential Circuits: Analysis Procedure – Race conditions.

Unit – V	**Register, Counter and Programmable Logic**	**9**

Shift Registers: Serial Transfer – Serial Addition – Universal Shift register – Synchronous Counters: Binary Ripple Counter – BCD Ripple Counter – Ring Counter – Johnson Counter – Programmable Logic devices: ROM – PLA – PAL.

TEXT BOOK:

1. Morris Mano M., Micheal D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog", 6 th Edition, Pearson Education, 2018.

REFERENCES:

1. Salivahanan S. &Arivazhagan S., "Digital Circuits and Design", 5th Edition, Oxford University Press, New Delhi, 2018.
2. Morris Mano M., Micheal D. Ciletti, "Digital Design (Uttaranchal Technical University)", 4th Edition, Pearson Education, 2012.

*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 different number systems and their conversion and boolean algebra	Applying (K3)
CO2	evaluate Boolean expression using map and tabulation technique and implement using logic gates	Applying (K3)
CO3	make use of combinational logic circuits to evaluate the Boolean expression	Applying (K3)
CO4	apply the concepts of sequential logic circuits to implement Boolean functions	Applying (K3)
CO5	construct simple digital systems using registers, counters, and programmable logic devices	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	1		1				3	3	1
CO2	3	2	1	1	1		1				3	3	1
CO3	3	2	1	1	1		1				3	3	1
CO4	3	2	1	1	1		1				3	3	1
CO5	3	2	1	1	1		1				3	3	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		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)

Signature of the Chairman
Board of Studies - CSD

ACADEMIC CELL
KONGU ENGINEERING COLLEGE

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 தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002
2.	கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016
3.	கீழடி 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)(Puplished by International Institute of Tamil Studies).
7.	Keeladi – 'Sangam City Civilzation 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)

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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24TAM02 - தமிழரும் தொழில்நுட்பமும்									
(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**
முன்னுரை	தமிழ் கலாச்சாரத்தோடு ஒன்றிய தொழில் நுட்பங்களை பற்றிப் எடுத்துரைத்தல்								
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 – பிரிட்டிஷ் காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடக் கலை.									
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 நீர்ப்பாசனத் 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:									
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002								
2.	கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016								
REFERENCES:									
1.	கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்.(தொல்லியல் துறை வெளியீடு)								
2.	பொருநை-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)								
3.	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)								
4.	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).								
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 Tamil to Indian Culture (Dr.M.Valarmathi) (Puplished by International Institute of Tamil Studies).								
7.	Keeladi – 'Sangam City Civilzation 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: படிப்பை முடித்தவுடன், மாணவர்கள்		BT Mapped (Highest Level)
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)

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

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

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.								

LIST OF EXPERIMENTS / EXERCISES:

PART A – Electrical Installation (30 Hours)

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

PART B – Internet of Things (30 Hours)

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

PART C – Web Technologies (30 Hours)

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.

REFERENCES/ MANUAL /SOFTWARE:

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.

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	Design electrical wiring circuits for buildings based on their requirement	Applying(K3) Precision (S3)
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)

Mapping of COs with POs and PSOs

COs/POs /PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	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

Signature of the Chairman
Board of Studies - EEE

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24CYL13 – CHEMISTRY LABORATORY 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	0	0	30	0	30	1

Preamble	This course aims to impart the basic concepts of volumetric, conductometric, spectrophotometric and pH metry 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, Fe^{2+}, Cu^{2+} and 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

Signature of the Chairman
Board of Studies - 5th

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

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	**Averages, Alligations, Time and Work:**	**6**
Averages, Alligations or Mixtures: Concepts – Definition – Formula – Simple problems on averages – Alligation or Mixture rule – Applications – Problems. **Time and Work:** Concepts – Work and wages – Pipes and Cisterns – Simple problems.		
Unit – II	**Time and Distance:**	**6**
Time and Distance: Time, speed and distance – Conversions – Average speed – Relative speed – Problems on boats and streams – Upstream and downstream – Simple problems.		
Unit – III	**Permutation and Combination, Probability:**	**8**
Permutation and Combination: Concepts – Simple problems. **Probability:** Basic Concepts – Applications – Simple problems.		

TEXT BOOK:

1.	Dr.R.S.Agarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S.Chand and company limited, 2022.

REFERENCES/ MANUAL / SOFTWARE:

1.	Abhijit Guha,"Quantitative Aptitude for Competitive Examination", 7th Edition, McGraw Hill Education, India, 2020.
2.	https://www.indiabix.com/aptitude/questions-and-answers
3.	https://www.geeksforgeeks.org/aptitude-questions-and-answers

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

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											
CO2	2	3											
CO3	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	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

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Board of Studies - S 4 H

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24MAT31 – DISCRETE MATHEMATICAL STRUCTURES									
(Common to Computer Science and Engineering & Computer Science and Design branches)									
Programme & Branch	**BE - Computer Science and Engineering & Computer Science and Design branches**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**BS**	**45**	**15**	**0**	**60**	**120**	**4**

Preamble	To impart knowledge in mathematical logic, partial ordering and lattices, investigate various category of functions and develop skills to apply group structures in coding theory.	
Unit – I	**Propositional Calculus:**	**9+3**
Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and Contradictions – Inverse, Converse and Contrapositive – Logical equivalences and implications –Normal forms – Principal conjunctive normal form and Principal disjunctive normal form – Rules of inference – Arguments – Validity of arguments.		
Unit – II	**Predicate Calculus:**	**9+3**
Predicates – Statement function – Variables – Quantifiers – Universe of discourse – Theory of inference – Rules of universal specification and generalization – Rules of Existential specification and generalization - Validity of arguments.		
Unit – III	**Relations:**	**9+3**
Cartesian product of sets – Relations on sets – Types of relations and their properties – Matrix representation of a relation - Graph of a relation – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices – Properties of lattices.		
Unit – IV	**Functions:**	**9+3**
Definition – Classification of functions – Composition of functions – Inverse functions – Characteristic function of a set – Recurrence relations – Solution of recurrence relations – Generating Functions – Solving recurrence relation by generating functions.		
Unit – V	**Group Theory:**	**9+3**
Groups and Subgroups (Definitions only) – Homomorphism – Cosets – Lagrange's theorem – Coding Theory : Group codes – Hamming distance – Basic notions of error correction – Error recovery in group codes (Excluding theorems in coding theory)		

TEXT BOOK:

1.	Veerarajan T., "Discrete Mathematics with Graph Theory and Combinatorics", Reprint Edition, Tata McGraw Hill Publishing Company, New Delhi, 2022.

REFERENCES:

1.	Kenneth H. Rosen, Kamala Krithivasan, "Discrete Mathematics and its Applications", 8th Edition, McGraw Hill Education Private Limited, New Delhi, 2023.
2.	Tremblay J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill, New Delhi, Reprint 2010.
3.	Susanna S. Epp, "Discrete Mathematics with Applications", Metric Edition, Cengage Learning, USA, 2019.

*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 propositional logic to validate the arguments.	Applying (K3)
CO2	Apply the rules of inference and methods of proof in predicate calculus to verify the validity of arguments.	Applying (K3)
CO3	Possess knowledge of various set theoretic concepts.	Applying (K3)
CO4	Understand different types of functions and solve recurrence relations.	Understanding (K2)
CO5	Apply the concepts of group structures in coding theory.	Applying (K3)

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2									3	
CO2	3	2	1									1	
CO3	3	2	1									1	
CO4	3	3	3									1	
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		40	60				100

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

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Board of Studies - S4H

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24CDC31 - PYTHON PROGRAMMING AND FRAMEWORKS									
Programme & Branch	**BE – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**ES**	**45**	**0**	**30**	**45**	**120**	**4**

Preamble	This course provides fundamental knowledge on Python programming and its frameworks. It also explores various packages for data manipulation and analysis.

Unit – I	**Basic Concepts**	**9**

Introduction – Variables, Expressions and Statements – Functions – Conditionals and recursion – Fruitful Functions – return values, parameters, local and global scope, function composition, recursion – Iteration Statements – Mutable vs Immutable data types – Strings – String slices – Searching – Looping and Counting – String methods – String Comparison.

Unit – II	**Data Structures**	**9**

Lists – List operations – slices and methods – Dictionaries – Dictionaries as set of Counters – Looping and Dictionaries – Dictionaries and Lists – Tuples – Tuples Basics – Lists and Tuples – Dictionaries and Tuples – Sequences of sequences – Sets – Sets Basics – Set Operations – Case Study – Data Structure Selection – Files – Basic File Operations – File names and paths – Exception Handling.

Unit – III	**Object Oriented Programming & Python Database Integration**	**9**

Classes and Objects – Classes and Functions – Classes and methods – Object-oriented features – __init__() method – __str__() method – Operator Overloading – Type-based dispatch – Polymorphism – Inheritance – Aggregation and Association – Need for database programming – Connect Database – CRUD operations – Cursor Attributes.

Unit – IV	**Data Manipulation with NumPy Arrays**	**9**

Python Environment & Frameworks: Anaconda – Jupyter notebook – NumPy: The Basics of NumPy Arrays – Computation on NumPy Arrays – Aggregations – Case Study Using Aggregation and Histogram – Computation on Arrays: Broadcasting – Comparisons, Masks and Boolean Logic – Sorting Arrays – Structured Arrays.

Unit – V	**Data Manipulation with Pandas and Visualization**	**9**

Data Manipulation with Pandas: Pandas Objects – Data Indexing and Selection – Operating on data – Handling missing data – Hierarchical Indexing – Concat and Append – Merge and Join – Aggregation and Grouping - Data Visualization with Matplotlib: Line plots: Line Colors and Styles – Axes Limits – Labeling Plots.

LIST OF EXPERIMENTS / EXERCISES:

1.	Implement user-defined functions with different types of argument passing methods
2.	Demonstrate the various string manipulation functions
3.	Demonstrate the various operations on List, Tuple, Dictionary, and Sets
4.	Implement the different file operations and exception handling
5.	Implement the concept of constructors and different types of inheritance
6.	Implement the concept of Aggregation, Association, and Polymorphism
7.	Develop an application to illustrate CRUD operations using Python and MySQL
8.	Develop an application to illustrate Array indexing, slicing, reshaping, and sorting using NumPy
9.	Demonstrate Data Manipulation with Pandas
10.	Demonstrate Data Visualization using line plots and histograms in Matplotlib

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

TEXT BOOK:

1.	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016 for Units I, II & III.
2.	Jake Vander Plas, "Python Data Science Handbook Essential Tools for Working with Data", 1st Edition, O'Reilly Publishers, 2016 for units IV & V.

REFERENCES/ MANUAL / SOFTWARE:	
1.	http://surl.li/tvzmi
2.	Martin C Brown, "Python: The Complete Reference", Fourth Edition, McGraw Hill Education, 2018
3.	https://www.i2tutorials.com/crud-operations-with-mysql-database-using-python/
4.	Software: Jupyter Notebook (Anoconda).
5.	Laboratory manual.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	apply the use of functions and string in Python	Applying (K3) Precision(s3)
CO2	make use of list, dictionaries, tuples, and sets data structures for developing applications	Applying (K3) Precision(s3)
CO3	build an object-oriented programming concepts and CRUD operations using MySQL	Applying (K3) Precision(s3)
CO4	develop a data manipulation with NumPy arrays	Applying (K3) Precision(s3)
CO5	use pandas and matplotlib to analyse of visualize large datasets	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	3	3	3	3	2	3	2
CO2	3	2	1	1	1	1	3	3	3	3	2	3	2
CO3	3	2	1	1	1	1	3	3	3	3	2	3	2
CO4	3	2	1	1	1	1	3	3	3	3	2	3	2
CO5	3	2	1	1	1	1	3	3	3	3	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		30	70				100
CAT2		30	70				100
CAT3		20	70	10			100
ESE		20	70	10			100

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

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Board of Studies - CSE-IT

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24CDC32 - DATA STRUCTURES									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**ES**	**45**	**0**	**30**	**45**	**120**	**4**

Preamble	The course focuses on the basic and advanced concepts and applications of linear data structures in problem solving.

Unit – I	**Linear Data Structures and its Applications:**	**9**

Overview of Array, List, Stack and Queue – Linked List – Applications of List: Polynomial Addition – Representing Sparse Matrices – Applications of Stack: Infix to Postfix Expression Conversion – Postfix Expression Evaluation – Towers of Hanoi – Balancing Parenthesis – String Reversal – Applications of Queue: Reversing the Queue using Stack.

Unit – II	**Trees:**	**9**

Preliminaries: Implementation of Trees – Tree Traversals with an Application – Binary Trees: Implementation – Expression Trees – The Search Tree ADT – Binary Search Trees: Construction – Insertion – Deletion – Searching – Find Min – Find Max – AVL Trees: Rotation – Insertion – Deletion.

Unit – III	**Graphs:**	**9**

Definitions – Representation of Graphs – Types of Graph – Graph Traversal: Depth-First Search (DFS) – Breadth-First Search (BFS) – Topological Sort – Applications of DFS: Bi-connectivity – Euler Circuits – Applications of BFS– Graph Coloring.

Unit – IV	**Advanced Trees and Hashing:**	**9**

Splay Trees: Splaying – B Tree – Priority Queues (Heaps) – Binary Heap – Skew Heaps. Hashing: Hash Functions – Separate Chaining – Open Addressing: Linear Probing – Quadratic Probing – Double Hashing – Rehashing.

Unit – V	**Searching and Sorting:**	**9**

Searching: Linear search – Binary Search – Sorting: Internal Sorting: Bubble sort – Shell sort – External Sorting: Multiway Merge – Polyphase Merge.

LIST OF EXPERIMENTS / EXERCISES:

1.	Implementation of singly linked list and its operations
2.	Implementation of doubly linked list and its operations
3.	Implementation of circular linked list and its operations
4.	Implementation of polynomial addition using linked list
5.	Infix to postfix conversion using stack ADT
6.	Implement the application for evaluating postfix expressions using array of stack ADT
7.	Implementation of reversing a queue using stack
8.	Implementation of binary search tree traversals
9.	Implementation of graph traversal techniques
10.	Implement the operations of AVL Tree
11.	Implement the operations of hash table using array
12.	Implementation of shell sort

TEXT BOOK:

1. Weiss M. A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2016.

REFERENCES/ MANUAL / SOFTWARE:	
1.	http://surl.li/tvzlm
2.	Langsam Y.M., Augenstein J. and Tenenbaum A. M., "Data Structures using C and C++", 2nd Edition, Pearson Education, 2015.
3.	Software: Dev C++
4.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	solve simple computational problems using linear data structures.	Applying (K3) Precision(s3)
CO2	make use of tree structure and its operations to solve problems.	Applying (K3) Precision(s3)
CO3	apply appropriate graph algorithms for solving real world problems.	Applying (K3) Precision(s3)
CO4	utilize advanced trees,heaps and hashing to solve problems	Applying (K3) Precision(s3)
CO5	demonstrate sorting and searching techniques and apply them to solve problems.	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				2	3	2
CO2	3	2	1	1	1		1				2	3	2
CO3	3	2	1	1	1		1				2	3	2
CO4	3	2	1	1	1		1				2	3	2
CO5	3	2	1	1	1		1				2	3	2

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

ASSESSMENT PATTERN - THEORY

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

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

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Board of Studies - CSE-IT

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24CDT31 - UX AND UI DESIGN									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**45**	**0**	**0**	**45**	**90**	**3**

Preamble	This course enables the students to learn the fundamentals of user interface (UI) design, user experience (UX) design, and the seamless integration of both disciplines to enhance user satisfaction and engagement. By exploring topics such as user research, information architecture, wireframing, prototyping, and usability testing, participants will develop the skills necessary to craft compelling designs that meet user needs and business objectives effectively.

Unit – I	**UX Design Process**	**9**
Introduction to UX – UX Design Vs UI Design – Why is UX so Important – Full Stack Design – UX Design Process – Discovery and Planning – The UX Strategy – UX Research: Discover – Explore – Test – Listen – UX Analysis – Design – Production.		
Unit – II	**User Research, User Personas, Affinity Mapping and Information Architecture:**	**9**
User Behavior Basics – The Gestalt Theory – Psychology in UX – User Research – User Personas - Creating a Persona – Four Different Perspectives on Personas – Benefits of Personas - Affinity Diagrams - Information Architecture: : Navigation – Task Flow – Content Strategy – Site Map – Gestures		
Unit – III	**Wireframes and Prototyping:**	**9**
Introduction to Wireframe – How to Create Wireframes? – Types of Wireframes – Wireframing Tools: Sketch Wireframes – Stenciling and Paper cutouts – Wireframing Software – What is Prototyping – Prototyping Methods – Paper Prototypes – Digital Prototypes – Coding Prototypes – The process of Creating Prototypes – Prototyping Tools.		
Unit – IV	**Visual Design, Colors, Typography and Material Design:**	**9**
Basics of Visual Design – Lines – Shapes – Colors – Font/Typography – Textures – Forms – Design Principles – Alignment – Hierarchy – Contrast – Repetition – Proximity – Balance – Space – Visual Design Tools. Material Design: Introduction, Principles. Material Environment: Surfaces. Elevation. Light and Shadows.		
Unit – V	**UI Design Components:**	**9**
App bars Bottom and Top - Bottom Navigation – Buttons – Cards - Text Fields - Navigation Drawer – Backdrop – Checkboxes – Chips - Date Pickers – Dialogs – Dividers - Image List – Lists – Menus - Progress Indicators - Radio Buttons – Sheets – Sliders – Snackbars – Switches – Tabs - Tool Tips - Time Pickers.		

TEXT BOOK:

1.	Elvis Canziba "Hands-On UX Design for Developers: Design, Prototype, and Implement Compelling User Experiences from Scratch", First Edition, Packet Publishing, 2018 for Unit I,II & III.
2.	Fabio Staiano, "Designing and Prototyping Interfaces with Figma Learn Essential UX/UI Design Principles by Creating Interactive Prototypes for Mobile, Tablet, and Desktop", Packt Publishing, 2022 for Unit IV & V.

REFERENCES :

1.	https://m3.material.io/

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	examine the importance of UX design in product or service delivery	Analyzing (K4)
CO2	apply principles and procedures to conduct UX activities like user research, user personas, affinity mapping and information architecture.	Applying (K3)
CO3	develop wireframes and prototypes for the product or service by using various tools and software.	Applying (K3)
CO4	make use of various UI design principles such as visual design, color and typography.	Applying (K3)
CO5	apply material design principles to create UI for mobile application using various components	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	1	1	3	3	3	3	2	3	2
CO2	3	2	1	1	1	1	3	3	3	3	2	3	2
CO3	3	2	1	1	1	1	3	3	3	3	2	3	2
CO4	3	2	1	1	1	1	3	3	3	3	2	3	2
CO5	3	2	1	1	1	1	3	3	3	3	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		50	50				100
CAT2		50	50				100
CAT3		40	60				100
ESE		40	60				100

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

Signature of the Chairman
Board of Studies - CSE - IT

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24CDT32 - COMPUTER ORGANIZATION									
Programme& Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**45**	**15**	**0**	**60**	**120**	**4**

Preamble	This course deals with the basics of digital computer and its functional units. It also covers the interfacing with memory and I/O devices. Advanced topics like pipelining and computer performance are also covered.

Unit – I	**Basic Structure of Computers and Machine Instructions:**	**9+3**

Functional Units–Basic Operational Concepts–Number Representation and Arithmetic Operations – Performance – Memory Locations and Addresses – Memory Operations – Instruction and Instruction Sequencing – Addressing Modes – CISC Instruction Sets – RISC and CISC Styles.

Unit – II	**Arithmetic Unit:**	**9+3**

Addition and Subtraction of Signed Numbers–Design of Fast Adders–Multiplication of Unsigned Numbers – Multiplication of Signed Numbers – Fast Multiplication – Integer Division – Floating Point Numbers and Operations.

Unit - III	**Basic Processing Unit and Pipelining:**	**9+3**

Fundamental Concepts–Instruction Execution –Hardware Components–Instruction Fetch and Execution Steps – Control Signals - Hardwired control – CISC Style Processors. Pipelining – Basic concepts – Pipeline Organization – Pipelining Issues - Data Dependencies – Memory Delay – Branch Delay.

Unit - IV	**Memory System:**	**9+3**

Basic Concepts–Semiconductor RAM Memories – Read-Only Memories – Direct Memory Access – Memory Hierarchy - Cache Memories: Mapping Functions – Performance Consideration

Unit - V	**Virtual Memory and I/O Organization:**	**9+3**

Virtual Memory – Secondary Storage- Magnetic Hard Disks- Interrupts – Enabling and Disabling Interrupts – Handling Multiple Devices

TEXT BOOK:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky and NaraigManjikian, "Computer Organization and Embedded Systems", 6th edition, McGraw Hill International Edition, New York, 2022.

REFERENCES:

1. https://mcgrawhillindia.vitalsource.com/reader/books/9789353164294/pageid/0
2. Patterson David, A. and Hennessy John L., "Computer Organization and Design: The Hardware / Software Interface", 6th edition, Harcourt Asia, Morgan Kaufmann, Singapore, 2021.
3. Stallings William, "Computer Organization and Architecture: Designing for Performance", 10th edition, Pearson Education, New Delhi, 2015.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	describe the basic structure, arithmetic and memory operations of a digital computer and illustrate the addressing modes for set of instructions	Applying (K3)
CO2	describe and apply algorithms for performing different arithmetic operations.	Applying (K3)
CO3	make use of the data path in a processor to write the sequence of steps to fetch and execute a given instruction and apply the concepts of pipelining	Applying (K3)
CO4	distinguish between different types of memory and apply the mapping functions between different levels of memory	Applying (K3)
CO5	illustrate various types of interrupts in I/O transfer and the role of different types of bus in I/O operations.	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	1		1				2	3	2
CO2	3	2	1	1	1		1				2	3	2
CO3	3	2	1	1	1		1				2	3	2
CO4	3	2	1	1	1		1				2	3	2
CO5	3	2	1	1	1		1				2	3	2

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

ASSESSMENT PATTERN - THEORY

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

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

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24MNT31 - ENVIRONMENTAL SCIENCE									
(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**	**3 / 6**	**MC**	**30**	**0**	**0**	**0**	**30**	**0**

Preamble	This course provides an approach to understand the various natural resources, ecosystem, bio-diversity, pollution control & monitoring methods for sustainable life and also to provide knowledge and to create awareness for engineering students onsocial Issues and the environment.	
Unit – I	**Environmental Studies and Natural Resources**	**6**
Introduction to Environmental Science – uses, over-exploitation and conservation of forest, water, mineral, food, energy and land resources–case studies.		
Unit – II	**Ecosystem and Biodiversity**	**6**
Ecosystems: concept and components of an ecosystem -structural and functional features – Functional attributes (Food chain and Food web only). Biodiversity: Introduction – Classification – Bio geographical classification of India- Values of biodiversity – Threats and Conservation of biodiversity - case studies.		
Unit – III	**Environmental Pollution**	**6**
Environmental Pollution: Definition – causes, effects and control measures of:(a) Air pollution - Climate change, global warming, acid rain, ozone layer depletion (b)Water pollution (c) Soil pollution - Role of an individual in prevention of pollution - case studies.		
Unit – IV	**Environment Quality Standards and Monitoring**	**6**
Ambient air quality standards - Water quality parameters and standards: Turbidity, pH, Suspended solids, hardness, residual chlorine, sulfates, phosphates, iron and manganese, DO, BOD, COD (definition, specifications and limits only) - Introduction to EIA – objectives and process of EIA - environment protection act – air (prevention and control of pollution) act – water (prevention and control of pollution) act- case studies		
Unit – V	**Social Issues and the Environment**	**6**
From Unsustainable to Sustainable development - three pillars of sustainability- factors affecting environmental sustainability- approaches for sustainable development- Social issues: Urban problem related to energy - population growth and explosion - issues related to resettlement and rehabilitation, E-waste recycling - role of IT in environment and human health - case studies.		

TEXT BOOK:

1. AnubhaKaushik, and Kaushik C.P., "Environmental Science and Engineering", 6th Multicolour Edition, New Age International Pvt. Ltd., New Delhi, 2023.

REFERENCES:

1. Palanisamy P.N., Manikandan P., Geetha A., Manjula Rani K., Kowshalya V.N., "Chemistry for Engineering", Revised Edition ,Pearson Education, New Delhi, 2024.
2. ErachBharucha, —Textbook of Environmental Studies for Undergraduate Coursesll, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad, 2005.

*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	illustrate the various natural resources and role of individual for its conservation	Understanding (K2)
CO2	elaborate the features of ecosystem and biodiversity to find the need for conservation.	Understanding (K2)
CO3	manipulate the sources, effects and control methods of various environmental pollution.	Applying (K3)
CO4	make use of the knowledge of Quality standards, EIA and environmental legislation laws to monitor the environment.	Applying (K3)
CO5	utilize the knowledge of various social issues and impact of population explosion on environment towards sustainability.	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	1	3			2	1						
CO2	2	1	3			2	1						
CO3	2	2	3			2	1						
CO4	2	2	3			2	1						
CO5	2	1	3			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	25	40	35				100
CAT2	25	40	35				100
CAT3	25	40	35				100
ESE	NA						

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

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24CDL31 - UX AND UI DESIGN LABORATORY									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**0**	**0**	**30**	**0**	**30**	**1**

Preamble	This UI/UX design laboratory course is enables the students to produce hands-on experience in designing intuitive and engaging user interfaces and experiences.

LIST OF EXPERIMENTS / EXERCISES:

1.	Perform user research to define the problem for your mobile app.
2.	Create user personas for your mobile app by using persona creator tool.
3.	Create affinity diagram for your mobile app by using Fig jam.
4.	Explore Figma Interface such as Toolbar, Layers, Assets, Pages and Design Panel.
5.	Apply design constraints to objects for your mobile app.
6.	Experiment with figma components for your mobile app.
7.	Utilize style guides for your mobile app.
8.	Create micro interactions for your mobile app.
9.	Develop wireframes for your mobile app by using frames and tools.
10.	Develop mock-ups for your mobile app by using Figma plugins.
11.	Create prototypes for your mobile app by using various UI Components.
12.	Create your UI/UX portfolio and add your mobile app project.

REFERENCES/ MANUAL /SOFTWARE:

1.	Figma and Figjam
2.	Laboratory Manual

COURSE OUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	explore and perform UX design process for mobile application.	Applying (K3), Precision(S3)
CO2	experiment with UI design components for mobile application.	Applying (K3), Precision(S3)
CO3	develop wireframe, mockup and prototype for mobile application.	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		3				2	2	3
CO2	3	2	1	1	1		3				2	2	3
CO3	3	2	1	1	1		3				2	2	3

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

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24CDL32 - DESIGN TOOLS LABORATORY									
Programme & Branch	**B.E. – Computer Science and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**SL***	**Total**	**Credit**
Prerequisites	**NIL**	**3**	**PC**	**0**	**0**	**30**	**0**	**30**	**1**

Preamble	This course provides knowledge to develop logos, icons, shapes, images for an application and micro interactions using design tools.

LIST OF EXPERIMENTS / EXERCISES:

Implement the following experiments using Adobe Illustrator:

1. a.	Creating shapes with various tools like Pen tool, Curvature tool, Line tool, Shape tool, Shape builder tool, Brush tool, Pencil tool
1. b.	Demonstrate the Type tool using type on path, applying character and paragraph settings.
2. a.	Develop an outlined text of your name and apply a Neon effect.
2. b.	Develop a logo for your brand using various illustrator tools
2. c.	Demonstrate a color tool using fill tool, stroke tool, gradient tool
3. a.	Implement Steal a color using Adobe color tool from any image that you like and apply the same to your illustration.
3. b.	Implement Masking technique by masking an image inside any shape.
3. c.	Create a flower vector and export it as a vector image.

Implement the following experiments using Framer:

4.	Implement the following actions using action button in Framer tool a. Create three circle-shaped buttons b. Design two states for all layers c. Add an event d. Spring animation
5.	Create and implement interaction for removing, archiving items from a list
6.	Develop a prototype to implement micro interactions for pull to refresh and dragging interaction

Implement the following experiments using blender:

7.	Design the following and apply texture with basic materials and image textures • A logo with 3D text and shapes • A Basic Mug, Wires, and Pipes Using Bezier Curves
8.	Model a basic car using cubes and cylinders.
9.	Rig and animate a model for posing.
10.	Simulate a basic fire effect using Blender's particle system.

REFERENCES/ MANUAL /SOFTWARE:

1.	Operating System: Windows/Linux/MacOS
2.	Software: Adobe illustrator, Framer, Blender
3.	Laboratory Manual

COURSE OUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	design and develop concept using various tools with images and shapes using adobe illustrator	Applying (K3), Precision (S3)
CO2	develop unique shapes & icons and animate them using framer	Applying (K3), Precision (S3)
CO3	experiment with the basic properties of modeling tools in blender	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		3				2	2	3
CO2	3	2	1	1	1		3				2	2	3
CO3	3	2	1	1	1		3				2	2	3

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

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