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 SCIENCE DEGREE
IN
SOFTWARE SYSTEMS

DEPARTMENT OF COMPUTER TECHNOLOGY-UG

KONGU
Assuring the Best

B.Sc – SOFTWARE SYSTEMS CURRICULUM - R2024
(For the students admitted from the academic year 2024-25)

SEMESTER – I										
Course Code	Course Title	Hours / Week				Credit	Maximum Marks			Category
		L	T	P	MP		CA	ESE	Total	
Theory/Theory with Practical										
24BCC11	Communicative English I	3	0	2	NE	4	50	50	100	HS
24BCC12	Mathematics I	3	1*	2*	NE	4	50	50	100	BS
24BCT11	Digital Principles and Logic Design	3	0	0	ES	3	40	60	100	BS
24BCT12	C Programming	3	0	0	NE	3	100	0	100	PC
24BCT13	Web Programming	3	0	0	ES	3	40	60	100	PC
Practical / Employability Enhancement										
24BCL11	Digital Principles and Logic Design Laboratory	0	0	4		2	60	40	100	BS
24BCL12	C Programming Laboratory	0	0	4		2	100	0	100	PC
24BCL13	Web Programming Laboratory	0	0	4		2	60	40	100	PC
24MNT14	Student Induction Program	2	0	0		0	100	0	100	MC
24MNT13	Quantitative Aptitude - I	2	0	0		0	100	0	100	MC
Total Credits to be earned						**23**				

*Alternate weeks

SEMESTER – II										
Course Code	Course Title	Hours / Week				Credit	Maximum Marks			Category
		L	T	P	MP		CA	ESE	Total	
Theory/Theory with Practical										
24BCC21	Communicative English II	3	0	2	NE	4	50	50	100	HS
24BCC22	Mathematics II	3	1*	2*	NE	4	50	50	100	BS
24BCT21	Python Programming	3	0	0	NE	3	100	0	100	PC
24BCT22	Data Structures and Algorithms	3	1	0	ES	4	40	60	100	PC
24BCT23	User Interface Technologies	3	0	0	ES	3	40	60	100	PC
Practical / Employability Enhancement										
24BCL21	Python Programming Laboratory	0	0	4		2	100	0	100	PC
24BCL22	Data Structures Laboratory	0	0	4		2	100	0	100	PC
24BCL23	User Interface Technologies Laboratory	0	0	4		2	60	40	100	PC
24MNT22	Quantitative Aptitude - II	2	0	0		0	100	0	100	MC
Total Credits to be earned						**24**				

Signature of the Chairman
Board of Studies - CSE & IT

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B.Sc – SOFTWARE SYSTEMS CURRICULUM - R2024
(For the students admitted from the academic year 2024-25)

SEMESTER – III

Course Code	Course Title	Hours / Week				Credit	Maximum Marks			Category
		L	T	P	MP		CA	ESE	Total	
Theory/Theory with Practical										
24BCT31	Java Programming	3	0	0	NE	3	100	0	100	PC
24BCT32	Database Management Systems	3	0	0	ES	3	40	60	100	PC
24BCT33	Computer Organization	3	0	0	NE	3	40	60	100	PC
24BCT34	Software Engineering	3	0	0	ES	3	40	60	100	PC
24BCC31	Operating Systems	3	0	2	NE	4	50	50	100	PC
Practical / Employability Enhancement										
24BCL31	Java Programming Laboratory	0	0	4		2	100	0	100	PC
24BCL32	Database Management Systems Laboratory	0	0	4		2	60	40	100	PC
24GCL31	Professional Skills Training I	0	0	4		2	100	0	100	EC
24BCL33	Design Thinking	0	0	4		2	100	0	100	EC
Total Credits to be earned						**24**				

SEMESTER – IV

Course Code	Course Title	Hours / Week				Credit	Maximum Marks			Category
		L	T	P	MP		CA	ESE	Total	
Theory/Theory with Practical										
24BCT41	Artificial Intelligence and Machine Learning	3	0	0	ES	3	40	60	100	PC
24BCT42	Mobile Application Development	3	0	0	ES	3	40	60	100	PC
24BCT43	Computer Networks	3	1	0	NE	4	40	60	100	PC
24BSC41	Software Testing	3	0	2	NE	4	50	50	100	PC
24BCC42	Big Data Analytics	3	0	2	NE	4	50	50	100	PC
Practical / Employability Enhancement										
24BCL41	Machine Learning Laboratory	0	0	4		2	60	40	100	PC
24BCL42	Mobile Application Development Laboratory	0	0	4		2	60	40	100	PC
24GCL42	Professional Skills Training II	0	0	4		2	100	0	100	EC
24BSP41	Mini Project	0	0	2		1	100	0	100	EC
Total Credits to be earned						**25**				

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B.Sc – SOFTWARE SYSTEMS CURRICULUM - R2024
(For the students admitted from the academic year 2024-25)

SEMESTER – V									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
24BCT51	Internet of Things	3	0	0	3	40	60	100	PC
24BCT52	Deep Learning	3	0	0	3	40	60	100	PC
	Elective I	3	0	0	3	40	60	100	PE
	Elective II	3	0	0	3	40	60	100	PE
Practical / Employability Enhancement									
24BCL51	Internet of Things Laboratory	0	0	4	2	60	40	100	PC
24BCL52	Deep Learning Laboratory	0	0	4	2	60	40	100	PC
24BSP51	Project Work I	0	0	12	6	50	50	100	EC
Total Credits to be earned					**22**				

SEMESTER – VI									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
	Elective III	3	0	0	3	40	60	100	PE
	Elective IV	3	0	0	3	40	60	100	PE
Practical / Employability Enhancement									
24BSP61	Project Work II	0	0	12	6	50	50	100	EC
Total Credits to be earned					**12**				

Total Credits : 130

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LIST OF PROFESSIONAL ELECTIVES (PEs)						
S. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**C**
Semester - V						
Elective – I						
1.	24BCE01	Cloud Computing	3	0	0	3
2.	24BSE01	Cyber Security	3	0	0	3
3.	24BSE02	Software Quality Assurance	3	0	0	3
Elective – II						
4.	24BCE04	E-Commerce	3	0	0	3
5.	24BSE03	Data Science	3	0	0	3
6.	24BCE06	UI/UX Design	3	0	0	3
Semester - VI						
Elective - III						
7.	24BCE07	Software Project Management	3	0	0	3
8.	24BSE04	Digital Marketing	3	0	0	3
9.	24BSE05	Social Networks	3	0	0	3
Elective – IV						
10.	24BCE10	Ethical Hacking	3	0	0	3
11.	24BSE06	Agile Software Development	3	0	0	3
12.	24BSE07	Total Quality Management	3	0	0	3

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ACADEMIC CELL ★ KONGU ENGINEERING COLLEGE ★

24BCC11 - COMMUNICATIVE ENGLISH I								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**HS**	**3**	**0**	**2**	**NE**	**4**

Preamble	To employ techniques of active reading, effective speaking and integrate ideas through writing skills	
Unit – I	**Grammar and Vocabulary:**	**9**
Parts of speech – Sentence formation and Sentence completion - Finite and non-finite verbs -Tenses- Reading: Prediction and Surveying - Writing: Essays- Dialogue writing - Activities: Listening: Types of listening - Speaking: Talking about oneself, one's family, friends and favorite persons.		
Unit – II	**Grammar and Vocabulary:**	**9**
Cause and effect expressions - Prefixes and Suffixes - Synonyms and Antonyms – Spellings- Reading: Types: Skimming, Scanning, Word-by-word and Speed - Writing: Describing persons, places, products and processes - Activities: Listening: Process of listening - Speaking: Non-technical Presentation.		
Unit – III	**Grammar and Vocabulary:**	**9**
Active and Passive voice - Impersonal Passive - Reported Speech – Reading: Reading Comprehension – Summarizing and Paraphrasing - Writing: Warnings and Instructions - Activities: Listening: Effective listening strategies - Speaking: short talks.		
Unit – IV	**Grammar and Vocabulary:**	**9**
Abbreviations and Acronyms – Idioms and Phrases-Structure of captions / slogans - Prepositions – Selecting words- Reading: Intensive reading and Note-making - Writing: Informal and Formal Letters: Enquiry and placing order - Activities: Listening: Gap filling activity while listening - Speaking: Narrating an event/story		
Unit – V	**Grammar and Vocabulary:**	**9**
Connectives and Discourse Markers-Text organization - Sentence Patterns – Punctuations - Reading: Tongue twisters – Cloze test-Rearranging jumbled words and sentences - Writing: E-mail Writing - Preparing the transcript for a speech - Activities: Listening: Listening to a lecture and taking notes – Speaking: Describing an image/picture.		

LIST OF EXPERIMENTS / EXERCISES:	
1.	Self-Introduction
2.	Making a non-technical presentation
3.	Situational dialogues
4.	Speaking about a dream job/company
5.	Reading newspaper articles/magazines
6.	Listening comprehension
7.	Preparing review of a book/movie
8.	Writing about a recent scientific invention/technology

Lecture:45, Practical:30, Total:75

TEXT BOOK:	
1.	Sanjay Kumar and PushpLata, "Communication Skills", 2nd Edition, New Delhi: Oxford University Press, 2015.

REFERENCES/ MANUAL / SOFTWARE:	
1.	Raymond Murphy, "Essential English Grammar: Reference and Practice for South Asian Students", 2nd Edition, Cambridge: Cambridge University Press, 2012.
2.	Glennis Pye, "Vocabulary in Practice, Parts 1 and 2", 1stEdition, Cambridge: Cambridge University Press, 2011.
3.	DVD, podcasts, Authentic Videos and Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	identify and use content words which carry more meaning	Understanding (K2) Manipulation (S2)
CO2	construct sentences in English	Applying (K3) Precision (S3)
CO3	read and listen short, simple messages and texts with complete understanding	Analyzing (K4), Manipulation (S2)
CO4	write at the sentence and paragraph level and beyond without grammatical errors	Applying (K3), Precision (S3)
CO5	speak in a given context and take part in various professional and academic events	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				1		2	1	2	3		3	1	1
CO2				1		2	1	2	3		3	1	1
CO3				1		2	1	2	3		3	1	1
CO4				1		2	1	3	3		3	1	1
CO5				1		2	1	2	3		3	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	-	26	57	17	-	-	100
CAT2	-	23	60	17	-	-	100
CAT3	-	26	57	17	-	-	100
ESE	-	22	60	18	-	-	100

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

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Board of Studies - CSE & IT

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

Dr. S. GANDHIMATHI

24BCC12 – MATHEMATICS – I								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme& Branch	**B.Sc (Computer Systems and Design, Information Systems, Software Systems branches)**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**BS**	**3**	**1***	**2***	**NE**	**4**

Preamble	The course aims to formulate and solve problems using matrices, differential equations and fitting the best curve to the given data. Eventually the course provides a thorough understanding of solving real world problems using numerical methods.

Unit – I	**Matrices:**	**9+3**

Characteristic Equation of a matrix - Eigen values and Eigen vectors of real matrix - Properties of Eigen values and Eigen vectors (statement and problems only) - Cayley-Hamilton Theorem (statement only) - Orthogonal Matrices - Orthogonal Transformation of Symmetric matrix to diagonal form - Quadratic forms - Reduction of Quadratic form to Canonical form by Orthogonal reduction.

Unit – II	**Differential Calculus:**	**9+3**

Statement & simple problems only: Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Applications: Maxima and Minima of functions of one variable. **Ordinary Differential Equations:** Linear differential equations of second order with constant coefficients when the RHS is e^{ax}, sin(ax), cos(ax), x^n (n>0).

Unit – III	**Curve Fitting:**	**9+3**

Evaluation of constants by the method of group averages: Fitting a straight line - Equations involving three constants of the form $y= a+bx+cx^2$, $y= ax^b+c$, $y=ab^x+c$ and $y= ae^{bx}+ c$ - Method of least squares: Fitting a straight line - Fitting a parabola.

Unit – IV	**Solution of Algebraic and Transcendental Equations:**	**9+3**

Bisection method - Newton-Raphson method - Regula Falsi method - System of Simultaneous Linear Equations: Direct Methods: Gauss elimination method - Gauss Jordan method. Iterative methods: Gauss Jacobi method - Gauss Seidel method

Unit – V	**Interpolation:**	**9+3**

Interpolation with equal intervals: Newton-Gregory forward and backward difference formula - Newton's divided difference method for unequal intervals - Lagrange's interpolation formula - Lagrange's inverse interpolation formula.

LIST OF EXPERIMENTS / EXERCISES:

1.	Introduction to MATLAB.
2.	Computation of Eigen values and Eigen vectors.
3.	Plotting and visualizing single variable functions.
4.	Determination of limits and derivatives.
5.	Curve fitting for variable as a function of a predictor variable.
6.	Finding positive root by Regula – Falsi method.
7.	Solving simultaneous linear equations by Gauss – Seidel Method.
8.	Compute intermediate values using Lagrange's interpolation formula.

***Alternate week**

Lecture:45, Tutorial & Practical:15, Total:60

TEXT BOOK:

1.	Veerarajan T, "Engineering Mathematics for first year", 3rd Edition, Tata McGraw-Hill, New Delhi, 2012, for Units I, II.
2.	Kandasamy P, Thilagavathy K, Gunavathy K, "Numerical Methods", 3rd Edition, S.Chand & Co, New Delhi, 2021 for Units III, IV, V.

REFERENCES/ MANUAL / SOFTWARE:

1.	Kandasamy P, Thilagavathy K, Gunavathy K, "Engineering Mathematics for first year", 9th Edition, S.Chand & Co, New Delhi, 2019.
2.	Jain M.K, Iyenkar S.R.K, Jain R.K, "Numerical Methods for Scientific and Engineering Computation", 8th Edition, New Age International, New Delhi, 2020.
3.	MATLAB Manual.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	interpret the basics of matrix and finding the Eigen values and Eigen Vector of a real matrix	Applying (K3) Manipulation(S2)
CO2	apply differential calculus tools in solving various application problems and the second order linear differential equations	Applying (K3) Manipulation(S2)
CO3	fitting a curve to the given data using different methods	Applying (K3) Manipulation(S2)
CO4	apply various numerical techniques to solve algebraic and transcendental equations	Applying (K3) Manipulation(S2)
CO5	illustrate interpolation techniques for equal and unequal intervals	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			3								
CO2	3	3			3								
CO3	3	2			3								
CO4	3	3			3								
CO5	3	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		30	70				100
CAT2		30	70				100
CAT3		13	87				100
ESE		23	77				100

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

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Board of Studies - CSE & IT

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

[Dr. S. INDRAKUMAR]

BRS

24BCT11-DIGITAL PRINCIPLES AND LOGIC DESIGN								
(Common to Computer Systems and Design , Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**BS**	**3**	**0**	**0**	**ES**	**3**

Preamble	To deal with the basic principles of number systems, Boolean algebra and to exemplify the fundamental concepts of combinational and synchronous sequential logic circuits.	
Unit –I	**Digital Systems and Logic Gates:**	**9**
Digital systems – Binary Numbers -Number Base Conversions - Decimal Numbers - Octal and Hexadecimal Numbers - Complement of Numbers: 1"s Complement - 2"s Complement. Binary codes - Digital logic gates.		
Unit –II	**Boolean Algebra and Minimization Techniques:**	**9**
Introduction to Boolean Algebra - Basic theorems and properties of Boolean Algebra - Boolean Functions - Canonical and Standard Forms. Gate-Level Minimization: The Map method - Two, Three, Four Variable K-Map - Product Of Sums Simplification - NAND and NOR Implementation.		
Unit –III	**Combinational Logic:**	**9**
Introduction-Combinational circuits: Design-Half Adder-Full Adder- Half Subtractor- Full Subtractor - Decoders - Encoders - Multiplexers - Demultiplexer.		
Unit –IV	**Synchronous Sequential Logic:**	**9**
Introduction –Sequential circuits –Storage Elements -Latches: SR Latch –D latch. Flip-Flops: SR Flip-Flop – D Flip-Flop –JK Flip-Flop - T Flip-Flop. Analysis of Clocked Sequential Circuits: Analysis of D Flip-Flops - Analysis of T Flip-Flops.		
Unit –V	**Registers and Counters:**	**9**
Registers -Types of Shift Registers: SISO - SIPO- PISO- PIPO- Universal Shift Register –Binary Synchronous Counters using T Flip flops - Ring Counters - Johnson Counter.		
		Total:45

TEXT BOOK:

1.	M. Morris Mano and Michael D.Ciletti ,"Digital Design with an introduction to the Verilog HDL,VHDL and SystemVerilog",sixth Edition,Pearson,India,2020.

REFERENCES:

1.	FloydL. Thomas," Digital Fundamentals",11thEdition,Pearson Education,Delhi,2018.
2.	Givone Donald D.," Digital Principles and Design ",Tata McGraw-Hill Education,Delhi,2017.

MICROPROJECT:

Implementation of basic sequential and combinatorial circuits using simulators

COURSEOUTCOMES: On completion of the course ,the students will be able to		BT Mapped (Highest Level)
CO1	Solve problems related to number base conversions and binary codes.	Applying(K3)
CO2	Apply the concept of Boolean algebra and to implement minimization techniques.	Applying(K3)
CO3	Design the basic combinational circuits.	Applying(K3)
CO4	Implementation of basic flip-flops.	Analyzing (K4)
CO5	Apply the concepts of registers and counters.	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	1	1							1	3	1
CO2	3	3	2	1		1					1	3	2
CO3	3	3	2	1		1					1	3	2
CO4	3	3	2	1		1					1	3	2
CO5	3	3	2	1		1					1	3	2

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

ASSESSMENTPATTERN-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	43	17			100
ESE	-	24	58	18			100

*±3% may be varied (CAT1,2,3–50 marks & ESE–100marks)

Signature of the Chairman
Board of Studies - CSE & IT

[B. Ravisankar]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCT12 – C PROGRAMMING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**PC**	**3**	**0**	**0**	**NE**	**3**
Preamble	This course introduces the fundamentals of C programming and emphasizes on developing c programs to solve problems in various domains.							
Unit – I	**Introduction to C & Input/Output Operations**							**9**
Overview of C: Importance of C – Structure of C Programs – Programming Style – Executing a C Program. **Constants, Variables and Data Types:** Characterset – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Storage Class – Assigning values to variables. **Managing Input and Output Operations:** Reading & Writing a Character – Formatted Input – Formatted Output.								
Unit – II	**Operators, Decision Making & Arrays**							**9**
Operators and Expression: Introduction – Types of Operators – Arithmetic Expressions – Evaluation of Expressions – Type Conversion – Operator Precedence and Associativity. Decision Making and Branching – Decision Making and Looping. **Array:** Introduction: Definition and Types – One-Dimensional Arrays – Declaration - Initialization – Two-Dimensional Arrays – Multi-Dimensional Arrays.								
Unit – III	**Strings and Functions**							**9**
CharacterArrays and Strings: Declaring and Initializing String Variables – Reading & Writing Strings – Arithmetic operations on Characters – Putting Strings together – Comparison of Two Strings – String Handling Functions. **User-Defined Functions:** A Multi-Function Program - Elements of User-Defined Functions - Definition of Functions – Return values and their types – Function Calls – Function Declaration – Category of Functions – Nesting of Functions – Recursion – Passing Arrays to Function.								
Unit – IV	**Structures, Unions & Introduction to Pointers**							**9**
Structures and Unions: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure Variables – Arrays of Structures – Structures within Structures – Structures and Functions – Unions. **Pointers:** Introduction – Understanding Pointers – Accessing the address of the variable – Declaring & Initialization of a Pointer Variable – Accessing variable through pointers – Chain of Pointers.								
Unit – V	**Pointers & Files**							**9**
Pointers: Pointer Expressions – Pointer Increments and Scale Factor - Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments – Pointers to Functions.. **File Management:** Introduction – Defining and Opening a file – Closing a File – Input/Output Operations on Files – Random Access to Files – Command Line Arguments.								
								Total:45
TEXT BOOK:								
1.	Balagurusamy E., "Programming in ANSI C" , 8th Edition, Mc Graw Hill Education, 2017.							
REFERENCES:								
1.	Yashavant Kanetkar,"Let us C", 16th Edition, BPB Publications, 2018.							
2.	Reema Thareja, "Programming in C ", 2nd Edition, Oxford University Press, New Delhi, 2018.							

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	implement the basic constructs of C Programming	Applying (K3)
CO2	identify the appropriate looping and control statements in C for providing the solution to the given problem.	Analyzing (K4)
CO3	illustrate the strings and its manipulation and decompose a problem into functions	Analyzing (K4)
CO4	develop basic programs using structures and pointers.	Analyzing (K4)
CO5	implement pointers to arrays and functions and perform file operations to create, store and retrieve data in file.	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	1	1				1	2	2	1	3	1
CO2	3	3	2	1				1	2	2	1	3	2
CO3	3	3	2	1				2	3	3	1	3	2
CO4	3	3	2	1				2	3	3	1	3	2
CO5	3	3	2	1				2	3	3	1	3	2

1–Slight,2–Moderate, 3–Substantial, BT- BloomsTaxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2)%	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	32	68	-			100
CAT2	-	30	50	20			100
CAT3	-	30	50	20			100
ESE	-	-	-	-			-

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

Signature of the Chairman
Board of Studies - CSE & IT

(N.T. Renukadevi)

ACADEMIC CELL

24BCT13 - WEB PROGRAMMING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**PC**	**3**	**0**	**0**	**ES**	**3**

Preamble	To impart the basic structure and design of webpage using HTML, CSS and Client-side scripting.	
Unit – I	**Introduction to Web:**	**9**
Web Publishing: Thinking Like a Web Publisher - Web Browsers - Web Servers - Uniform Resource Locators. Getting Your Tools in Order: Anatomy of a Website - Setting Up Your Computer for Web Publishing - Using the Google Chrome Developer Tools - Web Hosting. Introducing HTML and CSS: Definition of HTML - HTML Attributes - Using the style Attribute - History of HTML Standards - The Current and Evolving Standard: HTML5.		
Unit – II	**Creating Web Pages:**	**9**
Learning the Basics of HTML: Structuring Your HTML - The Title - Headings - Paragraphs - Comments. Organizing Information with Lists: An Overview - Numbered Lists - Unordered Lists - Definition Lists - Nesting Lists. Working with Links: Creating Links - Linking Local Pages Using Relative and Absolute Pathnames - Links to Other Documents on the Web - Linking to Specific Places Within Documents - Anatomy of a URL.		
Unit – III	**HTML and CSS:**	**9**
Formatting Text with HTML and CSS: Character-Level Elements - Character Formatting Using CSS - Preformatted Text - Horizontal Rules - Line Break - Addresses - Quotations - Special Characters - Fonts and Font Sizes. Using CSS to Style a Site: Including Style Sheets in a Page - Selectors - Editing Styles with Developer Tools - Using Color - Links - The Box Model - The <body> Tag. Using Images on Your Web Pages: Image on the web- image formats – Inline images in HTML- Building Tables: Creating tables - Table parts – Sizing table borders and cells - Spanning Multiple Rows or Columns.		
Unit – IV	**Building Forms using JavaScript:**	**9**
Designing Forms: Using the <form> Tag - Using the <label> Tag - Creating Form Controls with the <input> Tag - UsingOther Form Controls - Grouping Controls with fieldset and legend. Introducing JavaScript: Need - The <script> Tag. Using JavaScript in Your Pages: Validating Forms with JavaScript- Hiding and Showing Content.		
Unit – V	**Integrating Multimedia and Responsive Web Design:**	**9**
Video and Sound: Embedding Video the Simple Way - Hosting Your Own Video - Embedding Video Using <video> - Embedding Flash Using the <object> Tag - The <embed> Tag - Embedding Audio in Your Pages. Using Responsive Web Design (RWD): Definition of RWD - Writing Media Queries: Media Types – Break Point – Building a style sheet with Media Queries		
		Total:45

TEXT BOOK:

1.	Laura Lemay, Rafe Coburn, Jennifer Kyrnin, 2016, "HTML, CSS & JavaScript" Web Publishing, 7thEdition, Pearson Education.

REFERENCES:

1.	Paul Deitel, Harvey Deitel, Abbey Deitel, 2018, "Internet & World Wide Web: How to program " 5th Edition, Pearson Education
2.	Mike Mchrath, 2020, "HTML , CSS & Javascript", Special Edition, In Easy steps limited.

MICROPROJECT:

E-commerce Website (Home page, Product list, About, Contact us)

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	demonstrate the basic structure of a web page and codeeditors.	Understanding(K2)
CO2	organize the basic HTML tags	Applying(K3)
CO3	compare the various types of CSS in a web page.	Analyzing(K4)
CO4	experiment with form validation using JavaScript	Applying(K3)
CO5	categorize the different responsive web page using multimedia controls	Analyzing(K4)

Mapping of COs with POs and PSOs

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

1–Slight,2–Moderate, 3–Substantial, BT- BloomsTaxonomy

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	-	30	35	35			100
ESE	-	30	40	30			100

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

Signature of the Chairman
Board of Studies - CSE & IT

N. Nav
[N. Naveena]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE

24BCL11 - DIGITAL PRINCIPLES AND LOGIC DESIGN LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme &Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**BS**	**0**	**0**	**4**	**-**	**2**

Preamble	To provide the knowledge in the digital circuit design, implementation and to design the combinational and sequential circuits with the use of digital logic gates.

LIST OF EXPERIMENTS / EXERCISES:

1.	Verification of Logic Gates.
2.	Implementation of Code Convertor.
3.	Construction of Parity Generators.
4.	Construction and Verification of Adder.
5.	Demonstration of Subtractors.
6.	Verification of Encoder and Decoder.
7.	Implementation of Multiplexer and Demultiplexer.
8.	Construction of SR and JK Flip-flops.
9.	Design of T and D Flip-flops.
10.	Verification of Binary and BCD counter.

Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	demonstrate various digital ICs and implement the functionalities.	Applying (K3), Precision (S3)
CO2	design basic combinational circuits and verify their functionalities.	Applying (K3), Precision (S3)
CO3	apply the design procedures to design basic sequential circuits.	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	1
CO2	3	2	1	1							1	3	1
CO3	3	2	1	1							1	3	1

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

Signature of the Chairman
Bo... of Studies - CSE & IT

[B. Ravisankar]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCL12–C PROGRAMMING LABORATORY								
(Common to Computer Systems and Design, Information Systems& Software Systems branches)								
Programme &Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course provides the knowledge in c programming. It emphasizes on developing c programs by applying c programming concepts and features.

LISTOF EXPERIMENTS /EXERCISES:

1.	Programs to calculate the following: • Area & Circumference of Circle • Area & Perimeter of Triangle • Area & Perimeter of Rectangle
2.	Programs to demonstrate formatted Input and Output statements.
3.	Programs to demonstrate the different types of operators such as arithmetic, logical, relational and ternary operators. Programs to implement branching and looping statements.
4.	Program to calculate sum and average of N numbers using one-dimensional array. Program to perform Matrix Multiplication.
5.	Programs to illustrate String manipulation functions in C.
6.	Program to demonstrate call by value and call by reference using functions. Program to implement recursion(GCD of two numbers, Factorial).
7.	Program to perform arithmetic operations using pointers.
8.	Program using pointers to read in an array of integers and print its elements in reverse order. Program that displays the address and values pointed by an array of pointers.
9.	Program to create structure to implement the banking application to store and retrieve customer detail.
10.	Program in C to create and store information in a text file.

Total:60

REFERENCES/MANUAL/SOFTWARE:

1.	Laboratory Manual

COURSEOUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	apply conditional statements and iterative statements in solving real world problems	Applying(K3), Precision(S3)
CO2	construct programs using functions, arrays and strings	Applying(K3), Precision(S3)
CO3	Implement the pointers, structures and files in C.	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
CO2	3	2	1	1							1	3	2
CO3	3	2	1	1							1	3	2

1—Slight,2—Moderate,3—Substantial,BT-Bloom'sTaxonomy

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Board of Studies - CSE & IT

(N. T. Renukadevi)

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCL13 - WEB PROGRAMMING LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**1**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	To provide knowledge in the core concepts of web designing for developing static as well as dynamicweb applications.

LIST OF EXPERIMENTS / EXERCISES:

1.	Develop a static web page for your department using Basic HTML Tags
2.	Design a web page for Grocery Store use ordered list, unordered lists and navigation to showcase the products available in the store.
3.	Build a web page with hyperlinks for your Institution.
4.	Design a dynamic webpage using Inline, Internal and External CSS.
5.	Create a layout for a Grocery store incorporating with various CSS selectors to style different elements.
6.	Design a webpage using Table formatting and Images.
7.	Construct a user registration form using Form controls in HTML.
8.	Create a user registration form and validate with JavaScript functions for one or more controls.
9.	Construct a dynamic website for online tutorials embed with audio and video files within the web page.
10.	Design a Responsive web page that will adjust its layout and styling based on the screen size using media queries.
	Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Lab Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	demonstrate the usage of basic HTML tags, List, Links	Applying (K3) Manipulation (S2)
CO2	implement cascading style sheets and javascript concepts	Applying (K3) Manipulation (S2)
CO3	Apply the concept of Responsive web design using Media Queries	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	2	1	1								2	1
CO2	3	2	1	1								2	1
CO3	3	2	1	1								2	1

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

Signature of the Chairman
Board of Studies - CSE & IT

N. Naveena
[N. NAVEENA]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

MSR

24MNT14 - STUDENT INDUCTION PROGRAM							
(Common to Computer Systems and Design, Information Systems & Software Systems branches)							
Programme& Branch	**B.Sc& Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**Credit**
Prerequisites	**NIL**	**1**	**MC**	**2**	**0**	**0**	**-**

Preamble	To make the student to understand the meaning of happiness and prosperity for a human being. Also to facilitate the students to understand the harmony of human living and importance of the physical and mental strength through yoga and meditation.	
Unit – I	**Overview of College and Department:**	**5**
General facilities – Autonomous System- Curriculum Overview & Assessment – Outcome Based Education – Placement and Higher Education Opportunities – Entrepreneurship – Value added Course – Online Course.		
Unit – II	**Universal Human Values:**	**10**
Holistic Development & Role of Education – Understanding Happiness- Understanding the Human Being – Self & Body – Understanding the Human Being – Activities of self – Prosperity – Understanding Relationship Trust – Understanding Relationship Respect – Understanding Relationship Other Feelings – Understanding Society – Understanding Nature Existence.		
Unit – III	**Yoga and Meditation:**	**5**
Introduction to Yoga – Objective – Physical Exercises: Need and Objectives of Simplified Physical Exercise – Types of Physical Exercises – Meditation : Qualities acquired through Meditation – Mental Health – Simple Meditation – Stress Management – Human Values: Self Control – Self Confidence – Honesty – Contentment – Humility – Modesty Tolerance- Adjustment – Sacrifice – Forgiveness – Importance of Thought Process – Self Realization.		
		Total:20

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	Interpret the values and culture of the Institution	Understanding (K2)
CO2	Understand the value of harmonious relationship based on trust , respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.	Understanding (K2)
CO3	Know the value holistic vision of life and take steps to develop physical and mental health.	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											1		
CO2						3	3				2		
CO3						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	25	75					100

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

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M. Sakthiradha

[Dr. M. SAKTHIRADHA]

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24MNT13 - QUANTITATIVE APTITUDE - I								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Basic Mathematical skills**	**1**	**MC**	**2**	**0**	**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.		
		Total:20

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)

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[S. INDRAKUMAR]

24BCC21 - COMMUNICATIVE ENGLISH II								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**2**	**HS**	**3**	**0**	**2**	**NE**	**4**

Preamble	To facilitate the construction of sentences effectively and to improve the interpersonal skills of the learners	
Unit – I	**Grammar and Vocabulary:**	**9**
Analogy – Paired words - Coding and Decoding - Types of sentences - Assertive, Imperative, Interrogative and Exclamatory and Positive, Negative - Reading: Passages focusing on factual details, and features of text organization as well as gist, opinions and attitudes - Writing: Letter Writing: inviting guests, Job application with resume, seeking permission for Industrial Visit. Activities: Listening: Social Conversations - Speaking: Technical Presentation		
Unit – II	**Grammar and Vocabulary:**	**9**
Homonyms and Homophones- Commonly confused words – Odd words- Subject-verb agreement - Reading: Gapped-text exercises - Writing: Transcoding - Preparing proposals - Activities: Listening: Telephone conversations - Speaking: Role Play		
Unit – III	**Grammar and Vocabulary:**	**9**
Articles and determiners - Simple, compound and complex - Reading: Reading Comprehension-Multiple matching - Writing: Checklist – Memorandum – Designing brochures. Activities: Listening: Telephonic conversation - Mock Group Discussions - Speaking: Group Discussion		
Unit – IV	**Grammar and Vocabulary:**	**9**
Error detection and correction – Sentence selection and Improvement - Gerunds & Infinitives - Reading: Business English Certificate (BEC) type exercises - Writing: Recommendations - Activities: Listening: Motivational Talks - Speaking: Speaking with native accent.		
Unit – V	**Grammar and Vocabulary:**	**9**
Single word substitution - Definitions – Purpose and function – Interpreting news / advertisement - Reading: International English Language Testing System (IELTS) type exercises - Writing: Report Writing: special and technical reports - Activities: Listening: TED Talks - Speaking: Mock Interviews.		

LIST OF EXPERIMENTS / EXERCISES:	
1.	Mock Interview
2.	Job Application with resume
3.	Making a presentation on a technical topic/case study
4.	Group Discussion
5.	Reading Aloud
6.	Listening to native speakers' talks and imitating them
7.	Writing about a social issue for blogs/social media
8.	Writing company profiles

Lecture:45, Practical:30, Total:75

TEXT BOOK:	
1.	Sanjay Kumar and Pushp Lata, "Communication Skills", 2nd Edition, New Delhi: Oxford University Press, 2015.

REFERENCES/ MANUAL / SOFTWARE:	
1.	Raymond Murphy, "Essential English Grammar: Reference and Practice for South Asian Students", 2nd Edition, Cambridge: Cambridge University Press, 2012.
2.	Glennis Pye, "Vocabulary in Practice, Parts 1 and 2", 1st Edition, Cambridge: Cambridge University Press, 2011.
3.	Tense buster, DVD, podcasts, Authentic Videos, and Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	use structural words appropriately in spoken and written texts	Understanding (K2) Manipulation (S2)
CO2	construct different types of sentences	Applying (K3) Precision (S3)
CO3	read and listen longer academic and business English texts with maximum understanding	Analyzing (K4), Manipulation (S2)
CO4	write beyond the sentence level without grammatical errors	Applying (K3), Precision (S3)
CO5	communicate effectively in a vast range of personal, professional, academic, and cultural situations including Group Discussion, paper presentation and mock interview	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				1		2	1	2	3		3	1	1
CO2				1		2	1	2	3		3	1	1
CO3				1		2	1	2	3		3	1	1
CO4				1		2	1	3	3		3	1	1
CO5				1		2	1	2	3		3	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	-	21	62	17	-	-	100
CAT2	-	20	63	17	-	-	100
CAT3	-	27	56	17	-	-	100
ESE	-	28	54	18	-	-	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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[Dr. S. GANDHIMATHI]

IK

24BCC22 - MATHEMATICS - II								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme& Branch	**B.Sc (Computer Systems and Design, Information Systems, Software Systems branches)**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**2**	**BS**	**3**	**1***	**2***	**NE**	**4**

Preamble	To introductory course which inculcates the knowledge of Probability, Statistics and its application in the field of business and also it gives adequate exposure in the basic concepts of test of hypothesis and control charts.	
Unit – I	**Probability:**	**9+3**
Basic Terminology - Mathematical Probability - Axiomatic Approach to Probability - Addition Theorem on Probability - Conditional Probability - Multiplication Theorem on Probability - Independence of Events - Total Probability - Baye's Theorem.		
Unit – II	**Statistical Measures:**	**9+3**
Measures of central tendency: Mean, Median, Mode. Measures of dispersion: Range - Quartile deviation - Mean deviation - Standard deviation.		
Unit – III	**Correlation and Linear Regression:**	**9+3**
Introduction to Covariance – Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation -Spearman's Rank Correlation Coefficient - Repeated Ranks - Lines of Regression.		
Unit – IV	**Test of Significance for Small Samples:**	**9+3**
Introduction to sampling distributions - Types of sampling - Standard Error - Student's t-test: Test of significance between the sample mean and population mean – Test for difference between two sample means - F-test for difference between two population variances - Chi-square Test for Goodness of Fit - Chi-square Test for Independence of Attributes.		
Unit – V	**Statistical Quality Control:**	**9+3**
Control Charts - Control charts for variables: Mean Chart, R-Chart. Control Charts for attributes: c-Chart, p-Chart and np- chart.		

LIST OF EXPERIMENTS / EXERCISES:	
1.	Determination of the probability
2.	Compute the measures of central tendency and dispersion
3.	Determine the correlation coefficients and covariance
4.	Compute the linear regression lines for the given data
5.	Testing significance of means using student's t-test
6.	Testing the independence of attributes using Chi-square test
7.	Plot a control chart for variables
8.	Plot a control chart for attributes

***Alternate week**

Lecture:45, Tutorial and Practical:15, Total:60

TEXT BOOK:	
1.	Veerarajan T, "Probability and Statistics, Random process with Queueing Theory and Queueing Networks", 4th Edition, McGraw-Hill Education (India), New Delhi, 2017 for Units I, III, IV, V.
2.	S C Gupta & V K Kapoor, "Fundamental of Mathematical Statistics", 12th Edition, Sultan Chand and Sons, Educational Publishers, New Delhi, 2022 for Unit II.

REFERENCES/ MANUAL / SOFTWARE:	
1.	Kandasamy P, Thilagavathy K, Gunavathy K, "Probability Statistics and Queueing Theory", S. Chand & Co, New Delhi, 2016.
2.	Douglas C. Montgomery, George C. Runger, "Applied Statistics and Probability for Engineers" - 6th Edition, New Delhi Wiley, 2020.
3.	MATLAB Manual.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	make use of the concept of probability to real life scenarios	Applying (K3) Manipulation(S2)
CO2	determine the mean, median and mode for ungrouped and grouped data	Applying (K3) Manipulation(S2)
CO3	identify the relation between two variables understand the concepts of two-dimensional regression	Applying (K3) Manipulation(S2)
CO4	apply statistical tests for solving problems involving small sample tests	Applying (K3) Manipulation(S2)
CO5	prepare control charts to monitor the production process	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			3								
CO2	3	3			3								
CO3	3	2	2		3							3	
CO4	3	2	3		3							2	
CO5	3	2	3		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	-	13	87	-			100
ESE	-	23	77	-			100

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

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24BCT21 - PYTHON PROGRAMMING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**2**	**PC**	**3**	**0**	**0**	**NE**	**3**

Preamble	This course introduces the core python programming. It emphasizes on developing python programs with various data types, functions, modules, classes and objects	
Unit – I	**Basics of Python Programming:**	**9**
Basics of Python Programming: Features of Python- History of Python - Literals – Variables and Identifiers – Data Types - Input Operation – Comments – Reserved Words – Indentation – Operators and Expressions – Decision Control Statements: Introduction – Conditional Branching Statement – Iterative Statements – Nested Loops – Break, Continue and Pass statements – Else in Loops.		
Unit – II	**Functions and Modules:**	**9**
Functions and Modules: Introduction - Definition – Call – Variable Scope and Lifetime – The return Statement –More on Defining Functions: Required, Keyword and Default Arguments – Lambda Functions– Documentation Strings – Good Programming Practices - Recursive Functions -Modules – Packages.		
Unit – III	**Python Strings:**	**9**
Introduction –Concatenating, Appending, and Multiplying on Strings – Strings are Immutable – String Formatting Operator – Built-in String Methods and Functions – Slice Operation – ord() and chr() functions – in and not in Operators – Comparing Strings – Iterating String– String Module – Regular Expressions – match(), search(), sub(), findall() and finditer () Functions.		
Unit – IV	**Data Structures:**	**9**
Lists- Access Values - Update Values - Nested list - Cloning List - Basic List Operations - List Methods - List Comprehensions - Looping in Lists - Tuple - Create - Utility - Access Values - Update - Delete Elements -Basic Tuple Operations - Tuple Assignments - Returning multiple values - Nested tuples - Checking the Index - Count the Elements –Sets – Creation- Set operations.		
Unit – V	**Classes and Objects:**	**9**
Dictionaries -Create - Access - Add and Modify an Item - Delete an Item - Sorting Item - Looping Over - Nested Dictionary - Built-in Functions and Methods – List vs Tuple vs Dictionary. Classes and Objects: Classes and Objects – Class Method and self Argument – Constructor – Class and Object Variables – Destructor – Public and Private Data Members – Private Methods – Class Method – Static Method		
		Total:45

TEXT BOOK:

1.	Reema Thareja, "Python Programming Using Problem Solving Approach", 3rd Edition, Oxford University Press, New Delhi, 2020.

REFERENCES:

1.	Nageswara Rao, "Core Python Programming", 2nd Edition, DreamTech Press, New Delhi, 2018
2.	Timothy A. Budd, "Exploring Python", Paperback, McGraw Hill Education India Pvt Ltd., 2017.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	understand the basic building blocks of python and decision control statements	Understanding (K2)
CO2	solve the problems using functions and modules	Applying (K3)
CO3	analyze strings and regular expression for searching in a string	Analyzing (K4)
CO4	examine list, tuple and sets to handle variety of data	Analyzing (K4)
CO5	apply dictionaries in programming and understand the class and object	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	1						1	2	2	1	1	3
CO2	3	2	1	1	1			2	3	3	1	3	1
CO3	3	3	2	1	3	2		2	3	3	1	3	2
CO4	3	3	2	1	3	2		2	3	3	1	3	2
CO5	3	2	1	1	2			2	3	3	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	-	20	70	10			100
CAT2	-	10	60	30			100
CAT3	-	10	60	30			100
ESE	-	-	-	-			-

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

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V.Vishnu Priya

NTR

24BCT22 – DATA STRUCTURES AND ALGORITHMS								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems and Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**C PROGRAMMING**	**2**	**PC**	**3**	**1**	**0**	**ES**	**4**

Preamble	To impart the knowledge of basic data structure operations and algorithms. This course also discusses the application of the data structures.	
Unit – I	**Introduction**	**9+3**
Introduction: Definition, Structure and Properties of Algorithms – Development of an Algorithm- Data Structures and Algorithms – Data Structure-Definition and Classification. Analysis of Algorithms: Efficiency of Algorithms – Apriori Analysis – Asymptotic Notations – Time Complexity of an Algorithm Using O Notation. – Polynomial Vs Exponential Algorithms – Average, Best and Worst Case Complexities.		
Unit – II	**Linear Data Structures**	**9+3**
Stacks: Introduction- Stack Operations – Applications-Recursive programming Evaluation of expressions.Queues: Introduction – Operations on Queues -Circular Queues-Applications. Linked Lists: Introduction - Singly Linked Lists- Doubly Linked Lists -Circularly Linked List- - Application: Addition of Polynomials.		
Unit – III	**Trees**	**9+3**
Tree: Introduction – Trees: Definition and Basic Terminologies – Representation of Trees - Binary Trees: Basic Terminologies and Types - Representation of Binary Trees – Binary Tree Traversals – Threaded Binary Trees – Binary Search Trees: Definition and Operations, AVL Trees: Definition and Operations.		
Unit – IV	**Graphs**	**9+3**
Graphs: Introduction – Definitions and Basic Terminologies - Representations of Graphs – Graph Traversals: Breadth First Search – Depth First Search - Applications: Topological Sort – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm – Krusal Algorithm- Hamiltonian Cycle.		
Unit – V	**Sorting and Searching**	**9+3**
Sorting: Introduction- Bubble Sort- Insertion Sort - Selection Sort - Merge Sort - Quick Sort – Heap Sort. Searching: Linear Search – Binary Search.		
		Lecture:45, Tutorial:15, Total:60

TEXT BOOK:

1.	Vijayalakshmi Pai G.A, "Data Structures and Algorithms – Concepts, Techniques and Applications", 1st Edition, McGraw Hill Education, New Delhi, 2017.

REFERENCES:

1.	Data Structures Through C in Depth,S.K. Srivastava; Deepali Srivastava, BPB Publications
2.	Tremblay Jean-Paul and Sorensen Paul, "An Introduction to Data Structures with Applications", 2nd Edition, Tata McGraw Hill, New Delhi, 2017.
3.	Introduction to the Design and Analysis of Algorithms, 3rd edition
4.	**E-Content:** 1. https://www.tutorialspoint.com/data_structures_algorithms/kruskals_spanning_tree_algorithm.htm 2. https://www.studytonight.com/data-structures/dijkstras-algorithm

MICRO PROJECT:

Maze solver using Stack, Queue and Graph

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	analyze the algorithm efficiency with different problem statements for optimizing the code.	Analyzing (K4)
CO2	illustrate the concepts of linear data structures like stacks ,queues, linked list	Applying (K3)
CO3	demonstrate the tree traversal algorithms for various non-linear data structures.	Applying (K3)
CO4	apply the concepts of graph for various non-linear data structures.	Applying (K3)
CO5	analyze and demonstrate the concepts of various sorting, searching algorithms.	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	3	2	1							1	3	2
CO2	3	3	2	1							1	3	2
CO3	3	2	1	1							1	3	1
CO4	3	2	1	1							1	3	1
CO5	3	2	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	-	10	50	40			100
CAT2	-	30	70	-			100
CAT3	-	20	80	-			100
ESE	-	30	50	20			100

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

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(N.T. Renukadevi)

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AMS

24BCT23- USER INTERFACE TECHNOLOGIES								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme& Branch	**B.Sc& Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Web Programming**	**2**	**PC**	**3**	**0**	**0**	**ES**	**3**

Preamble	This course provides a web application development in the emerging technologies of ReactJS, NodeJS, ExpressJS and MongoDB.	
Unit – I	**React Basics:**	**9**
The Foundation of React: UI Layer - Virtual DOM. JSX: Definition - Syntax Basics of JSX - Conditionals in JSX - Expressions in JSX - Using Children in JSX - React Fragments. All About Components: Definition - Components vs Elements - Built-in Components - User-Defined Components. Types of Components: Class Components - Function Components. The Component Lifecycle: Mounting - Updating - Unmounting.		
Unit – II	**Building Components of React:**	**9**
React Data Flow: One-Way Data Flow - Props - React State - The Difference between state and props - Updating state.Events: SyntheticEvent - Using Event Listener Attributes - The Event Object - Supported Events - Event Handler Functions - Passing Data to Event Handlers. Forms: Forms Have State - Controlled Inputs vs. Uncontrolled Inputs - Lifting Up Input State -Using Uncontrolled Inputs - Using Different Form Elements. Refs - Styling React. Routing: Definition - Using Reat Router: Installing and importing react-router-dom - The Router Component - Linking to Routes.		
Unit – III	**Node JS:**	**9**
Node JS: Getting Started with Node.js - Understanding the Node.js - Installing Node.js - Working with Node Packages. Using Events, Listeners, Timers, and Callbacks in Node.js: Understanding the Node.js Event Model - Adding Work to the Event Queue - Implementing Callbacks.		
Unit – IV	**Data Processing in Node JS & Introduction to MongoDB:**	**9**
Handling Data I/O in Node.js: Working with JSON - Using the Buffer Module to Buffer Data - Using the Stream Module to Stream Data. Accessing the File System from Node.js: Synchronous vs Asynchronous File System Calls - Opening & Closing Files - Writing Files - Reading Files. Implementing HTTP Services in Node.js: Processing URLs - Processing Query Strings & Form Parameters - Understanding Request, Response, and Server Objects - Implementing HTTP Clients and Servers in Node.js.Understanding NoSQL and MongoDB - Getting started with MongoDB: Building the MongoDB Environment - Administering User Accounts - Administering Databases - Managing Collections. Getting started with MongoDB and Node.js: Adding the MongoDB Driver to Node.js - Connecting to MongoDB from Node.js - Accessing & Manipulating Databases - Accessing & Manipulating Collections.		
Unit – V	**MongoDB& Express with Node.js:**	**9**
Manipulating MongoDB Documents from Node.js: Understanding Database Change Options - Understanding Database Update Operators - Adding Documents to a Collection - Getting Documents from a Collection - Updating Documents in a Collection - Deleting Documents from a Collection - Removing a Single Document from a Collection. Accessing MongoDB from Node.js: Introducing the Data Set - Understanding Query Objects - Understanding Query Options Objects - Finding Specific Sets of Documents - Counting Documents - Limiting Result Sets - Sorting Result Sets - Finding Distinct Field Values. Implementing Express in Node.js: Getting started with Express - Configuring Routes - Using Requests Objects - Using Response Objects - Implementing a Template Engine.		
		Total:45

TEXT BOOK:

1. Chris Minnick, "Beginning ReactJS Foundations Building User Interfaces with ReactJS", John Wiley & Sons, Inc., Hoboken, New Jersey, 1st edition, 2022, ISBN: 978-1-119-68554-8. Unit - I & II.
2. Node.js, MongoDB and Angular Web Development, Brad Dayley, Brendan Dayley Caleb Dayley, 2nd edition, Pearson Edu., Inc. 2018, ISBN: 978-0-13-465553-6. Unit - III, IV & V

REFERENCES:

1. Vasan Subramanian, "Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node", 2nd edition, Apress, 2019.
2. Fullstack React, The Complete Guide to ReactJS and Friends by Anthony Accomazzo, Nate Murray, Ari Lerner · 2017.

MICROPROJECT:

Utilize API calls to populate Maps in React

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	demonstrate the various components of React.	Understanding (K2)
CO2	examine React JS framework to develop web applications.	Analyzing (K4)
CO3	construct the Node.js applications.	Applying (K3)
CO4	develop web applications using Node JS with MongoDB.	Applying (K3)
CO5	inspect the role of Express in web applications.	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	2	1										1	3
CO2	3	3	2	1							1	3	2
CO3	3	2	1	1							1	3	1
CO4	3	2	1	1							1	3	1
CO5	3	3	2	1							1	3	2

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

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	-	30	40	30	-	-	100
CAT3	-	30	40	30	-	-	100
ESE	-	40	30	30	-	-	100

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

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ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

(Dr. A Muthusamy)

VVP

24BCL21 - PYTHON PROGRAMMING LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**2**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course provides the knowledge in the core concepts of python programming. It emphasizes on developing python programs using core programming features.

LIST OF EXPERIMENTS / EXERCISES:

1.	Implementation of the conditional and looping statements:- a. Write a program to find the greatest among three numbers b. Program to accept any number and prints the number of digits in the given number. c. Write a program to generate square, triangle, diamond pattern using *.
2.	Implementation the conditional and looping statements:- a. Write a program to read two numbers. Then find out whether the first number is a multiple of the second number. b. Write a program to sum the series 1**2/1+2**2/2+....+n**2/n c. Write a program to prints all the prime number for 50 to 1.
3.	Implementation of functions:- a. Write a function is_prime() that returns a1 if the argument passed to it is a prime number and a 0 otherwise. b. Write a program that uses lambda function to multiply two numbers. c. Write a program to concatenate two strings using recursion.
4.	Implementation of functions:- a. Demonstrate the various parameters passing type to the function that accepts three integers and returns True if any of the integers is 0, otherwise it returns False. b. Write a program to swap two variables that are defined as global variable. c. Write a program to print n terms of the Fibonacci series using recursion
5.	Implementation of the various string operations:- a. Write a program to print the mirror of the given string.(„abc'->"cba') and check for palindrome. b. Write a program to count the number of characters, words and lines in the given text. c. Write a program that accepts a comma separated sequence of words as input and prints the unique words of it.
6.	Implementation of the regular expressions:- a. Write a program to check whether a string starts with specified character. b. Write a program to remove leading and trailing spaces from a sting. c. Write a program to match strings which starts with an upper case character followed by a digit and a „-„.
7.	Implementation of the list operations:- a. Make a list of first ten letters of the alphabet, apply slice for the following i. Print the first three letters from the list ii. Print any three letters from the middle of the list. iii. Print the letters from any particular index to the end of the list. b. Write a program that creates a list of numbers from 1 to 75 that are either divisible by 4 or by 5. c. Write a program to create a tuple from the list and do the vice versa.
8.	Implementation of tuple concepts:- a. Create a tuple that has just one element which in turn may have three elements „a','b' and „c'. Print the length of the tuple. b. Count the occurrences of an element in a tuple and Check if an element exists in a tuple.
9.	Implementation of dictionary concepts:- a. Write a snake and ladder game program using dictionary. b. Write a program that has a dictionary of your friends name(key) and birthday. Print the items in the dictionary in a sorted order. . Prompt the user to enter a name and check if it is present in the dictionary. If the name does not exit, then ask the user to enter the birthday and add it to the dictionary.

10.	Implementation of classes and objects:- a. Write a python program to deposit or withdraw money in a bank account using class and object. b. Write a python program that has a class student that stores roll number, name and marks(in five subjects) of 10 students. Display all the information stored about 10 students.
	Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	solve problems using core python programming	Applying(K3) Manipulation(S2)
CO2	implement function and data types for solving problems	Applying(K3), Manipulation(S2)
CO3	demonstrate data structures and objects and classes	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
CO2	3	2	1	1							1	3	2
CO3	3	2	1	1							1	3	2

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

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NTR

24BCL22 - DATA STRUCTURES LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme &Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**2**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	To implement linear and non linear data structure operations, algorithms and its applications.

LIST OF EXPERIMENTS / EXERCISES:

1	Implement a program for stack that performs following operations using ADT (a) PUSH (b) POP (c) PEEP (d) DISPLAY
2	Evaluation of expression using Stack
3	Write a program to implement QUEUE using ADT that performs following operations (a)INSERT (b) DELETE (c) DISPLAY
4	Implementation of Linked List Operations (Polynomial addition using Linked List)
5	Implementation of stack and queue using linked list(balancing symbols)
6	Implementation of tree traversal techniques.
7	Implementation of BFS Graph traversal algorithms.
8	To perform topological sorting
9	Implementation of Sorting algorithms a) Insertion sort b)Selection sort
10	Implementation of merge sort to sort the given integer in ascending order
	Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: **On completion of the course, the students will be able to**		**BT Mapped (Highest Level)**
CO1	Code the operations of linked list, tree and graph data structures	Applying(K3), Manipulation(S2)
CO2	Apply sorting and searching on a given dataset	Applying(K3), Manipulation(S2)
CO3	Solve the problem by applying programming skills	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
CO2	3	2	1	1							1	3	2
CO3	3	2	1	1							1	3	2

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

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AMS

24BCL23 - USER INTERFACE TECHNOLOGIES LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Web Programming Laboratory**	**4**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course is designed to impart the knowledge to design and implement static and dynamic websites for real time applications.

LIST OF EXPERIMENTS / EXERCISES:

1.	Design a web page of your bio-data using HTML tags and CSS.
2.	Create a web application using components and forms in React.
3.	Construct a form to maintain personal information and perform validation using React.
4.	Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
5.	Design a webpage to create simple interactive CGPA calculator using Event Handling.
6.	Prepare a web application using HTTP Request and HTTP Response.
7.	Develop a simple login page of customer registration by performing event handling using GET and POST method.
8.	Develop a simple calculator using "Modules" in Node.js.
9.	Implement CRUD operations using MongoDB in Node.js
10.	Demonstrate Express Routing.

Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	construct dynamic web pages.	Applying(K3), Precision(S3)
CO2	apply the concepts of ReactJS to design web applications.	Applying(K3), Precision(S3)
CO3	develop a web application to maintain information in a database using server-side scripting.	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						2	1	3	2
CO2	3	2	1	1						2	1	3	2
CO3	3	2	1	1						2	1	3	2

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

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(Dr.A. Muthusamy)

24MNT22 - QUANTITATIVE APTITUDE - II								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Basic Mathematical skills**	**2**	**MC**	**2**	**0**	**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.		
		Total:20

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)

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24BCT31 - JAVA PROGRAMMING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**3**	**0**	**0**	**NE**	**3**

Preamble	This course introduces the fundamentals of object-oriented features using java programming. It also emphasizes on developing java programs using packages, multithreading, exception handling and streams.	
Unit – I	**Introduction:**	**9**
Introduction: History and evolution of Java – Java's .Lineage – .Creation of Java – How Java impacted the Internet– Byte code– Moving beyond Applets – Servlets – The Java Buzz words – The evolution of Java. An overview of Java: Object Oriented Programming – A First Simple Program– Two Control statements – Using Blocks of code – Lexical Issues – Java, Class libraries – Data types, variables, Command Line arguments.		
Unit – II	**Operators, Arrays and Control statements:**	**9**
Arrays - Operators: Arithmetic Operators – Bitwise Operators – Relational Operators – Boolean Logical Operators – Assignment operator – The ? Operator – Operator Precedence – Using Parenthesis. Control statements: Java Selection statements – Iteration statements – Jump statements.		
Unit – III	**Class and object:**	**9**
Class fundamentals – Declaring objects – Assigning object reference variables – Introducing methods – Constructors – this Keyword – Garbage collection – The Stack class – Overloading methods – Using object as Parameters – Closer look at argument passing - Returning object – Recursion – Static & final - Nested and Inner classes – String classes.		
Unit – IV	**Inheritance, Packages and Interfaces:**	**9**
Inheritance: basics – Using Super – Method Overriding – Dynamic method dispatch – Abstract classes – Using final with Inheritance. Packages and Interfaces: Packages – Packages as member access – Importing packages – Interfaces – Default Interface methods.		
Unit – V	**Exception Handling, Multi-threading and Collection frameworks:**	**9**
Exception Handling: Fundamentals – types –Uncaught exception – Using try and catch – Multiple catch – Nested try statements– throw & throws – finally – Built in Exceptions– Creating our own exception. Multi-threading: Java Thread model – Main thread – Creating a thread – Creating multiple threads. Collections framework: Overview – The collection Interfaces – The collection classes.		
		Total:45

TEXT BOOK:

1.	Schildt Herbert, "Java: The Complete Reference", 12th Edition, McGraw Hill Education, New Delhi, 2022.

REFERENCES:

1.	Balagurusamy E., "Programming with Java", 7th Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023.
2.	Paul Deitel, Harvey Deitel., "Java How to Program", 11th Edition, Pearson Education, 2018.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	construct basic java programs	Applying (K3)
CO2	apply the concepts of arrays and control structures	Applying (K3)
CO3	solve the real time problems using classes and objects	Analyzing (K4)
CO4	apply interfaces concepts and create user defined packages	Applying (K3)
CO5	examine exception handling techniques and Collections	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	1	1							1	3	1
CO2	3	2	1	1							1	3	1
CO3	3	2	1	1							1	3	1
CO4	3	2	1	1							1	3	1
CO5	3	2	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	-	40	60	-	-	-	100
CAT2	-	30	50	20	-	-	100
CAT3	-	30	50	20	-	-	100
ESE	-	-	-	-	-	-	-

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

Signature of the Chairman
Board of Studies - CSE & IT

Ch. Saraswathi

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCT32 - DATABASE MANAGEMENT SYSTEMS								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**3**	**0**	**0**	**ES**	**3**

Preamble	To interpret the knowledge about various aspects of database design, database languages and database system implementation.	
Unit – I	**Introduction and Database Design Model:**	**9**
Introduction: Database-System Applications - View of Data – Database and Application Architecture. Introduction to the relational model: Database Schema – Keys – Relational Algebra: The Select Operation – The project Operation. Database Design using the E-R Model: Overview of the Design Process - The Entity-Relationship Model – Complex Attributes – Mapping Cardinalities – Primary Key - Removing Redundant Attributes in Entity Sets - Reducing E-R diagrams to Relational Schemas - Extended E-R Features.		
Unit – II	**Introduction to SQL:**	**9**
Overview of the SQL Query Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries - Modification of the Database.		
Unit – III	**Intermediate SQL:**	**9**
Intermediate SQL: Join Expressions – Views: Materialized Views. Transactions: Commit – Rollback. Integrity Constraints - SQL Data Types and Schemas - Authorization.		
Unit – IV	**Relational Database Design:**	**9**
Features of Good Relational Designs – Functional-Dependency Theory - Atomic Domains and First Normal Form - Second Normal Form - Third Normal Form - Boyce-Codd Normal Form – Multi-valued Dependency and Fourth Normal Form - Join Dependency and Fifth Normal Form.		
Unit – V	**Transactions Control:**	**9**
Transactions: Transaction Concept - A Simple Transaction Model – Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability.		
		Total:45

TEXT BOOK:

1.	Silberschatz Abraham, Korth Henry F., and Sudarshan S., "Database System Concepts", 7th Edition, McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2023.

REFERENCES:

1.	Elmasri Ramez, Navathe Shamkant B, "Fundamentals of Database Systems", 7th Edition, Pearson, 2023.
2.	Date C J, Kannan A, Swamynathan S, "An Introduction to Database Systems", 8th Edition, Pearson, 2022.

MICROPROJECT:

Library Management System: Design and implement a database system to manage books, borrowers and transactions in a library.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	develop E-R model for database related applications	Applying (K3)
CO2	execute SQL queries using SET operations and aggregate functions	Analyzing (K4)
CO3	develop SQL expressions using join operations	Applying (K3)
CO4	analyze the normalization techniques	Analyzing (K4)
CO5	interpret the transaction control concepts	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	2	1	1							1	3	1
CO2	3	3	2	1							1	3	2
CO3	3	2	1	1							1	3	1
CO4	3	3	2	1							1	3	2
CO5	2	1										1	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	35	35			100
CAT2	-	30	35	35			100
CAT3	-	30	30	40			100
ESE	-	30	35	35			100

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

Signature of the Chairman
Board of Studies - CSE & IT

S. Poorani
[S. POORANI]

KONGU ★ ACADEMIC CELL ★ ENGINEERING COLLEGE

24BCT33– COMPUTER ORGANIZATION								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Digital Principles and Logic Design**	**3**	**PC**	**3**	**0**	**0**	**NE**	**3**

Preamble	This course deals with the basic concepts of computer architecture and organization that can help the participants to have a clear view as to how a computer system works.	
Unit – I	**Basic Computer Organization:**	**9**
Introduction: Digital Computers - Computer Organization and Architecture– Basic Issues-Basic Organization of a computer - Register Transfer: Register Transfer Language – Register Transfer – Bus and Memory Transfer - Basic Computer Organization and Design: Instruction codes- Computer Registers – Computer Instructions – Timing and Control - Instruction cycle - Memory Reference Instructions-Input-output and Interrupt- Complete Computer Description.		
Unit – II	**Computer Design and Arithmetic operations:**	**9**
Basic Computer Organization and Design: Design of Basic Computer – Design of Accumulator logic - Computer Arithmetic: Introduction – Addition and Subtraction – Multiplication Algorithms -Division Algorithms – Decimal Arithmetic Unit.		
Unit – III	**Input – Output Organization:**	**9**
Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer - Programmed I/O – Interrupt Initiated I/O – Priority Interrupt – Direct Memory Access - Bus Arbitration – DMA Controller – DMA Transfer– Input – Output Processor - CPU-IOP Communication – Intel 8089 IOP.		
Unit – IV	**Memory Organization**:	**9**
Memory Hierarchy – Main Memory - RAM and ROM Chips – Memory Address Map – Memory Connection to CPU – Memory Technology – ROM – PROM -EEPROM – Flash Memory – RAM Technologies – Auxiliary Memory – Associative Memory –Cache Memory – Virtual Memory.		
Unit – V	**Pipeline and Vector Processing**:	**9**
Parallel Processing – Pipelining – Arithmetic pipeline – Instruction Pipeline – RISC Pipeline – Vector Processing - Vector Operations –Matrix multiplications – Memory Interleaving – Super Computers – Array Processor - Attached Array Processor – SIMD Array Processor.		
		Total:45

TEXT BOOK:

1.	M. Morris Mano, "Computer System Architecture", 3rd Edition, Pearson India Education Pvt.Ltd., 2024.

REFERENCES:

1.	Hamacher Carl, Vranesic Zvonko, ZakySafwat, "Computer Organization", 5th Edition, McGraw Hill Education, 2016.
2.	John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill Education, 2017.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	explain the power of stored program general purpose device and describe the internal operations of the computer.	Understanding (K2)
CO2	Examine and apply the arithmetic algorithms to calculate the arithmetic operations over binary numbers.	Analyzing (K4)
CO3	interpret the input – output organization of computer and transfer modes.	Applying (K3)
CO4	categorize the functionalities of each element of a memory hierarchy	Understanding (K2)
CO5	demonstrate the concept of pipelining to increase the processing speed	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	1	1	1							1	1	3
CO2	3	3	2	1							1	3	2
CO3	3	2	1	1							1	3	1
CO4	2	1	1	1							1	1	3
CO5	3	2	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	-	40	50	10			100
CAT2	-	26	60	14			100
CAT3	-	30	70	-			100
ESE	-	20	60	20			100

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

Signature of the Chairman of Studies - CSE & IT

[G. DEEPIKA]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCT34 – SOFTWARE ENGINEERING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**3**	**0**	**0**	**ES**	**3**
Preamble	This course introduces the software engineering concepts and software development lifecycle. It focuses on requirement analysis, design, agile development, tools for software development and testing.							
Unit – I	**Software Process Models:**							**9**
Introduction: Software Engineering: Defining the discipline - The Software Process – Software Engineering Practice. Process Models: Prescriptive Process Models – Specialized Process Models - Unified Process – Case Study: Identification and analysis of process model.								
Unit – II	**Analysis and Design:**							**9**
Requirements Engineering: Requirements Engineering Tasks – Developing Use cases – Building the Analysis Model – Requirements Modeling: Scenario-Based Methods – Design Engineering: Design Process – Design concepts – The Design Model: Data Design Elements- Architectural Design Elements – Interface Design Elements – Component-level design Elements – Deployment-Level Design Elements.								
Unit – III	**Agile Development:**							**9**
Agile development: Agility – Agile Process – Extreme Programming – Scrum – Other Agile Process Models: Scrum - Dynamic Systems Development Method - Agile Modeling - Agile Unified Process - A Tool set for the Agile Process.								
Unit – IV	**Tools and Techniques for Software Development**							**9**
DevOps – Introduction – DevOps Architecture – DevOps Lifecycle – DevOps Tools: Version control with Git - Containerization Using Docker and Kubernetes – Software Development using JIRA - Continuous Integration with Jenkins.								
Unit – V	**Software Testing**							**9**
Software Testing: Issues – Unit Testing - Integration Testing – Validation Testing - System Testing - Black Box Testing - White Box Testing – Testing using Selenium IDE.								
								Total:45

TEXT BOOK:

1.	Roger S.Pressman and Bruce R. Maxim, "Software Engineering- A Practitioner's Approach", 8th Edition, McGraw-Hill International Edition, 2019. (Unit I, II, III, V)
2.	https://www.javatpoint.com/devops (Unit IV)

REFERENCES:

1.	Ian Sommerville, "Software Engineering", 10th Edition, Pearson Education, 2016. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview
2.	Tools: https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013094433045078016241 3_shared/overview Containerization Using Docker and Kubernetes : https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0133039757276610563598 6_shared/overview https://instatus.com/blog/devops-containers

MICROPROJECT:

Prepare software requirements specification document for a "Food Ordering System" and draw the DFD

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	interpret the concepts of software processes and software process models	Understanding (K2)
CO2	analyze the scenario-based models to represent software systems	Analyzing (K4)
CO3	compare the various agile software development methods	Understanding (K2)
CO4	examine the tools for version control, software development and containerization	Analyzing (K4)
CO5	demonstrate the testing strategies for ensuring software quality	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	1										1	3
CO2	3	3	2	1							1	3	2
CO3	2	1										1	3
CO4	3	3	2	1							1	3	2
CO5	3	2	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	-	30	40	30			100
CAT2	-	30	40	30			100
CAT3	-	30	50	20			100
ESE	-	30	40	30			100

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

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Board of Studies - CSE & IT

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

[Dr. S. KARUNAKARAN]

KS

24BCC31 - OPERATING SYSTEMS								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**3**	**0**	**2**	**NE**	**4**

Preamble	To impart the role of operating systems in managing the process, memory and storage. It also focuses on process synchronization, deadlocks and disk scheduling process.	
Unit – I	**Overview of Operating System and System Calls:**	**9**
Introduction: Role of Operating System – Operating System Operations – Resource Management – Virtualization – Computing Environments – Operating System Structures: Operating System Services – System Calls – Types of System Calls – Building and Booting an Operating System.		
Unit – II	**Process Management:**	**9**
Process: Process Concept – Process Scheduling – Operation on Processes – Inter Process Communication – Threads: Overview – Multicore Programming – Multithreading Models – CPU Scheduling: Basic Concepts – Scheduling Criteria –Scheduling Algorithms.		
Unit – III	**Process Synchronization:**	**9**
Synchronization Tools: Background – Critical Section Problem – Peterson`s Solution – Mutex locks – Semaphores – Synchronization Examples: Classic Problems of Synchronization – The Bounded Buffer Problem – The Readers Writers Problem. Deadlocks: System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.		
Unit – IV	**Memory Management:**	**9**
Main Memory: Background – Contiguous Memory Allocation – Paging – Structure of Page Table – Swapping – Virtual Memory: Background – Demand Paging – Copy on Write – Page Replacement: FIFO – LRU – Optimal.		
Unit – V	**Storage Management and File System:**	**9**
Mass Storage Structure: Overview – HDD Scheduling – File System Interface: File concept – Access Methods – Directory Structure – File System Implementation: File System Structure – File System Operations – Directory Implementation – Allocation Methods – Free space Management.		

LIST OF EXPERIMENTS / EXERCISES:

1.	Execute the basic Unix commands, directory / File commands and File permission commands in UNIX environment
2.	Execute the commands related to Standard I/O, Redirection Pipes and Filters in Unix
3.	Write a shell script program using shell variables, branching and looping control structures.
4.	Demonstration of Operating System Installation and Virtualization.
5.	Implementation of FCFS scheduling.
6.	Implementation of SJF scheduling.
7.	Write the C program to Implement producer consumer problem.
8.	Implementation of FIFO page replacement algorithm.
9.	Implementation of file operations.

Lecture:45, Practical:30, Total:75

TEXT BOOK:

1.	Silberschatz Abraham., Galvin B Peter and Gagne Greg, "Operating System Concepts", 10th Global Edition, Wiley India Pvt. Ltd., New Delhi, 2023.

REFERENCES:

1.	Manish Kumar Singh,Sachin Kumar,Saibal Kumar Pal," Operating Systems: Concept Building & Problem Solving Approach" 1st Edition ,Cengage Learning India Private Limited, 2022.
2.	William Stallings, "Operating Systems Internals and Design Principles", 9th Edition, Prentice Hall, 2021.
3.	Lab Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	elucidate the role and types of operating systems	Applying (K3) Precision(S3)
CO2	implement various process scheduling algorithms	Applying (K3) Precision(S3)
CO3	make use of different methodologies for deadlock management	Applying (K3) Precision(S3)
CO4	compare the page replacement algorithms for memory management.	Analyzing (K4) Precision(S3)
CO5	experiment with the various disk scheduling algorithms in secondary storage management	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	1
CO2	3	2	1	1							1	3	1
CO3	3	2	1	1							1	3	1
CO4	3	3	2	1	1						1	3	2
CO5	3	2	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	-	40	60	-			100
CAT2	-	40	60	-			100
CAT3	-	40	50	10			100
ESE	-	30	60	10			100

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

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Board of Studies - CSE & IT

(K. Saraswathi)

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCL31 - JAVA PROGRAMMING LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course provides knowledge in the core concepts and implementation of object-oriented features in Java programming.

LIST OF EXPERIMENTS / EXERCISES:

1.	Write simple Java programs with control statements.
2.	Implementation of command line arguments in Java.
3.	Implement the concepts of classes and objects
4.	Write a java program to implement overloading and constructors.
5.	Implementation of inheritance and method overriding.
6.	Implementation of multiple inheritances using interface.
7.	Create and import a user defined package.
8.	Implementation of threading & multithreading concept.
9.	Implementation of exception handling mechanisms.
10.	Write a java program to implement collections.
	Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	demonstrate constructors and method overloading using classes and objects..	Applying(K3), Manipulation(S2)
CO2	implement inheritance and packages for an application.	Applying(K3), Precision(S3)
CO3	experiment with multithreading, exception handling mechanism and collections.	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	2	1										2	3
CO2	3	2	1	1							1	3	2
CO3	3	2	1	1							1	3	2

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

Signature of the Chairman
Board of Studies - CSE & IT

(K. Saraswathi)

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

24BCL32 - DATABASE MANAGEMENT SYSTEMS LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**NIL**	**3**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course enhances the knowledge in the design and implementation of Database with SQL queries.

LIST OF EXPERIMENTS / EXERCISES:

1.	Study of DDL commands, DML commands, DCL commands and TCL commands.
2.	Design relations to implement the integrity constraints (primary key, foreign key, unique and check).
3.	Apply aggregate functions and group by functions with having clause to group the values of multiple rows.
4.	Create views to display the part of the database.
5.	Retrieve data from one or more relations with nested sub queries.
6.	Apply join operations to retrieve data from multiple relations.
7.	Develop PL/SQL functions with select and update statements.
8.	Demonstrate the execution of Triggers whenever the insertion or deletion event occurs in the database.
9.	Design a login form using ReactJS with SQL/MySQL.
10.	Design a course registration form using ReactJS with SQL/MySQL.

Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	design database for student and banking applications.	Applying (K3), Manipulation (S2)
CO2	execute aggregate functions, views, join operations and nested sub-queries on a database.	Applying (K3), Manipulation (S2)
CO3	manipulate database using PL/SQL functions and procedures.	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	2	1	1							1	3	1
CO2	3	2	1	1							1	3	2
CO3	3	2	1	1							1	3	2

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

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Board of Studies - CSE & IT

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

S. Poonani
[S. POONANI]

PG

24GCL31 - PROFESSIONAL SKILLS TRAINING - I							
(Common to Computer Systems and Design, Information Systems & Software Systems branches)							
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**Credit**
		3	**EC**	**0**	**0**	**4**	**2**
Preamble	This subject is to enhance the employability skills and to develop career competency						
Prerequisites	Nil						
UNIT - I	**Soft Skills - I**						**20**
Soft skills and its importance: Pleasure and pains of transition from an academic environment to work environment- Need for change- Fear, stress and competition in the professional world-Importance of positive attitude- Self motivation and continuous knowledge upgradation-Self-confidence. Professional grooming and practices: Basics of corporate culture-Key pillars of business etiquette- Basics of etiquette-Introductions and greetings-Rules of the handshake, earning respect, business manners-Telephone etiquette- Body Language.							
UNIT-II	**Quantitative Aptitude & Logical Reasoning - I**						**30**
Problem solving level: Number System- Percentage- Profit and Loss- Average- Ratio and Proportion- Time and Work- Time Speed Distance- Trains- Probability- Permutation and Combination- Ages- Chain Rule- Blood Relations- Calendars- Coding-Decoding- Logical connectives- Binary logic Linear arrangements- Data Sufficiency- Puzzles- Seating Arrangements							
UNIT - III	**Grammar, Vocabulary, Listening, Speaking, Reading & Writing**						**30**
Grammar: Parts of speech - Tenses - Articles and Prepositions - Vocabulary: Synonyms & Antonyms – Analogies - Syllogism - Spelling test - Cloze test - Concord - Spotting Errors - Listening: Listening to TED talks, ESL & ESOL Videos - Podcasts - Speaking : Mock Interviews - Personality traits - Better pronunciation - Extempore talk - Reading: Reading with stress, pauses, slurs and fillers - Soft skills - Writing: Job application letter & resume - Video resume – Different types of writing - Jumbled sentences - Professional e-mail writing - Business letters - One page essay - Report writing - Editing & proofreading – Writing skills for IELTS							
							Total:80
Textbook:							
1.	Edgar Thorpe and Showick Thorpe, "Objective English for Competitive Examination", 6th Edition, Pearson India Education Services Pvt Ltd, 2017.						
References:							
1	Stephen Bailey, "Academic Writing: A practical guide for students", Routledge, New York, 2011.						
2	Meenakshi Raman and Sangeeta Sharma. "Technical Communication- Principles and Practice". 4th Edition, Oxford University Press, New Delhi, 2022.						

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	develop the soft skills of learners to support them work efficiently in an organization as an individual and as a team	Applying (K3), Precision (S3)
CO2	solve real time problems using numerical ability and logical reasoning	Applying (K3), Precision (S3)
CO3	apply English language skills for various academic and professional purposes	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				3		3		3	2		
CO2	3	2				3		3		3	2		
CO3		2					3		3	3	3	2	

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

Assessment Pattern

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		50	50				100
ESE	NA						

*±3% may be varied (CAT 1,2 – 30 marks (Aptitude), CAT 3-20 marks (English))

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Board of Studies - CSE & IT

P. Gokila
(P. Gokila Boindha)

24BCL33 – DESIGN THINKING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**3**	**EC**	**0**	**0**	**4**	**-**	**2**

Preamble	Design Thinking is human-centered problem solving tool which emphasize on empathy, collaboration, cocreation and stakeholder feedback to unlock creativity and innovation, to devises feasible and viable idea/solutions.

LIST OF EXPERIMENTS / EXERCISES:

1.	Develop SCOPES Template for your design challenge.
2.	Perform User Research by using explore method and tools.
3.	Conduct Field Observation for your design challenge
4.	Conduct an interview with your customer by using empathy map and journey map.
5.	Create user personas for your product or service.
6.	Develop SCAMPER template for ideation
7.	Create user scenario/story telling for your product or service.
8.	Create low-fidelity prototypes (paper prototypes) for your design challenge.
9.	Create medium-fidelity prototypes (hardware/software prototypes) for your design challenge.
10.	Collect feedback from users for your prototype model.

Total:60

TEXT BOOK:

1.	Lee Chong Hwa, "Design Thinking the Guidebook", Design Thinking Master Trainers of Bhutan, 2017. (E-Book)

REFERENCES / MANUALS / SOFTWARES / TOOLS USED:

1.	Chart Papers, Sticky Notes, IOT Components.
2.	Any Web Browser.

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	construct design challenge and reframe the design challenge into design opportunity.	Applying (K3), Precision(S3)
CO2	interview the user, and know the feelings of users to foster deep user understanding and be able to uncover the deep user insights and needs.	Applying (K3), Precision(S3)
CO3	develop ideas and prototypes by brain storming using the ideation tools.	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	3	3	1					3	2	1	3	1
CO2	3	3	3	1					3	2	1	3	1
CO3	3	3	3	1					3	2	1	3	1

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

Signature of the Chairman
Board of Studies - CSE&IT

S. Parvathavarthini
[S. PARVATHAVARTHINI]

ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

NTR

24BCT41 - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**4**	**PC**	**3**	**0**	**0**	**ES**	**3**

Preamble	This is an introductory course in Artificial Intelligence and Machine Learning which focuses on fundamentals of Artificial Intelligence concepts, Machine Learning techniques and its algorithms.	
Unit – I	**Artificial Intelligence and Problem Solving:**	**9**
Introduction to AI – Problem Solving : Introduction – Problem Formulation – State-space Representation – Problem Formulation – Eight Tile Puzzle – Water Jug Problem – Vacuum Cleaner Problem – Wumpus World Problem – Missionaries and Carnivals Problem – Production System – Difference between Conventional and AI Problems – Searching – Problem Characteristics and Issues in Design of Search Program – Solving Problem by Searching – Types of search strategies.		
Unit – II	**Introduction to Machine Learning, Model Preparation and Evaluation:**	**9**
Human Learning –Types – Machine Learning – Types – Problems not to be solved – Applications – Languages/tools in Machine Learning – Issue –.Machine Learning Activities –Types of data – Exploring structure of data – Data quality and remediation – Data Preprocessing – Selecting a model – Training a model – Model representation and interpretability– Model Evaluation – Improving performance of a model.		
Unit – III	**Supervised Learning - Classification and Regression:**	**9**
Classification: Introduction – Example – Classification model – Learning steps– Common classification algorithms– K-Nearest Neighbor – Decision Tree – Support Vector Machines – Regression: Introduction – Example – Simple Linear Regression – Assumptions and Problems in Regression Analysis – Improving the Accuracy.		
Unit – IV	**Unsupervised Learning - Clustering:**	**9**
Introduction – Unsupervised Learning Vs Supervised Learning – Applications – Clustering as a machine learning task – K-means - Centroid-based Approach – K-medoids – Hierarchical clustering – Density based methods – DBSCAN – Association rule.		
Unit – V	**Artificial Neural Network and other Learning methods**	**9**
Introduction – Biological neuron – Artificial Neuron – Types of activation functions – Early Implementation of ANN - Architectures of NN – Learning process in ANN–Back propagation.		
		Total:45

TEXT BOOK:

1.	Dr.Nilakshi Jain, "Artificial Intelligence Making a System Intelligent", 1st Edition, Wiley, 2019 for Unit I.
2.	Saikat Dutt, Subramanian Chandramouli and Amit Kumar Das, "Machine Learning", 1st Edition, 2023 Pearson Education, India, for Units II,III,IV and V.

REFERENCES:

1.	Deepak Khemani, "A First Course in Artificial Intelligence", 1st Edition, McGraw Hill Education, India, 2017.
2.	Tom M. Mitchell, "Machine Learning", Indian Edition, McGraw–Hill Education (India), 2017.
3.	Stephen Marsland, "Machine Learning – An Algorithmic Perspective", 2nd Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.

MICRO PROJECT:

Implement two Machine Learning algorithms for any benchmark dataset and compare their performance with measures such as Classification Accuracy, Precision, Recall and F-measure using graphical plots.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	identify the importance of artificial intelligence concepts and problem solving techniques	Applying (K3)
CO2	demonstrate the need of data preprocessing techniques, machine learning model construction and evaluation	Applying (K3)
CO3	analyze various classification and regression algorithms in terms of accuracy and other statistical measures	Analyzing (K4)
CO4	apply the unsupervised learning algorithms for the given applications and compare the performance	Applying (K3)
CO5	apply artificial neural network model for real life problems and describe other various learning techniques	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	1	1	1				1	2	2	1	2	3
CO2	2	1	1	1				1	2	2	1	2	3
CO3	3	3	2	1				2	3	3	2	2	3
CO4	2	1	1	1				2	3	3	2	2	3
CO5	2	1	1	1				1	2	2	1	2	3

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

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	40	60	-			100
CAT2	-	40	50	10			100
CAT3	-	40	60	-			100
ESE	-	40	50	10			100

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

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Board of Studies - CSE & IT

(N.T. Renukadevi)

KONGU ENGINEERING COLLEGE * ACADEMIC CELL *

SND

24BCT42 – MOBILE APPLICATION DEVELOPMENT								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Java Programming**	**4**	**PC**	**3**	**0**	**0**	**ES**	**3**

Preamble	To impart the fundamental knowledge and to create mobile application using Android programming.	
Unit – I	**Introduction:**	**9**
Getting Started with Android Programming: Android: Android versions - Features of Android - Architecture of Android - Android Devices - Android Market - Android Studio - Android SDK - Creating AVDs - Launching the First Android Application - Using Android Studio for Android Development: Exploring the IDE- Using code completion - Debugging the application - Publishing the Application.		
Unit – II	**Activities, Fragments and Intent:**	**9**
Understanding Activities: Applying Styles and Themes to an Activity - Hiding the Activity Title - Dialog Window - Progress Dialog - Linking Activities using Intents- Returning Results from an Intent - Passing Data using Intent Object – Fragments- Adding Fragments Dynamically - Life Cycle of a Fragment - Interaction between fragments - Understanding the Intent Object - Using Intent Filters - Displaying Notifications.		
Unit – III	**Android User Interface:**	**9**
Understanding the Components of a Screen - Views and View Groups – Linear Layout – Table Layout- Relative Layout-Frame Layout-Scroll View-Utilizing the Action Bar - Adding Action Items to the Action Bar –Designing user interface with Views - Using Basic Views – Progress Bar view – Auto Complete Text View - Picker Views - List Views to display long lists.		
Unit – IV	**Pictures, Menus and Content Providers:**	**9**
Using Images to Display Pictures – Image View - Image Switcher – Grid View- Using Menus with Views - Creating the Helper Methods - Options Menu - Context Menu - Using Web View – Web View - Content Providers: Sharing Data in Android - Using a Content Provider - Creating and Using Content Provider.		
Unit – V	**Data Persistence:**	**9**
Saving and Loading User Preferences - Accessing Preferences using an Activity - Programmatically Retrieving and Modifying the Preferences Values - Persisting Data to Files- Saving to internal storage - Saving to External storage - Choosing the Best Storage Option - Creating and Using Databases- Creating the DBAdapter Helper class - Using the Database Programmatically		
		Total:45

TEXT BOOK:

1.	J.F. DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, John Wiley & sons, Inc.,2018

REFERENCES:

1.	Pradeep Kothari, " Android Application Development (with KitKat support) Black Book", dreamtech Press,2018.
2.	John Horton, " Android Programming for Beginnners", 3rd Edition,Packt Publishing Ltd, 2021.

MICROPROJECT:

Create a ticket reservation mobile application using android studio with SQLite database.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	explore the Android Studio Environment and Run the application using emulator	Applying (K3)
CO2	examine the activities, fragments and Intents in android applications	Analyzing (K4)
CO3	design the application using Views and view Groups	Applying (K3)
CO4	analyze the apps which handle images and menus.	Analyzing (K4)
CO5	categorize the different data storage mechanisms.	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	2	1										1	3
CO2	3	2	1	1		1						2	3
CO3	3	2	1	1		1						2	3
CO4	3	3	2	1		1						2	3
CO5	3	3	2	1		1						2	3

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

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	25	50	25			100
CAT2	-	30	50	20			100
CAT3	-	30	50	20			100
ESE	-	30	50	20			100

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

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Board of Studies - CSE & IT

P. Gokila

(P. Gokila Brindha)

ACADEMIC CELL

24BCT43 - COMPUTER NETWORKS								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Nil**	**4**	**PC**	**3**	**1**	**0**	**NE**	**4**

Preamble	This course will help the students to gain knowledge in computer network components, models and technologies. It further provides the functionalities of protocols in use at different layers of networks.	
Unit – I	**Introduction:**	**9+3**
Overview of the Internet: Networks- Switching - The Internet- Accessing the Internet- Hardware and Software–Protocol Layering: Scenarios-TCP/IP Protocol Suite-The OSI Model- Standards and Administration: Internet Standards - Internet Administration - Transmission Media: Guided Media-Unguided Media: Wireless.		
Unit – II	**Application Layer:**	**9+3**
Introduction: Providing Services-Application Layer Paradigms - Client-Server Paradigm: Application Programming Interface-Using Services of the Transport Layer-Standard Client-Server Applications: World Wide Web and HTTP-FTP-Electronic Mail-Domain Name System (DNS).		
Unit – III	**Transport Layer:**	**9+3**
Introduction: Transport Layer Services- Transport Layer Protocols: Simple Protocol-Stop and Wait Protocol- Go Back N Protocol-Selective Repeat Protocol- Bidirectional Protocols Piggybacking - Internet Transport Layer Protocols-User Datagram Protocol (UDP): User Datagram-UDP Services-UDP Applications- Transmission Control Protocol (TCP): TCP Services – Segment – a TCP connection – Flow Control-Error Control.		
Unit – IV	**Network Layer:**	**9+3**
Introduction: Network Layer Services – Network Layer Performance - Network Layer Congestion - Structure of a router - Network Layer Protocols: IPv4 Datagram format - IPv4 Addresses - Next Generation IP - IPv6 Addressing – Unicast Routing - Routing algorithms.		
Unit – V	**Data Link Layer:**	**9+3**
Introduction: Data Link Control (DLC) - Framing - Flow and Error Control - Error Detection and Correction - Multiple Access Protocols (MAC): Random Access -Controlled Access - Wired LANs: Ethernet Protocol - IEEE Project 802- Standard Ethernet- Fast Ethernet Gigabit Ethernet.		
		Lecture:45, Tutorial:15, Total:60

TEXT BOOK:

1.	Forouzan Behrouz A, Moshrraf Firouz, "Computer Networks A Top-Down Approach", 1st Edition, Tata McGraw Hill Education, 2019.

REFERENCES:

1.	Kurose James F. and Ross Keith W., "Computer Networking: A Top-Down Approach", 8th Edition, Pearson Education, New Delhi, 2020.
2.	Andrew S.Tanenbaum, Nick Feamster,David J.Wetherall, "Computer Networks", 6th Edition, Pearson Education, 2020.
3.	Behrouz A. Forouzan, "Data Communications and Networking", 5th Edition, McGraw Hill Education, 2017.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	explain the network layered architecture and the data transfer through the Internet.	Understanding (K2)
CO2	examine the functionalities of network applications like HTTP, FTP, DNS and Email	Analyzing (K4)
CO3	assess the end–to-end functionalities of transport layer protocols	Analyzing (K4)
CO4	apply IP addressing to construct forwarding and routing solutions	Applying (K3)
CO5	experiment the flow control and error control techniques at data link layer level	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	1										3	2
CO2	3	3	2	1								2	3
CO3	3	3	2	1								2	3
CO4	3	2	1	1								2	3
CO5	3	2	1	1								2	3

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

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	30	30	40			100
CAT2	-	30	40	30			100
CAT3	-	30	40	30			100
ESE	-	30	30	40			100

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

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(S-KALAISELVI)

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24BSC41 – SOFTWARE TESTING								
Programme & Branch	**B.Sc & Software Systems**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Software Engineering**	**4**	**PC**	**3**	**0**	**2**	**NE**	**4**
Preamble	This course provides fundamentals of software testing and implements various testing methodologies to develop quality software.							
Unit – I	**SDLC Models and Testing:**							**9**
Phases of Software Project – Quality Assurance and Control – Testing, Verification and Validation – Process model to different phases – Life Cycle Models – White Box Testing: Definition – Static Testing: Static Testing by Human-Static Analysis Tools – Structural testing: Code Functional Testing-Code Coverage Testing-Code Complexity Testing-Challenges.								
Unit – II	**Black Box Testing:**							**9**
Definition – Why and When to do black box testing – How to do black box testing – Integration Testing: Definition – Types – Phase of testing – Scenario Testing – Defect bash.								
Unit – III	**System and Acceptance Testing:**							**9**
Overview – Functional versus Non-functional testing – Functional System Testing – Non-Functional Testing – Acceptance Testing– Summary of testing phases.								
Unit – IV	**Performance Testing:**							**9**
Introduction – Factors Governing Performance testing – Methodology – Tools – Process – Challenges – Regression Testing: Definition – Types – When and How to do Regression testing.								
Unit – V	**Test Management and Automation:**							**9**
Test Planning – Test Management – Test process – Test Reporting – Software Test Automation: Definition – Skills – Scope of Automation – Design and Architecture – Generic Requirements – Process model.								
LIST OF EXPERIMENTS/EXERCISES:								
1.	Construct a java program to implement the binary search algorithm to determine the independent paths of execution. Derive the test cases, execute and discuss the test results. (Test cases may include: Zero, one, two or n elements in the array, sorted array, unsorted array)							
2.	Construct a java program to find the prime numbers between 1 to 100 and perform the following testing • Code coverage • Path coverage • Conditional coverage							
3.	Write a Java program for insertion sort and find the following • Loop coverage • Draw a control flow graph • Find the cyclomatic complexity							
4.	Create a web page consisting of the registration form and perform the positive and negative testing.							
5.	Construct a java program to find the Armstrong numbers between n to m. Write the test cases to check the boundaries of the range, execute it and analyze the results. (Check for n-1, n, n+1 and m-1, m, m+1)							
6.	Perform the record and play back using Selenium.							
7.	Write a java program to Open a Web Page using Chrome, Firefox browser and fetch the webpage details.							
8.	Create a simple test plan and analyze how performance of a web application can be measured using Apache Jmeter/Selenium.							
9.	Develop a java code for identifying the web elements using tag name, link text, id and Xpath and to navigate between Webpages.							
10.	Design a simple test script to validate each field of the registration page							
	Lecture:45, Practical:30, Total:75							
TEXT BOOK:								
1	Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing: Principles and Practices", 1st Edition, Pearson Education, 2020.							
REFERENCES:								
1	Paul Ammann and Jeff Offutt, "Introduction to Software Testing", 2nd Edition, Cambridge University Press, 2017.							
2	Ali Mili, FairouzTchier, "Software Testing: Concepts and Operations", 1st Edition, John Wiley &Sons,Inc, 2015.							

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	create test cases to perform various white box testing	Applying (K3)
CO2	apply Black Box testing based on chosen application	Applying (K3)
CO3	correlate the functional and non functional testing to evaluate the system compliance with specified requirements	Analyzing (K4)
CO4	analyze the performance of the applications using performance testing tools.	Analyzing (K4)
CO5	execute the scripts to perform the tests using automation tools.	Applying (K3)

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	1	2	1	3				2			2	3
CO2	2	1	2	1	3				2			2	3
CO3	3	2	1	1	2				3			3	3
CO4	3	2	1	1	2				3			3	3
CO5	2	1	2	1	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	-	25	75	-			100
CAT2	-	25	55	20			100
CAT3	-	30	55	15			100
ESE	-	30	60	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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P. Glokila
(P. Glokila Bindhu)

24BCC42 - BIG DATA ANALYTICS								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme& Branch	**B.Sc& Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**DATABASE MANAGEMENT SYSTEMS**	**4**	**PC**	**3**	**0**	**2**	**NE**	**4**
Preamble	This course imparts the knowledge about Big Data, develops skill set in analyzing of Big data and get insights on data streaming.							
Unit – I	**Digital Data and Big Data:**							**9**
Types of Digital Data: Classification of Digital Data – Introduction to Big Data: Characteristics of Data – Evolution – Definition – Challenges – Volume, Velocity and Variety – Other Characteristics of Big Data – Need for Big Data – Information Consumer or We Produce Information – Traditional BI vs Big Data – Typical Data Warehouse Environment – Hadoop Environment – New Today – Changing in Realms of Big Data.								
Unit – II	**Big Data Analytics and Technology Landscape:**							**9**
Big Data Analytics: Introduction – Sudden Hype – Classifications of Analytics – Greatest Challenges – Top Challenges Facing Big Data – Importance of Big Data Analytics – Kind of Technologies – Data Science – Data Scientist – Terminologies Used in Big Data Environment– Base – Top Analytical Tools – Big Data Technology Landscape: NoSQL – Hadoop.								
Unit – III	**Hadoop and Map Reduce:**							**9**
Hadoop: Introduction – Need for Hadoop – Why not RDBMS – RDBMS vs Hadoop – Distributed Computing Challenges – History – Hadoop Overview – Use Case of Hadoop – Hadoop Distributors – Hadoop Distributed File System – Processing Data with Hadoop – Managing Resources and Applications with Hadoop Yarn – Interacting with Hadoop Eco System – Map Reduce Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression.								
Unit – IV	**Cassandra:**							**9**
Apache Cassandra – Features of Cassandra – CQL Data Types – CQLSH – Keyspaces – CRUD – Collections – Using a Counter – Time to Live –Alter Commands – Import and Export – Querying System Tables – Practice Examples.								
Unit – V	**Spark and Streaming:**							**9**
Spark and Big data analytics: Introduction – Spark – Introduction to data analysis with Spark – Programming using RDD and MLIB – Data ETL – Analyting, Reporting and Visualizing.								
LIST OF EXPERIMENTS / EXERCISES:								
1.	Perform file management tasks using Hadoop commands.							
2.	Write a Map Reduce program to count the frequency of each word in a text file							
3.	Implement Cassandra CRUD operation in database							
4.	Perform the following operations in Cassandra collections • Creating sets, maps andlists • Adding elements to thecollections • Removing elements fromlist							
5.	Apply the commands to import and export data from/to CSV file in Casandra.							
Lecture:45, Practical:30, Total:75								
TEXT BOOK:								
1	Seema Acharya , Subhashini Chellapan, "Big Data And Analytics", 2nd Edition, Wiley, 2019 (for Unit I,II,III,IV).							
2.	Raj Kamal, Preeti Saxena , "Big Data Analytics, Introduction to Hadoop, Spark, and Machine–Learning",1st Edition, McGraw Hill Education Private Limited,2019 (for Unit V).							
REFERENCES:								
1.	Bill Franks, "Taming the Big Data Tidal Wave", 1st Edition, Wiley Reprint, 2014.							
2.	DJ Editorial Services, "Big Data Black Book", 1st Edition, Dreamtech Press, 2016.							

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Make use of digital data and big data concepts	Applying (K3) Manipulation(S2)
CO2	utilize big data analytics and technology landscape	Applying (K3) Manipulation(S2)
CO3	experiment Hadoop and map reduce framework	Applying (K3) Manipulation(S2)
CO4	examine the Cassandra query expressions	Analyzing(K4) Precision (S3)
CO5	analyze Spark tool to process real time data from various sources	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	1	2	1	3	2		2				2	3
CO2	2	1	2	1	3	2		2				2	3
CO3	2	1	2	1	3	2		2				2	3
CO4	3	3	2	1	2	3		1				3	3
CO5	3	3	2	1	1	2		3				3	3

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

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	-	70	30	-			100
CAT2	-	40	60	-			100
CAT3	-	30	50	20			100
ESE	-	25	55	20			100

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

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ACADEMIC CELL * KONGU ENGINEERING COLLEGE *

S. Poorani
[S. POORANI]

24BCL41– MACHINE LEARNING LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem.**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Python Programming**	**4**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course provides the knowledge in Machine Learning platform and emphasizes on developing real time applications by applying Machine Learning algorithms.

LIST OF EXPERIMENTS / EXERCISES:

1.	Study of IDE and Cloud platform Spyder, Jupyter Notebook and Data repositories UCI and Kaggle
2.	Calculate mean, median, variance and standard deviation of the given numerical data
3.	Demonstrate plotting techniques and explore the relationship between variables of numerical data
4.	Implement k–NN algorithm for the given data.
5.	Write a program to find the attribute with maximum information gain and gain ratio for the given data
6.	Apply support vector machines algorithm
7.	Implement simple Linear regression algorithm
8.	Implement k–means clustering algorithm for the given data
9.	Explore various activation functions used in ANN
10.	Implement single layer Artificial Neural Network Architecture

Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Jupyter Notebook/Spyder/ Google Colab Cloud platform/Scikit–learn package

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	perform various data processing and plotting techniques	Applying (K3), Manipulation (S2)
CO2	apply classification and clustering algorithms on the given data set	Applying (K3), Precision (S3)
CO3	develop a real time application using artificial neural network.	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	2					3	2	2	3
CO2	3	2	1	1	2					3	2	2	3
CO3	3	2	1	1	3					3	2	2	3

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

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(N.T. Renukadevi)

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24BCL42 – MOBILE APPLICATION DEVELOPMENT LABORATORY								
(Common to Computer Systems and Design, Information Systems & Software Systems branches)								
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**MP**	**Credit**
Prerequisites	**Java Programming Laboratory**	**4**	**PC**	**0**	**0**	**4**	**-**	**2**

Preamble	This course provides the knowledge in the basic concepts of android programming and it emphasis on the development of simple android applications

LIST OF EXPERIMENTS / EXERCISES:

1.	Explore the android studio environment and display the "Hello World" Message.
2.	Implementation of simple activity.
3.	Implementation of fragments within the activity.
4.	Create Intents to establish connection between the Activities.
5.	Implementation of dialogs to interact with the users.
6.	Design the application with different views
7.	Develop a simple calculator application
8.	Create application to handle images using Grid view and image switcher.
9.	Implementation of option menu and Context Menu
10.	Create a SQLite Database application.

Total:60

REFERENCES/ MANUAL /SOFTWARE:

1.	Laboratory Manual

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	develop application using activities, fragments and intents.	Applying (K3), Manipulation (S2)
CO2	design the need based applications using views, view groups and images.	Applying (K3), Precision (S3)
CO3	create applications to handle menus and data storage.	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								2	3
CO2	3	2	1	1								2	3
CO3	3	2	1	1								2	3

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

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P. Gokila

(P. Gokila Brindha)

PG

24GCL42 - PROFESSIONAL SKILLS TRAINING - II							
(Common to Computer Systems and Design, Information Systems & Software Systems branches)							
Programme & Branch	**B.Sc & Computer Systems and Design, Information Systems, Software Systems branches**	**Sem**	**Category**	**L**	**T**	**P**	**Credit**
		4	**EC**	**0**	**0**	**4**	**2**
Preamble	This subject is to enhance the employability skills and to develop career competency						
Prerequisites	Nil						
UNIT - I	**Soft Skills - II**						**20**
Group discussions: Advantages of group discussions-Structured GD- Team work: Value of team work in organizations- Definition of a team, why team-Elements of leadership, disadvantages of a team, stages of team formation- Group development activities. Facing an interview: Foundation in core subject- industry orientation / knowledge about the company- professional personality- Communication skills-Activities before Interview, upon entering interview room, during the interview and at the end Mock interviews.							
UNIT-II	**Quantitative Aptitude & Logical Reasoning - II**						**30**
Problem solving level II: Mixtures and Allegations-Simple interest and Compound interest- Geometry I(Angels and Triangles)-Geometry II (Circles and Quadrilaterals)- Mensuration -Trigonometry-Heights and Distances-Algebra-Progressions-Data Interpretation-Logical Reasoning-Direction Sense – Decision Making-Input output-Analogies-Letter Series-Odd one out-Number Series-Logical Deductions-Syllogism-Clocks-Analytical Puzzles- Comparison and Distributions-order and Ranking-Venn Diagrams							
UNIT - III	**Grammar, Vocabulary, Listening, Speaking, Reading & Writing**						**30**
Grammar: Direct & Indirect Speeches - Active & Passive voice - Vocabulary: Technical vocabulary - Unscrambling words - Spotting errors - Assertion and Reason - Verbal puzzle - Pair words - Logical sequence of words - Listening: Short extracts - Structured talks - classroom lectures - Speaking: Telephonic conversations - Technical project presentations - Effective public speaking - Role Play - Negotiation skills - Mock Interview - Sharing of real time experience - Pair discussion - Life skills - Team Management - Leadership skills - Group Discussion - Reading: Stress & Intonation - Effective reading strategies - Reading News articles - Notices & book reviews - GATE type reading comprehension - Newspaper reading - Writing: Summary Writing - Review of real time interviews/Competitive examinations							
							Total:80
Textbook:							
1	Edgar Thorpe and Showick Thorpe, "Objective English for Competitive Examination", 6th Edition, Pearson India Education Services Pvt. Ltd, 2017.						
References:							
1	Aruna Koneru, "Professional Speaking Skills," Oxford University Press India, New Delhi, 2015.						
2	Edgar Thorpe and Showick Thorpe, "Winning at Interviews," 5th Edition, Pearson Education India, 2013.						

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	develop the soft skills of learners to support them work efficiently in an organization as an individual and as a team	Applying (K3), Precision (S3)
CO2	solve real time problems using numerical ability and logical reasoning	Applying (K3), Precision (S3)
CO3	apply English language skills for various academic and professional purposes	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				3		3		3	2		
CO2	3	2				3		3		3	2		
CO3		2					3		3	3	3	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		50	50				100
ESE	NA						

*±3% may be varied (CAT 1,2 – 30 marks (Aptitude), CAT 3-20 marks (English))

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P. Gokila
(P. Gokila Brindha)

24BCP41 – MINI PROJECT							
Programme & Branch	**B.Sc & Computer Systems and Design**	**Sem.**	**Category**	**L**	**T**	**P**	**Credit**
Prerequisites	**Programming Languages**	**4**	**EC**	**0**	**0**	**2**	**1**

Preamble	It provides practical exposure to the students and an opportunity to apply the computational mathematics concepts to solve the real world problems. It also gives opportunity to the students to work in a team.

Total: 30

COURSE OUTCOMES: On completion of the course, the students will be able to		**BT Mapped (Highest Level)**
CO1	formulate specific problem statements for ill-defined real life problems with reasonable assumptions and constraints	Creating (K6), Precision (S3)
CO2	perform literature search in the area of interest.	Evaluating (K5), Precision (S3)
CO3	conduct experiments, design and analysis, solution iterations and document the results.	Evaluating (K5), Precision (S3)
CO4	perform error analysis and synthesize the results and arrive at scientific conclusions.	Evaluating (K5), Precision (S3)
CO5	document the results in the form of technical report and give oral presentation	Creating (K6), 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	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO4	3	3	3	2	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3

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

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S. Parvathavarthini
[S. PARVATHAVARTHINI]

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