M.Tech Computer Science and Engineering(5years integrated)

CURRICULUM AND SYLLABI

I to IV Semesters

Regulation- 2023

EXcēl
ENGINEERINGCOLLEGE
(Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Accredited by NBA and NAAC with "A+"and Recognized by UGC (2f&12B)

KOMARAPALAYAM–637303

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KOMARAPALAYAM–637303

Department of M.Tech Computer Science and Engineering
(5 Years Integrated)
REGULATION 2023
I to X Semesters Curriculum

I SEMESTER									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MA101	Linear Algebra and Differential Calculus	BS	3	1	0	4	40	60	100
23MCS101	Problem Solving using C	PC	3	0	0	3	40	60	100
23LET07	Heritage of Tamil (தமிழர் மரபு)	HSS	1	0	0	1	100	0	100
Theory with Practical Course(s)									
23EN101	Business English Communication	HSS	2	0	2	3	50	50	100
23PH101	Engineering Physics	BS	3	0	2	4	50	50	100
Practical Course(s)									
23MCS102	C Programming Laboratory	PC	0	0	2	1	60	40	100
23ME101	Engineering Graphics	ES	2	0	2	3	60	40	100
Mandatory Course									
23MC101	Induction Programme	MC	2 Weeks			0	100	-	100
	TOTAL		14	1	8	19	400	300	700

II SEMESTER									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MA201	Calculus and Complex Variables	BS	3	1	0	4	40	60	100
23MCS201	Python Programming	PC	3	0	0	3	40	60	100
23MCS202	Data Structures	PC	3	0	0	3	40	60	100
23EE203	Basics of Electrical, Electronics and instrumentation Engineering	ES	3	0	0	3	40	60	100
23LET08	Tamils & Technology (தமிழரும்தொழில்நுட்பமும்)	HSS	1	0	0	1	100	0	100

	Theory with Practical Course(s)								
23EC203	Digital Principles and System Design	ES	3	0	2	4	50	50	100
	Practical Course(s)								
23MCS203	Python Programming Laboratory	PC	0	0	2	1	60	40	100
23MCS204	Data Structures Laboratory	PC	0	0	2	1	60	40	100
	Mandatory Course								
23MC201	Environmental Sciences	MC	2	0	0	0	100	-	100
23EN201	Effective Communication Skills	MC	2	0	0	0	100	-	100
	TOTAL		20	1	6	20	630	370	900

III SEMESTER									
			Periods /Week				Maximum Marks		
Code No.	Course	Category	L	T	P	C	CA	FE	Total
	Theory Course(s)								
23MA302	Probability and Statistics	BS	3	1	0	4	40	60	100
23MCS301	Operating Systems	PC	3	0	0	3	40	60	100
23MCS302	Design and Analysis of Algorithms	PC	3	0	0	3	40	60	100
23MCS303	Computer Architecture	PC	3	0	0	3	40	60	100
	Theory with Practical Course(s)								
23MCS304	Object Oriented Programming	PC	3	0	2	4	50	50	100
	Practical Course(s)								
23MCS305	Operating Systems Laboratory	PC	0	0	3	2	60	40	100
	Mandatory course								
23MC301	Design Thinking	MC	1	2	0	3	50	50	100
	TOTAL		16	3	5	22	320	380	700

IV SEMESTER									
			Periods /Week				Maximum Marks		
Code No.	Course	Category	L	T	P	C	CA	FE	Total
	Theory Course(s)								
23MA401	Numerical Methods	BS	3	1	0	4	40	60	100
23MCS401	Database Management Systems	PC	3	0	0	3	40	60	100
23MCS402	Theory of Computation	PC	3	0	0	3	40	60	100
23MCS403	Software Engineering	PC	3	0	0	3	40	60	100

Theory with Practical Course(s)									
23EC408	Microcontrollers	ES	3	0	2	4	50	50	100
Practical Course(s)									
23MCS404	Database Management Systems Laboratory	PC	0	0	3	2	60	40	100
Mandatory Course									
23MC401	Soft Skills	MC	2	0	0	0	100	-	100
23MC402	Innovative Thinking And Prototyping Lab	MC	0	0	4	2	50	50	100
	TOTAL		17	1	9	21	420	380	800

V SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MCS501	Data Warehousing and Mining	PC	3	0	0	3	40	60	100
23MCS502	Artificial Intelligence	PC	3	0	0	3	40	60	100
23MCS503	JEE Framework	PC	3	0	0	3	40	60	100
23MCS504	PHP and JS Framework	PC	3	0	0	3	40	60	100
23MC501	Universal Human Values	MCC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23MCS505	Computer Networks	PC	3	0	2	4	50	50	100
23MCS506	Agile Technology	PC	3	0	2	4	50	50	100
Practical Course(s)									
23MCS507	JEE and JS Framework Laboratory	PC	0	0	3	2	60	40	100
	TOTAL		21	0	7	25	360	440	800

VI SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MCS601	Compiler Design	PC	3	0	0	3	40	60	100
23MCSEXX	Professional Elective I	PE	3	0	0	3	40	60	100
23MCS602	Big Data Analytics	PC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23MCS603	Cryptography Network Security and Application Security	PC	3	0	2	4	50	50	100

23MCS604	Software Validation and Testing	PC	3	0	2	4	50	50	100
23MCS605	Mobile Application Development	PC	2	0	3	4	50	50	100
Practical Course(s)										
23MCS606	Big Data Analytics Laboratory	PC	0	0	2	1	60	40	100
23MCS607	Mini project I	EEC	0	0	2	1	50	50	100
TOTAL			17	0	11	23	380	420	800

VII SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MCSEYY	Open Elective I	OE	3	0	0	3	40	60	100
23MCSEXX	Professional Elective II	PE	3	0	0	3	40	60	100
23MCSEXX	Professional Elective III	PE	3	0	0	3	40	60	100
23MCS701	Block chain Technology	PC	3	0	0	3	40	60	100
23MCS702	Internet of Things	PC	3	0	0	3	40	60	100
23MCS703	Cloud Computing	PC	3	0	0	3	40	60	100
Practical Course(s)									
23MCS704	Block chain Technology Laboratory	PC	0	0	2	1	60	40	100
23MCS705	IoT and Cloud Laboratory	PC	0	0	2	1	60	40	100
TOTAL			18	0	4	20	360	440	800

VIII SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MCS801	Micro services and Distributed Computing Architecture	PC	3	0	0	3	40	60	100
23MCSEYY	Open Elective II	OE	3	0	0	3	40	60	100
23MG801	Banking and Insurance	HSS	3	0	0	3	40	60	100
23MCSEXX	Professional Elective IV	PE	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23MCS802	Machine Learning	PC	3	0	2	4	50	50	100
23MCS803	Front end Frameworks Engineering	PC	3	0	2	4	50	50	100
Practical Course(s)									
23MCS804	Mini Project II	EEC	0	0	4	2	50	50	100

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			L	T	P	C	CA	FE	Total
	TOTAL		18	0	8	22	310	390	700

IX SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
23MCSEXX	Professional Elective V	PE	3	0	0	3	40	60	100
23MCSEXX	Professional Elective VI	PE	3	0	0	3	40	60	100
Practical Course(s)									
23MCS901	Project Phase I	EEC	0	0	16	8	50	50	100
EMPLOYABILITY ENHANCEMENT SKILLS									
23EEC001	Employability Enhancement Skills	EEC	2 Weeks			2	100	-	100
	TOTAL		6	0	16	16	230	170	400

X SEMESTER

Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Practical Course(s)									
23MCS1001	Project Phase II	EEC	0	0	32	16	50	50	100
	TOTAL		0	0	32	16	50	50	100

HUMANITIES AND SOCIAL SCIENCES (HSS)

SNo.	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1	23LET07	Heritage of Tamil	1/0/0	3	1	100	HSS
2	23EN101	Business English Communication	2/0/2	4	3	50/50	HSS
3	23LET08	Tamils & Technology	1/0/0	3	1	100	HSS
4	23MG801	Banking and Insurance	3/0/0	3	3	60/40	HSS

BASIC SCIENCE COURSES (BS)

SNo.	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1	23MA101	Linear Algebra and Differential Calculus	3/1/0	4	4	60/40	BS
2	23PH101	Engineering Physics	3/0/2	5	4	50/50	BS
3	23MA201	Calculus and Complex Variables	3/1/0	4	4	60/40	BS
4	23MA301	Discrete Structures	3/1/0	4	4	60/40	BS
5	23MA401	Applied Probability	3/1/0	4	4	60/40	BS

ENGINEERING SCIENCE COURSES(ES)

S. No	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1	23ME101	Engineering Graphics	2/0/2	4	3	40/60	ES
2	23EE203	Basics of Electrical , Electronics and Instrumentation Engineering	3/0/3	5	3	40/60	ES
3	23EC203	Digital Principles and System Design	3/0/2	5	4	50/50	ES
4	23EC407	Microcontrollers	3/0/2	5	4	50/50	ES

PROFESSIONAL CORE COURSES (PC)

S. No	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1.	23MCS101	Problem Solving using C	3/1/0	3	3	60/40	PC
2.	23MCS102	C Programming Laboratory	0/0/2	3	1	40/60	PC
3.	23MCS201	Python Programming	3/0/0	3	3	60/40	PC
4.	23MCS202	Data Structures	3/0/0	3	3	60/40	PC
5.	23MCS203	Python Programming Laboratory	0/0/2	2	1	60/40	PC
6.	23MCS204	Data Structures Laboratory	0/0/2	2	1	60/40	PC
7.	23MCS301	Operating Systems	3/0/0	3	3	60/40	PC
8.	23MCS302	Design and Analysis of Algorithms	3/0/0	3	3	60/40	PC
9.	23MCS303	Computer Architecture	3/0/0	3	3	60/40	PC
10.	23MCS304	Object Oriented Programming	3/0/2	5	4	50/50	PC
11.	23MCS305	Operating Systems Laboratory	0/0/3	3	2	60/40	PC
12.	23MCS401	Database Management Systems	3/0/0	3	3	60/40	PC
13.	23MCS402	Theory of Computation	3/0/0	3	3	60/40	PC
14.	23MCS403	Software Engineering	3/0/0	3	3	60/40	PC
15.	23MCS404	Database Management Systems Laboratory	0/0/3	3	2	60/40	PC
16.	23MCS501	Data Warehousing andMining	3/0/0	3	3	60/40	PC
17.	23MCS502	Artificial Intelligence	3/0/0	3	3	60/40	PC
18.	23MCS503	JEE Framework	3/0/0	3	3	60/40	PC
19.	23MCS504	PHP and JS framework	3/0/0	3	3	60/40	PC
20.	23MCS505	Computer Networks	3/0/2	5	4	50/50	PC
21.	23MCS506	Agile Technology	3/0/2	5	4	50/50	PC
22.	23MCS507	JEE and JS Framework Laboratory	0/0/4	4	2	60/40	PC
23.	23MCS601	Compiler Design	3/0/0	3	3	60/40	PC
24.	23MCS602	Big DataAnalytics	3/0/0	3	3	60/40	PC
25.	23MCS603	Cryptography, Network				50/50	

		Security and Application Security	3/0/2	5	4		PC
26.	23MCS604	Software Validation and Testing	3/0/2	5	4	50/50	PC
27.	23MCS605	Mobile Application Development	2/0/3	5	4	50/50	PC
28.	23MCS606	Big Data Analytics Laboratory	0/0/3	3	1	60/40	PC
29.	23MCS701	Block chain Technology	3/0/0	3	3	60/40	PC
30.	23MCS702	Internet of Things	3/0/0	3	3	60/40	PC
31.	23MCS703	Cloud Computing	3/0/0	3	3	60/40	PC
32.	23MCS704	Block Chain Technology Laboratory	0/0/3	3	1	60/40	PC
33.	23MCS705	IoT and Cloud Laboratory	0/0/3	3	1	60/40	PC
34.	23MCS801	Micro services and Distributed Computing Architecture	3/0/0	3	3	60/40	PC
35.	23MCS802	Machine Learning	3/0/2	5	4	50/50	PC
36.	23MCS803	Front end Frameworks Engineering	3/0/2	5	4	50/50	PC

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1.	23MCS607	Mini project I	0/0/2	2	1	50/50	ECC
2.	23MCS804	Mini project II	0/0/4	4	2	50/50	ECC
3.	23MCS901	Project Phase I	0/0/16	16	8	50/50	ECC
4	23MCS1001	Project Phase II	0/0/32	32	16	50/50	ECC
5	23EEC001	Employability Enhancement Skills	2 weeks	2 weeks	2	100/0	ECC

PROFESSIONAL ELECTIVE COURSES(PE)

S. No	Course Code	Course Title	L/T/P	Contact Hrs/Wk	Credits	Category
Computer and Network Security						
1.	23MCS01	Mobile Ad Hocnet works	3/0/0	3	3	PE
2.	23MCS02	Mobile Computing	3/0/0	3	3	PE
3.	23MCS03	Distributed Systems	3/0/0	3	3	PE
4.	23MCS04	Wireless Sensor Networks	3/0/0	3	3	PE
5.	23MCS05	Cyber Security and Ethical Hacking	3/0/0	3	3	PE
6.	23MCS06	Advanced Databases	3/0/0	3	3	PE
7.	23MCS07	Advanced Algorithms	3/0/0	3	3	PE
8.	23MCS08	Software Product Management	3/0/0	3	3	PE
9.	23MCS09	Information Ethics and Cyber Laws	3/0/0	3	3	PE
Intelligent Systems						
10.	23MCS10	Soft Computing	3/0/0	3	3	PE
11.	23MCS11	Deep Learning	3/0/0	3	3	PE
12.	23MCS12	Human Computer Interaction	3/0/0	3	3	PE

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13.	23MCS13	Image Processing and Pattern Recognition	3/0/0	3	3	PE
14.	23MCS14	Speech and Natural Language Processing	3/0/0	3	3	PE
15.	23MCS15	Social Network Analysis	3/0/0	3	3	PE
16.	23MCS16	Optimization Techniques	3/0/0	3	3	PE
17.	23MCS17	Data Visualization	3/0/0	3	3	PE
18.	23MCS18	Computer Vision	3/0/0	3	3	PE
Thriving Electives						
19.	23MCS19	Game Theory and its Applications	3/0/0	3	3	PE
20.	23MCS20	Computing for Digital Media	3/0/0	3	3	PE
21.	23MCS21	Business Intelligence	3/0/0	3	3	PE
22.	23MCS22	Quantum Computing	3/0/0	3	3	PE
23.	23MCS23	Robotics and Embedded Systems	3/0/0	3	3	PE
24.	23MCS24	Virtual Reality	3/0/0	3	3	PE
25.	23MCS25	Parallel Computing	3/0/0	3	3	PE
26.	23MCS26	DevOps	3/0/0	3	3	PE

Open Elective Courses (OEC) offered to other departments

S. No	Course Code	Course Title	L	T	P	Credit	Ext/Int
1	23MCSO1	Multimedia Applications	3	0	0	3	60/40
2	23MCSO2	.NET Framework for Application Development	3	0	0	3	60/40
3	23MCSO3	Dependable Computing	3	0	0	3	60/40
4	23MCSO4	Business Information Systems	3	0	0	3	60/40

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SCHEME OF CREDIT DISTRIBUTION –SUMMARY

S. No	Stream	Credits /Semester										Credits	Credits in %
		I	II	III	IV	V	VI	VII	VIII	IX	X		
1.	Humanities and Science Courses (HSS)	4	1						3			8	4%
2.	Basic Science Courses(BS)	8	4	4	4							20	10%
3.	Engineering Science Courses (ES)	3	7		4							14	7%
4.	Professional Core Courses(PC)	4	8	15	11	22	19	11	11			101	50%
5.	Professional Elective (PE)						3	6	3	6		18	9%
6.	Open Electives Courses(OE)							3	3			6	3%
7.	Employability Enhancement courses (EEC)						1		2	10	16	29	13.5%
8.	Mandatory Course (MC)	No credit										0	-
9	Mandatory Credit Courses(MCC)			3	2	3						8	3.5%
	Total	19	20	22	21	25	23	20	22	16	16	204	100%

HSS - Humanities and Sciences

BS-Basic Sciences

ES – Engineering Sciences

PC-Professional Core

PE - Professional Electives

OE-Open Electives

EEC-Employability Enhancement Courses

MC - Mandatory Courses (Non-Credit Courses)

MCC- Mandatory Credit Course

CA-Continuous Assessment

FE-Final Examination

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23MA101	LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS	L	T	P	C
		3	1	0	4
Nature of Course	Basic Sciences				
Pre requisites	Higher secondary mathematics				

Course Objectives

The course is intended to

1. Study the methodologies involved in solving problems related to fundamental principles of matrices study the methodologies involved in solving problems related to fundamental principles of matrices.
2. Provide the skill to use matrix algebra techniques that is needed byengineers for practical applications
3. Learn the mathematical analysis to understand the sequences.
4. Incorporate the functions of several variables, Taylor's series expansion, Jacobins, maximum & minimum values
5. Instill the mathematical skills to solve the differential equation

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Identify the Eigen values, Eigen vectors and apply Cayley- Hamilton theorem.	Apply
CO2.	Apply the concept of orthogonal reduction to Diagonalise the given matrix	Apply
CO3.	Apply the concept of convergence in the context of sequence and series of real numbers.	Apply
CO4.	Apply functions of two variables with their visualization,	Apply
CO5.	Apply the knowledge of differential equation and extreme values of the given functions to solve the engineering problems	Apply

Course Contents:

UNIT I   MATRICES   12

Symmetric, skew — symmetric and orthogonal matrices - Characteristic equation —   Eigen values and Eigenvectors of real matrices and their properties. Cayley-Hamilton theorem.

UNIT II   LINEAR ALGEBRA   12

Orthogonal transformation of a real symmetric matrix to diagonal form. Reduction of quadratic form to canonical form by orthogonal transformation-Rank, Index, Signature and Nature.

UNIT III   SEQUENCES AND SERIES   12

Convergence and Divergence of sequences and series –Series of Positive and negative terms – Test of convergence- Comparison test - D'Alembert's ratio test- Leibnitz"s test

UNIT IV   DIFFERENTIAL CALCULUS   12

Functions of two variables-Limits and Continuity-Partial derivatives- Total derivatives — Jacobians - Maxima and Minima – Lagrangian multipliers-Taylor series.

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UNIT V ORDINARY DIFFERENTIAL EQUATIONS 12

Second and Higher order linear differential equations with constant coefficients —Cauchy's and Legendre's linear differential equations- Method of variation of parameters.

Total: 60 Periods

Text Books:

1. Grewal. B.S, "Higher Engineering Mathematics", 3rd edition, Khanna Publications, Delhi, 2019.
2. Kreyszig. E, "Advanced Engineering Mathematics" Tenth Edition, John Wiley and Sons (Asia) Limited, Singapore 2018
3. G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 13th Edition, Pearson, Reprint, 2018.

Reference Books:

1. Veerarajan. T, "Engineering Mathematics I", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2018.
2. N.P.Bali and Dr.ManishGoyal,"A Text book of Engineering Mathematics" 9th edition, Laxmi publications ltd, 2016.
3. Glyn James, —Advanced Modern Engineering Mathematics, Pearson Education, 4th edition, 2012.

Additional References:

1. https://www.coursera.org/learn/linearalgebra2
2. https://www.coursera.org/learn/differentiation-calculus
3. https://alison.com/courses/Algebra-Functions-Expressions-and-Equations

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO3	3	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO5	3	3	2	-	-	-	-	-	2	-	-	-	2	-	-
	3	High			2		Medium			1		Low			

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Remember	Online Quiz	5	
Understand	Tutorial Class/ Assignment	5	15
	Attendance	5	

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| Bloom's Category | Summative Assessment | | | |
| | Continuous Assessment Tests | | | Final Examination (60) |
	IAE-I (5)	IAE-II (10)	IAE-III (10)	
Remember	10	10	10	20
Understand	30	30	30	60
Apply	10	10	10	20
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	0	0	0

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23MCS101	PROBLEM SOLVING USING C	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core				
Pre requisites	NIL				

Course Objectives

The course is intended to
1. Understand the constructs of C Language.
2. Develop C Programs using basic programming constructs
3. Develop C programs using arrays and strings
4. Develop modular applications in C using functions
5. Develop applications in C using pointers, structures and input/output in file handling.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Demonstrate knowledge on C Programming constructs.	Understand
CO2.	Develop simple applications in C using basic constructs.	Understand
CO3.	Design and implement applications using arrays and strings.	Apply
CO4.	Develop and implement modular applications in C using functions.	Apply
CO5.	Develop applications in C using structures and pointers.	Analyze

Course Contents:

UNIT I   BASICS OF C PROGRAMMING   9
Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process

UNIT II   ARRAYS AND STRINGS   9
Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

UNIT III   FUNCTIONS AND POINTERS   9
Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT IV   STRUCTURES AND UNION   9
Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.

UNIT V   FILE PROCESSING   9
Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.

Total: 45 Periods

Passed in Board of studies Meeting

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Text Books:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2022.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, PearsonEducation, 2020.

Reference Books:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition,Pearson Education, 2022.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 2019.

Additional References:

1. http://nptel.ac.in/courses/106105085/
2. https://onlinecourses.nptel.ac.in/noc17_cs43/
3. http://raptor.martincarlisle.com/
4. https://scratch.mit.edu/

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
CO2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
CO3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
CO4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
CO5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
	3	High				2	Medium				1	Low			

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Apply	Classroom or Online Quiz	5	
Understand	Class Presentation/Power point presentation	5	15
	Attendance	5	

Summative Assessment				
Bloom's Category	Continuous Assessment Tests			Final Examination (60)
	IAE-I (5)	IAE-II (10)	IAE-III (10)	
Remember	10	10	10	10
Understand	20	20	20	40
Apply	20	20	20	50
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	0	0	0

Passed in Board of studies Meeting

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23LET07   தமிழர் மரபு   L T P C
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3

அலகு I   மொழி மற்றும் இலக்கியம்:
இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II   மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை –
**   சிற்பக் கலை:**   **3**
நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள்– பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை – இசைக் கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III   நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:   **3**
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV   தமிழர்களின் திணைக் கோட்பாடுகள்:   **3**
தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V   இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத்
**   தமிழர்களின் பங்களிப்பு:**   **3**
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

TEXT BOOKS
1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

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Passed in Board of Studies Meeting on 17.03.23   Passed in Academic Council Meeting on 27.04.23

REFERENCE BOOKS

1. பொருரை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
2. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
3. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
4. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
5. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

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23LET07   HERITAGE OF TAMILS   L T P C
                                                                             1 0 0 1

UNIT I   LANGUAGE AND LITERATURE   3
Language Families in India - Dravidian Languages – Tamil as aClassical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II   HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE   3
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III   FOLK AND MARTIAL ARTS   3
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV   THINAI CONCEPT OF TAMILS   3
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V   CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE   3
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TEXT BOOKS   **TOTAL : 15 PERIODS**

1.   தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.   கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.   கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

REFERENCE BOOKS

1.   பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
2.   Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
3.   Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
4.   Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
5.   The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

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23EN101	BUSINESS ENGLISH COMMUNICATION	L	T	P	C
		2	0	2	3

Nature of Course	Humanities
Pre requisites	Basic English

Course Objectives

The course is intended to

1. Develop the listening skills and reading practice using authentic business vocabulary.
2. Instill analytical thinking and logical reasoning.
3. Enhance LSRW skills in business related situations.
4. Make the students to communicate effectively in corporate sector using business English.
5. Prepare students for competitive exams like BEC, IELTS, TOEFL.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Acquire proficiency with business vocabulary	Apply
CO2.	Attain and enhance competence in LSRW	Create
CO3.	Apply Task- based activity to enhance an effective communication	Apply
CO4.	Apply Business English in working environment	Apply
CO5.	Produce a short research paper using the drafting process	Analyze

Course Contents:

UNIT I   9

Grammar: Business Vocabulary (from Technical Articles)- Tenses (Present, Past & Future) – Wh & Yes/No Questions – Listening: Types of Listening – Barriers of Listening - Speaking: Introducing oneself – Role play Reading: Types of Reading – Intensive reading – Extensive Reading (Prescribed Novels) – Reading Comprehension - Writing: Job Application and Resume – Instructions- Describing Favorite place – Describing Memorable day/event.

UNIT II   9

Grammar: Gerund -Active Voice and Passive Voice- Conditional clauses Listening: Inferring ideas- Listening to short monologues – Listening to Business meeting Speaking: Business Meetings – Connecting ideas- Collaborative task – Short talk on a business topics- Film Reviews – Reading: Skimming - Scanning - Reading Newspaper and Articles Writing: Caption, slogan writing and Advertisement – Business Correspondence (Circular, Agenda & Minutes).

UNIT III   9

Grammar: Business Collocations- One word substitution -Reported Speech – Listening: - Listening to Telephone calls and taking notes – Listening Lectures Speaking: Technical Presentation – Group Discussion Reading: Reading Magazines - Cloze Test Writing: Memo - E-mail - Letter calling for quotations, Replying for quotations- Placing an order and complaint letter.

UNIT IV   9

Grammar: Cause and Effect – Discourse Markers – Acronyms and Abbreviations - Modal Verbs - Relative Pronouns Listening: Listening and gap filling – Listening and Match the answers - Speaking: Likes and dislikes – Asking and giving directions Reading: Rearranging Jumbled sentence - Note making Writing: Transcoding (Bar Chart, Flow Chart) – Recommendations – General Essays / Paragraph.

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UNIT V   **9**

Grammar: Articles- Modal verbs - Homophones Homonyms - Spotting errors Listening: Listening announcements – Listening and Summing up Speaking: Impromptu speech – Presentation at a business meeting Reading: Reading and summarizing articles - Writing: Letter writing (Inviting dignitaries, Accepting and Decling Invitation) - Report writing – (Sales report, Survey & Accident)- Academic Writing.

Lab Components
1. Mini Presentation
2. Logical reasoning and Ethics in a given situation
3. Technical Presentation
4. Group Discussion
5. Extempore

Total: 45 Periods

Text Books:
1. Sumant S, "English for Engineers, Tata Mcgraw Hill Education Private Limited 2020.
2. Rizvi Ashraf M, "Effective Technical Communication", McGraw Hill Education (India)Private Limited, 2nd Edition, 2018.

Reference Books:
1. Wood, Ian, Paul Sanderson, Anne Williams, Marjorie Rosenberg, "Pass Cambridge BEC Vantage", Cengage learning. 2ndEdition. 2020.
2. Objective English Lewis, Norman, "Word Power Made Easy", Pocket Books, New York, 2019.
3. Jane Eyre, "Northanger Abbey", Strawberry Hills, NSW, 2012.

Additional References:
1. http://www.cambridgeindia.org
2. http://www.cambridgeenglish.org/exams/business-certificates/business-vantage
3. https://steptest.in

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
Cos	**Pos**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	-	-	-	-	-	-	-	1	1	1	-	1	1	1	1
CO2	-	-	-	-	-	-	-	1	1	1	-	1	1	1	1
CO3	-	-	-	-	-	-	-	3	3	1	-	2	3	2	3
CO4	-	-	-	-	-	-	-	3	3	2	-	1	3	2	3
CO5	-	-	-	-	-	-	-	3	3	2	-	1	3	2	3
	3	High			**2**	Medium				**1**	Low				

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Apply	Listening and Reading Comprehension	5	
Create	Project and Presentation	5	15
	Attendance	5	

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Bloom's Category	Summative Assessment			
	Continuous Assessment Tests			Final Examination (60)
	IAE-I (5)	IAE-II (5)	IAE-III (10)	
Remember	10	10	10	10
Understand	10	10	20	20
Apply	30	10	20	50
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	20	0	20

Passed in Board of studies Meeting   Approved in Academic Council Meeting

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23PH101	ENGINEERING PHYSICS	L	T	P	C
		3	0	2	4
Nature of Course	Basic Sciences				
Pre requisites	Fundamentals of Basic Physics				

Course Objectives

The course is intended to
1. Impart knowledge of laser and its applications.
2. Acquire knowledge of fiber optics and their applications.
3. Gain knowledge to learn thermal properties of materials and their applications.
4. Learn the electronic properties of materials like semiconductors and its applications.
5. Able to get a clear understanding of optical devices like solar cell, LED etc.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Demonstrate the types of lasers for various industrial applications.	Apply
CO2.	Explain the fabrication and applications of optical fiber	Apply
CO3.	Describe the thermal conductivity of the good and bad Conductors.	Understand
CO4.	Interpret the knowledge about semiconductor materials.	Understand
CO5.	Illustrate the working of optoelectronic devices.	Understand

Course Contents:

UNIT I   LASER PHYSICS   9

Lasers: Introduction- characteristics of laser - population of energy levels, Einstein's A and B coefficients derivation – resonant cavity – semiconductor lasers: homojunction and heterojunction – Applications of lasers - particle size determination and holography.

UNIT II   FIBER OPTICS   9

Fiber Optics: Introduction – features of optical fiber- principle, numerical aperture and acceptance angle - types of optical fibers - fabrication of optical fiber– optical fiber communication system – applications- fiber optic sensors – temperature and displacement sensors - fiber optic endoscope.

UNIT III   THERMAL PHYSICS   9

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conductivity - Forbe's and Lee's disc method: theory and experiment – thermal insulation – applications ; heat exchangers in refrigerators, ovens and solar water heaters.

UNIT IV   SEMICONDUCTOR PHYSICS   9

Introduction – properties – types - Intrinsic Semiconductors – energy band diagram – direct and indirect band gap semiconductors — carrier concentration intrinsic semiconductors- extrinsic semiconductors- N-type - P-type semiconductors—Hall effect – theory – experimental and its applications.

UNIT V   OPTICAL PROPERTIES OF MATERIALS   9

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Classification of optical materials – carrier generation and recombination processes - solar cell and photo detectors: working principle – LED: principle and working – organic LED: principle and working, advantages over LED.

Total: 45 Periods

Laboratory Components:

S.No	List of Experiments	CO Mapping	RBT
1	Determination of rigidity modulus – Torsion pendulum	CO3	Apply
2	Determination of Young's modulus by non-uniform Bendingmethod.	CO3	Apply
3	Determination of wavelength, and particle size using Laser	CO1	Apply
4	Determination of acceptance angle in an optical fiber	CO2	Apply
5	Determination of thermal conductivity of a bad conductor ByLee's Disc method	CO4	Apply
6	Determination of velocity of sound and compressibility of Liquid - Ultrasonic interferometer	CO3	Apply
7	Determination of Coefficient of viscosity of liquid	CO3	Apply

Total: 30 Periods

Text Books:
1. Bhattacharya, D.K and Poonam, T, "Engineering Physics",Oxford University Press, 3rd edition,2019.
2. M.N. Avadhanulu, M.N. &Kshirsagar P.G. TVS Arun Murthy "A Text book of Engineering Physics", Chand and company, Ltd., New Delhi, Revised Edition, 2019.
3. William D.Callister,Jr and David. G.Bethwisch, "Materials Science and Engineering",John Wiley & Sons, Inc,9th edition, 2019.

Reference Books:
1. Serway, R.A. & Jewett, J.W, "Physics for Scientists and Engineers", Cengage Learning, 9th edition, 2019.
2. Raghavan, V. "Materials Science and Engineering, A First course", PHI Learning, 7th edition, 2019.
3. Halliday, D, Resnick, R and Walker, J, "Principles of Physics", Wiley, 10th edition, 2014.

Additional References:
1. https://nptel.ac.in/courses/115/107/115107095/
2. https://www.coursera.org/lecture/fe-exam/stresses-in-beams-strains-in-pure-and-nonuniform-bending-6aMRx
3. https://nptel.ac.in/courses/115/105/115105099/#

Web References:
1. https://nptel.ac.in/courses/115/107/115107095/
2. https://www.coursera.org/lecture/fe-exam/stresses-in-beams-strains-in-pure-and-nonuniform-bending-6aMRx
3. https://nptel.ac.in/courses/115/105/115105099/#
4. https://www.youtube.com/watch?v=uv0LxMoalEQ

Passed in Board of studies Meeting

Approved in Academic Council Meeting

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Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1												
CO2	3	1	1												
CO3	3	2	1												
CO4	3	1	1												
CO5	3	1	1												
	3	High			2		Medium				1		Low		

Bloom's Level	Summative assessment					
	Continuous Assessment					Final Examination (Theory) [50marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	12	12	12		-	30
Understand	34	34	28		40	60
Apply	4	4	4		60	4
Analyze	-	-	6		-	6
Evaluate	-	-	-		-	-
Create	-	-	-		-	-

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23MCS102	C PROGRAMMING LABORATORY	L	T	P	C
		0	0	2	1
Nature of Course	Professional Core				
Pre requisites	NIL				

Course Objectives

The course is intended to

1. Familiarize with C programming constructs.
2. Develop programs in C using basic constructs.
3. Develop programs in C using arrays.
4. Develop applications in C using strings, pointers, functions.
5. Develop applications in C using structures and file processing.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Demonstrate knowledge on C programming constructs.	Apply
CO2	Develop programs in C using basic constructs.	Apply
CO3	Develop programs in C using arrays.	Apply
CO4	Develop the programming in C using strings, pointers, functions.	Apply
CO5	Develop applications in C using structures and file processing.	Apply

Course Content:
List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	I/O statements, operators, expressions.	CO1	Understand
2	Decision-making constructs: if-else, goto, switch-case, break-Continue.	CO2	Understand
3	Loops: for, while, do-while.	CO3	Apply
4	Arrays: 1D and 2D, Multi-dimensional arrays, traversal.	CO3	Apply
5	Strings: operations.	CO4	Apply
6	Functions: call, return, passing parameters by (value, reference), passing arrays to function.	CO4	Analyze
7	Recursion.	CO4	Apply
8	Pointers: Pointers to functions, Arrays,Strings, Pointers to Pointers, Array of Pointers.	CO4	Analyze
9	Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.	CO5	Analyze
10	Files: reading and writing, File pointers, file operations, random access, processor directives.	CO5	Apply

Passed in Board of studies Meeting

CHAIRMAN - BOARD OF STUDIES

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TOTAL: 60 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	2	1	-	-	-	-	2	1	2	2	2	2	3
CO2	3	3	1	1	-	-	-	-	1	1	1	3	1	2	2
CO3	2	1	3	1	-	-	-	-	1	1	2	3	3	3	3
CO4	3	1	3	3	-	-	-	-	1	2	3	3	2	1	2
CO5	3	2	1	1	2	-	-	-	3	3	3	1	3	1	3
	3	High			2		Medium			1		Low			

Summative assessment based on Continuous and End Semester Examination

Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember		
Understand	10	30
Apply	20	50
Analyze	20	20
Evaluate		
Create		

23ME101	Engineering Graphics	L	T	P	C
		2	0	2	3
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

Course Objectives:

The course is intended to

1. Understand technical drawings in various fields of engineering
2. Imagine and visualize the geometric details of engineering objects.
3. Translate the geometric information of engineering objects into engineering drawings.
4. Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
5. Visualize and draw isometric and perspective views

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the conic sections, special curves, and draw orthographic views from pictorial views.	Apply
CO 2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	Apply
CO 3	Construct the projections of simple solids like prisms, pyramids, cylinder and cone.	Apply
CO 4	Build the sectional views of solids like cube, prisms, pyramids, cylinders & cones and development of its lateral surfaces.	Apply
CO 5	Organize and draw isometric and perspective sections of simple solids.	Apply

Course Contents

Concepts and Conventions (Not for Examination)   1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT -I   Plane Curves and Free Hand Sketching   (3+12)

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT –II   Projection of Points, Lines and Plane Surfaces   (3+12)

Orthographic projection- principles-Principal Planes-First angle projection-projection of points Projection of straight lines (only First angle projections) inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT –III   Projection of Solids   (3+12)

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

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UNIT- IV   Projection of Sectioned Solids and Development of Surface   (3+12)

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section, Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNIT -V   Isometric and Perspective Projections   (3+12)

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

TOTAL: (15+60)   Periods

TEXT BOOKS

1. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2012.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2011.

REFERENCE BOOKS

1. ParthasarathyN S and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
2. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2010.
3. BasantAgarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Web References

1. http://nptel.ac.in/courses/112103019/Engineering drawing
2. http://pioneer.netserv.chula.ac.th/~kjirapon/self-practice.html

Publication of Bureau of Indian Standards

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable only to Final Examinations of Engineering Graphics:

1. There will be five questions, each of either-or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

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COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2										1	2		
CO2	3	2										1	2		
CO3	3	2										1	2		
CO4	3	3										1	2		
CO5	3	2										1	2		
	3		High			2		Medium			1		Low		

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Bloom's Level	Summative assessment					
	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory				Practical	
	IAE-I [5]	IAE-II [5]	IAE-III [10]	Attendance [5]	Rubric based CA [10 Marks]	
Remember	10	10	10		20	20
Understand	20	20	20		40	40
Apply	20	20	20		40	40
Analyze						
Evaluate						
Create						

23MC101	Induction Programme	L	T	P	C
		2	0	0	0
Nature of Course	Mandatory, Non Credit				
Pre requisites	Completion of Schooling at Higher Secondary Level				

Course Objectives

The course is intended to
1. To nurture the character and behavior as a student.
2. To have broad understanding of society and relationships.
3. To impart interpersonal and soft skills.
4. To inspire the students in the field of engineering.
5. To provide exposure to industries.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Perform curricular and co-curricular activities excellently.	Knowledge
CO 2	Do the skill based training with excellence.	Understand
CO 3	Work as team for the given task	Apply
CO 4	Gain character and behavior	Knowledge
CO 5	Demonstrate the acquired skills effectively	Apply

Course Contents PHYSICAL ACTIVITY

Yoga, Sports

CREATIVE ARTS (students can select any one of their choice) Painting, sculpture, pottery, music, craft making and so on **UNIVERSAL HUMAN VALUES**
Enhancing soft skills

LITERARY AND PROFICIENCY MODULES

Reading, Writing, Speaking- Debate, Role play etc., Communication and computer skills

LECTURES BY EMINENT PEOPLE

Guest lecture by subject experts

VISIT TO LOCAL CITIES

Meditation centers / Industry

FAMILARIZATION TO DEPARTMENT / BRANCH INNOVATION

Lectures by Departments Head and senior faculty members

Total Hours: 45

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Mapping of COs with POs and PSOs

COs	Pos												PSOs		
Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	1	2				3	2		
CO2						2	1	2				3	2		
CO3						2	1	2				3	2		
CO4						2	1	2				3	2		
CO5						2	1	2				3	2		
	3			High		2			Medium			1	Low		

Bloom's Level	Continuous Assessment (Non-Credit, Mandatory)				
	Test -I [20]	Test -II [20]	Test - III [20]	Assignment/ Activity [20]	Attendance [20]
Remember	10	10	10		
Understand	20	20	20	10	
Apply	20	20	20	10	
Analyze					
Evaluate					
Create					

23MA201	CALCULUS AND COMPLEX VARIABLES	L	T	P	C
		3	1	0	4
Nature of Course	Basic Sciences				
Pre requisites	Higher secondary mathematics				

Course Objectives

The course is intended to

1. Gain knowledge in improper integrals, Gamma and Beta functions which are needed in engineering applications.
2. Develop logical thinking and analytical skills in evaluating multiple integrals.
3. Apply the concepts of vector calculus in Engineering disciplines.
4. Obtain knowledge of analytic approach to analyze the conformal mapping.
5. Learn the concept of complex integration to evaluate definite integrals.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply the basic integration formulae and understand Beta and Gamma Functions	Apply
CO2	Compute double and triple integrals	Apply
CO3	Apply the concepts of integration in evaluating engineering problems related to area, volume and vector point functions	Apply
CO4	Identify the concepts of analytic functions and its properties and apply it in conformal mapping.	Apply
CO5	Determine the singularities and its corresponding residues for the given function	Apply

Course Content:

UNIT-I   INTEGRAL CALCULUS   12
Evaluation of definite integrals using Bernoulli's formula. Beta and Gamma functions- Relation - Evaluation of Integrals

UNIT-II   MULTIPLE INTEGRALS   12
Double and Trible integration in Cartesian coordinates –Area and Volume by Iterated Integrals.

UNIT-III   VECTOR CALCULUS   12
Vector differential operator- Gradient and Directional derivatives of a scalar point function - Divergence and Curl of a vector point function-Integration in vector field- Green's theorem-Gauss divergence theorem– Applications involving cubes and rectangular parallelepipeds.

UNIT-IV   COMPLEX DIFFERENTIATION   12
Analytic Functions – Cauchy-Riemann equations – Harmonic functions- Conjugate harmonic functions –Construction of analytic functions – Conformal mapping. Transformation: w = cz, 1/z and Bilinear transformation.

UNIT-V   COMPLEX INTEGRATION   12
Cauchy Integral theorem – Cauchy Integral formula – Laurent's series – singularities and Zeros – Residues – Cauchy Residue theorem.

TOTAL: 60 Periods

Passed in Board of studies Meeting

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Text Books:
1. G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 13th Edition,Pearson, Reprint, 2014.
2. Kreyszig. E, "Advanced Engineering Mathematics" Tenth Edition, John Wiley and Sons (Asia) Limited, Singapore 2014
3. Grewal. B.S, "Higher Engineering Mathematics", 43rd edition, Khanna Publications, Delhi, 2014

Reference Books:
1. Veerarajan. T, "Engineering Mathematics II",Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2018.
2. N.P.Bali and Dr.ManishGoyal,"A Text book of Engineering Mathematics" 9th edition, Laxmi publications ltd, 2016.
3. Glyn James, —Advanced Modern Engineering Mathematics, Pearson Education, 4th edition, 2012.

Additional References:
1. http://nptel.ac.in/video.php?subjectId=117102060
2. https://www.coursera.org/leam/pre-calculus
3. https://alison.com/courses/Advanced-Mathematics-1

Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	1	-	-	-	-	-	1	-	-	2	1	2	1
CO2	3	3	1	-	-	-	-	-	2	-	-	3	2	3	2
CO3	3	3	2	-	-	-	-	-	3	-	-	3	3	3	3
CO4	3	3	2	-	-	-	-	-	3	-	-	3	3	3	3
CO5	3	3	2	-	-	-	-	-	3	-	-	1	3	3	3
	3	\multicolumn{3}{c}{High}			2	\multicolumn{3}{c}{Medium}			1	\multicolumn{3}{c}{Low}		

Mapping of Course Outcomes (Cos) with Programme Outcomes (Pos) Programme Specific Outcomes (PSOs)

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz	5	
Understand	Tutorial Class/ Assignment	5	15
	Attendance	5	

Bloom's Category	Summative Assessment			
	Continuous Assessment Tests			Final Examination (60)
	IAE-I (5)	IAE-II (10)	IAE-III (10)	
Remember	10	10	10	20
Understand	30	30	30	60
Apply	10	10	10	20
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	0	0	0

Passed in Board of studies Meeting

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Approved in Academic Council Meeting

23MCS201	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core				
Pre requisites	NIL				

Course Objectives

The course is intended to
1. Think logically and write algorithm and draw flow charts for problems.
2. Read and write simple Python programs.
3. Develop Python programs with conditionals and loops.
4. Define Python functions and call them.
5. Use Python data structures — lists, tuples, dictionaries and files.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Develop algorithmic solutions to simple computational problems and read, write, execute by simple python programs.	Apply
CO2	Structure simple python programs for solving problems.	Understand
CO3	Administer the role of control statements and functions involving the idea of modularity.	Apply
CO4	Represent compound data using python strings and lists.	Apply
CO5	Read and write data from/to files in python Programs.	Understand

Course Contents:

Unit I   Basics of Computers & Problem Solving   9

Computer Basics – Components-Computer organization - Computer Software- Types of software - Software Development steps -Need for logical analysis and thinking- Algorithms – Flowchart - Number system.

Unit II   Introduction of Python Programming   9

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, Input and Output Statements.

Unit III   Control statements and Functions   9

Conditional (if), alternative (if-else), chained conditional (if-elif-else)-Iteration-while, for, break, continue, pass – Functions - Introduction, inbuilt functions, user defined functions, passing parameters, return values, recursion, Lambda functions.

Unit IV   Strings and Lists   9

Strings-String slices, immutability, string methods and operations -Lists-creating lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions-list processing-list comprehension, searching and sorting.

Unit V   Tuples, Dictionaries and Files   9

Tuples- Tuple assignment, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Files and Exception-Text files, reading and writing files, format Operator, Exception handling.

TOTAL: 45 Periods

Passed in Board of studies Meeting

CHAIRMAN - BOARD OF STUDIES

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Text Books:
1. Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2021 , 2nd Edition.
2. Dr. R. Nageswara Rao, "Core Python Programming", Dreamtech Press, 2021 2nd Edition.

Reference Books:
1. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2019.
2. Ashok NamdevKamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" ,Mc-Graw Hill Education, 2020.
3. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2022.
4. Timothy A. Budd," Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2019.

Additional References:
1. https://www.wileyindia.com/introduction-to-computer-science-using-python.html
2. https://www.programiz.com/python-programming
3. https://www.fullstackpython.com/best-python-resources

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)

COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1										3	1	
CO2	3	2	1										3	1	
CO3	3	2	2										3	1	
CO4	3	2	2										3	1	
CO5	3	2	2										3	1	
	3	High			2		Medium					1	Low		

Formative assessment

Bloom's Level	Assessment Component	Marks	Total marks
Remember	Classroom or Online Quiz	5	
Understand	Class Presentation/Power point presentation	5	15
	Attendance	5	

Summative Assessment

Bloom's Category	Continuous Assessment Tests			Terminal Examination (60)
	IAE1 (5)	IAE2 (10)	IAE3 (10)	
Remember	10	10	10	20
Understand	20	20	20	50
Apply	20	20	20	30
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	0	0	0

Passed in Board of studies Meeting

CHAIRMAN - BOARD OF STUDIES

Approved in Academic Council Meeting

23MCS202	DATA STRUCTURES	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core				
Pre requisites	Problem Solving using C				

Course Objectives

The course is intended to
1. Understand the concepts of ADTs.
2. Learn linear data structures – lists, stacks, and queues.
3. Understand non-linear data structures – trees and graphs.
4. Understand sorting, searching and hashing algorithms.
5. Apply Tree and Graph structures.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Define linear and non-linear data structures.	Understand
CO2.	Implement linear and non–linear data structure operations.	Understand
CO3.	Use appropriate linear/non–linear data structure operations for solving a given problem.	Apply
CO4.	Apply appropriate graph algorithms for graph applications.	Apply
CO5.	Analyze the various searching and sorting algorithms.	Analyze

Course Contents:

UNIT I LISTS   9
Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT Radix Sort – Multilists.

UNIT II STACKS AND QUEUES   9
Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions- Infix to Postfix conversion – Function Calls – Queue ADT – Operations – Circular Queue – DeQueue – Applications of Queues.

UNIT III TREES   9
Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap.

UNIT IV MULTIWAY SEARCH TREES AND GRAPHS   9
B-Tree – B+ Tree – Graph Definition – Representation of Graphs – Types of Graph - Breadth-first traversal – Depth-first traversal –– Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES   9
Searching – Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Shell sort –, Merge Sort – Hashing – Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

Total: 45 Periods

Passed in Board of studies Meeting   Approved in Academic Council Meeting

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Text Books:
1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, PearsonEducation, 2022.
2. Kamthane, Introduction to Data Structures in C, 2nd Edition, Pearson Education, 2020.

Reference Books:
1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2022.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction toAlgorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2020.
3. Alfred V. Aho, Jeffrey D. Ullman,John E. Hopcroft ,Data Structures and Algorithms, 1st edition, Pearson, 2019.

Additional References:
1. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
2. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
3. https://www.geeksforgeeks.org/data-structures/

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
CO2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
CO3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
CO4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
CO5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
	3	High			2	Medium			1	Low					

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Apply	Classroom or Online Quiz	5	
Understand	Class Presentation/Power point presentation	5	15
	Attendance	5	

Summative Assessment				
Bloom's Category	Continuous Assessment Tests			Final Examination (60)
	IAE-I (5)	IAE-II (10)	IAE-III (10)	
Remember	10	10	10	10
Understand	20	20	20	40
Apply	20	20	20	50
Analyze	0	0	0	0
Evaluate	0	0	0	0
Create	0	0	0	0

Passed in Board of studies Meeting

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Approved in Academic Council Meeting

23EE203	BASICS OF ELECTRICAL , ELECTRONICS AND INSTRUMENTATION ENGINEERING (Common to PCT & M.TECH- CSE)	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core				
Pre requisites	Engineering Science				

Course Objectives

The course is intended to

1. Introduce the basic concepts of electrical elements and measuring instruments.
2. Familiarize the basics of electric circuits and analysis
3. Impart knowledge in the basics of working principles and application of electrical machines.
4. Predict the analog devices and their characteristics
5. Educate on the fundamental concepts of digital electronics.

Course Outcomes

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

CO.No	Course Outcome	Bloom's Level
CO 1	Express the operating principles of electrical elements and measuring instruments	Understand
CO 2	Compute the electric circuit parameters for simple problems.	Apply
CO 3	Examine the working principle and applications of electrical machines	Understand
CO 4	Explain the characteristics of analog electronic devices	Understand
CO 5	Discuss the basic concepts of digital electronics	Understand

Course Contents

Module – I	INTRODUCTION AND MEASURING INSTRUMENTS	9
Resistance, Inductance, Capacitance, Wires and Cables Ammeter, Voltmeter, Wattmeter, Energy meter, Thermistor and Anemometer		
Module – II	ELECTRICAL CIRCUITS	9
Ohm's Law, Kirchhoff's Laws, Mesh and Nodal analysis (D.C Circuits), Introduction to AC Circuits, Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor.		
Module-III	ANALOG ELECTRONICS	9
Semiconductor Materials: Silicon &Germanium ,Construction and operating characteristics of PN Junction Diodes, Zener Diode , Half wave and Full wave Rectifiers , Bipolar Junction Transistor ,CB, CE, CC Configurations and Characteristics.		
Module – IV	DIGITAL ELECTRONICS	9
Number System ,Logic Gates ,Boolean algebra ,Adders, Subtractors, SOP and POS forms, K-map representations, minimization using K maps (Simple Problems only)		

Passed in Board of Studies Meeting (13.12.2023)   Approved in Academic Council Meeting (11.01.2024)

CHAIRMAN - BOARD OF STUDIES   **CHAIRMAN - ACADEMIC COUNCIL**

Module – V	ELECTRICAL MACHINES	9
Construction and working: DC Motor, DC Generator, Single Phase Transformer.		
		Total : 45 Periods

Text Books

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2. S.K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

Reference Books

1. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
2. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
3. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
4. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

Additional References

1. **NPTEL** - https://nptel.ac.in/courses/108105017
2. **NPTEL** -https://onlinecourses.nptel.ac.in/noc21_ee55/preview

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	1	1										1	1
CO 2	3	2	1										1	1
CO 3	2	1	1										2	1
CO 4	2	1	1										2	1
CO 5	2	1	1										2	1
	3-High				2-Medium				1-Low					

Passed in Board of Studies Meeting (13.12.2023)
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Formative Assessment			
Blooms Taxonomy	Assessment Component	Marks	Total marks
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Examinations (IAE)			Final Examinations (FE)
	IAE – I (5)	IAE – II (10)	IAE – III (10)	60
Remember	10	10	10	20
Understand	40	20	30	60
Apply		20	10	20
Analyse				
Evaluate				
Create				

Passed in Board of Studies Meeting (13.12.2023)
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Approved in Academic Council Meeting (11.01.2024)
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23LET08	தமிழரும் தொழில்நுட்பமும் TAMILS AND TECHNOLOGY (Common to all B.E. / B.Tech Programme)	L	T	P	C
		1	0	0	1

Nature of Course	Humanities and Sciences
Pre requisites	Tamil

Course Objectives
The course is intended to
1. Introduce students to the great technology of ancient Tamil society.
2. Realize the contribution of various technologies for the development of governing area.
3. Highlighting the different manufacturing technology to make the coins, jewels, stones, art etc.
4. Know the role of agriculture, water management system and food processing.
5. Learn about the Scientific Tamil and Tamil computing of the past and how it has evolved over the generations.

Course Outcomes
On successful completion of the course the students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Remember the life style and technology of the Sangam people.	Remember
CO 2	Get an updated knowledge of ancient designing and construction of House, Temple, hero stones etc.	Understand
CO 3	Learnt the speciality of manufacturing technology types and usages.	Understand
CO 4	Gain the knowledge on production of agricultural products based on the ancient technologies.	Understand
CO 5	Understand the evaluation of Tamil language through the digital system.	Understand

Course Contents (in Tamil)

அலகு - I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	2

சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில் நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	2

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் . மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு கட்டிடக் கலை - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை.

அலகு - III	உற்பத்தித் தொழில் நுட்பம்	2
கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சன்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் -நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் –சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.		

அலகு - IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்	2
அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குழுழிகள் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் –பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார்.		

அலகு - V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்	2
அறிவியல் தமிழின் வளர்ச்சி – கணினித்தமிழ் வளர்ச்சி – தமிழ் நூல்களை மின் பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.		
	Total : 10 Periods	

Course Contents (in English)

Module – I	WEAVING AND CERAMIC TECHNOLOGY	2
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.		

Module – II	DESIGN AND CONSTRUCTION TECHNOLOGY	2
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.		

Module – III	MANUFACTURING TECHNOLOGY	2
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold Coins as source of history - Minting of Coins – Beads making-industries Stone beads –Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.		

Module – IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	2
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea – Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.		

Module – V	SCIENTIFIC TAMIL & TAMIL COMPUTING	2

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

Total : 10 Periods

பார்வை நூல்கள் (TEXT-CUM-REFERENCE BOOKS)

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

2. கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).

3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நகரிகம் (தொல்லியல் துறைவெளியீடு)

4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.

7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Passed in Board of Studies Meeting on 28.12.2023   Patsed in Academic Council Meeting on 11.01.2024

CHAIRMAN - BOARD OF STUDIES

23EC203	DIGITAL PRINCIPLES AND SYSTEM DESIGN	L	T	P	C
		3	0	2	4

Natureof Course	Engineering Sciences
Pre requisites	Electronic Devices

Course objectives:

The course is intended to

1. Study the Digital fundamentals, Boolean algebra, Logic circuit minimization techniques and its applications in digital systems
2. Acquire the knowledge of combinational digital circuits using logic gates
3. Expose synchronous sequential circuits with flip-flop elements.
4. Study the procedures for asynchronous sequential circuits.
5. Learn various semiconductor memories and related technology.

Course Outcomes:

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Discover the knowledge in Digital logic fundamentals and minimization of logic circuits.	Understand
CO2.	Develop the various combinational digital circuits using logic gates.	Apply
CO3.	Construct various synchronous sequential circuits.	Apply
CO4.	Analyze various asynchronous sequential circuits.	Analyze
CO5.	Explain the semiconductor memories and Programmable Logic devices.	Understand

Course Contents:

UNIT I Digital Fundamentals   9

Number Systems , 1s and 2s complements, Binary Codes, Boolean theorems, Postulates, Logic gates, Universal gates, Sum of products and product of sums, Karnaugh Map Minimization .

UNIT II Combinational Circuit Design   9

Design of Half and Full Adders, Subtractors, Binary Parallel Adder, BCD Adder, Binary Multiplier, Multiplexer, De Multiplexer, Magnitude Comparator, Decoder, Encoder, HDL Models of Combinational Circuits

UNIT III Synchronous Sequential Circuits   9

Latches, Flip flops, Analysis and design of clocked sequential circuits - state minimization, state assignment, - Counters – registers , HDL Models of Sequential Circuits

UNIT IV Asynchronous Sequential Circuits   9

Fundamental mode sequential circuits, Pulse mode sequential circuits, Stable and Unstable states, state reduction, Design of Hazard free circuits.

UNITVMemory Devices And Digital IntegratedCircuits   **9**

ROM - PROM - EPROM - RAM - Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Design of combinational logic circuits using PLA, PAL.

Total : 45 periods

DIGITAL EXPERIMENTS

S.No.	List of Experiments	CO	RBT
1.	Design the basic logics with a help of Postulates and SPO and POS methods.	CO1	Apply
2	Design and implementation of code converters using logic gates (i) BCD to excess-3 code and vice versa (ii) Binary to gray and vice-versa.	CO1	Apply
3.	Design and implementation of 4 bit binary Adder/ Subtractor and BCD adder using IC 7483.	CO1	Apply
4.	Design and implementation of Multiplexer and De-multiplexer using logic gates.	CO2	Apply
5.	Design and implementation of encoder and decoder using logic gates.	CO2	Apply
6.	Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters.	CO4	Apply
7.	Design and implementation of 3-bit synchronous up/down counter Simulation.	CO3	Apply
8.	Design of combinational logic circuits using PLA, PAL.	CO5	Apply

Total : 30 periods

Text Books:

1. Morris Mano.M and Michael D. Ciletti,"Digital Design", Pearson Publication, Sixth Edition 2018.
2. Salivahanan.S and Arivazhagan.S,"Digital Electronics",Vlikas Publishing House Pvt Ltd, First Edition ,2012.

Reference Books :

1. A.Anand Kumar, "Fundamentals of Digital Circuits", PHI Learning Private Limited, Fourth Edition, 2016.
2. Thomas L. Floyd," Digital Fundamentals", Pearson Education Inc, Eleventh Edition, 2015.
3. Charles H.Roth,"Fundamentals of Logic Design", Thomson Learning, Sixth Edition, 2013.

Additional References:

1. https://www.youtube.com/watch?v=CeD2L6KbtVM
2. https://nptel.ac.in/courses/108/105/108105132/

Mapping of Course Outcomes (COs) with Program Outcomes (POs) Program Specific Outcomes (PSOs)

COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	-	-	-	-	-	-	-	-	3	3	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	3	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-	3	3	-
CO4	3	3	3	3	-	-		-	-	-	-	-	3	3	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-	3	3	-
	3		High			2			Medium			1		Low	

Formative assessment

Bloom's Level	Assessment Component	Marks	Total Marks
Remember	Classroom / Online Quiz/Group Discussion	5	15
Understand	Assignment	5	
	Attendance	5	

summative Assessment

Bloom's Category	Continuous Assessment Tests			Terminal Examination (60)
	IAE I (5)	IAE II (10)	IAE III (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	20	20	20	40
Analyze	10	10	10	20
Evaluate	0	0	0	0
Create	0	0	0	0

Passed in Board of Studies

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Approved in Academic Council

23MCS203	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	2	1

Nature of Course	Professional Core
Pre requisites	C Programming Laboratory

Course Objectives

The course is intended to

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Write, test, and debug simple Python programs.	Apply
CO2	Implement Python programs with conditionals and loops.	Apply
CO3	Develop Python programs step-wise by defining functions and calling them.	Apply
CO4	Use Python lists, tuples, dictionaries for representing compound data.	Apply
CO5	Read and write data from/to files in Python.	Analyze

Course Content:
List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Write a algorithm & draw flowchart for simple computational problems	CO1	Understand
2	Write a program to perform different arithmetic operations on numbers in python.	CO2	Understand
3	Write a python program to implement the various control structures	CO3	Apply
4	Write a python program for computational problems using recursive function.	CO3	Apply
5	Demonstrate use of list for data validation.	CO4	Apply
6	Develop a python program to explore string functions	CO4	Analyze
7	Implement linear search and binary search.	CO4	Apply
8	Develop a python program to implement sorting methods	CO4	Analyze
9	Develop python programs to perform operations on dictionaries.	CO5	Analyze
10	Write a python program to read and write into a file	CO5	Apply

TOTAL: 60 Periods

Passed in Board of studies Meeting

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Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	2	1	-	-	-	-	2	1	2	2	2	2	3
CO2	3	3	1	1	-	-	-	-	1	1	1	3	1	2	2
CO3	2	1	3	1	-	-	-	-	1	1	2	3	3	3	3
CO4	3	1	3	3	-	-	-	-	1	2	3	3	2	1	2
CO5	3	2	1	1	2	-	-	-	3	3	3	1	3	1	3
	3	High				2	Medium				1	Low			

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember		
Understand	10	30
Apply	20	50
Analyze	20	20
Evaluate	0	0
Create	0	0

Passed in Board of studies Meeting

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Approved in Academic Council Meeting

23MCS204	DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	2	1
Nature of Course	Professional Core				
Pre requisites	C Programming Laboratory				

Course Objectives
The course is intended to
1. Demonstrate array implementation of linear data structure algorithms.
2. Implement the applications using Stack.
3. Implement the applications using Linked list
4. Implement Binary search tree and AVL tree algorithms, Heap, Dijkstra's and Prim's algorithm.
5. Implement the Sorting, Searching and Hashing algorithms.

Course Outcomes
On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Implement Linear data structure algorithms.	Apply
CO2	Implement applications using Stacks and Linked lists	Apply
CO3	Implement Binary Search tree and AVL tree operations.	Apply
CO4	Implement graph algorithms.	Apply
CO5	Analyze the various searching and sorting algorithms.	Analyze

Course Content:
List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Array implementation of Stack, Queue and Circular Queue ADTs	CO1	Apply
2	Implementation of Singly Linked Lis	CO1	Apply
3	Linked list implementation of Stack and Linear Queue ADTs	CO2	Apply
4	Implementation of Polynomial Manipulation using Linked list	CO2	Apply
5	Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion	CO3	Analyze
6	Implementation of Binary Search Trees	CO3	Analyze
7	Implementation of AVL Trees	CO4	Apply
8	Implementation of Heaps using Priority Queues	CO4	Apply
9	Implementation of Dijkstra's Algorithm	CO4	Apply
10	Implementation of Prim's Algorithm	CO5	Apply
11	Implementation of Linear Search and Binary Search	CO5	Apply
12	Implementation of Insertion Sort ,Selection Sort and Merge Sort	CO5	Apply

TOTAL: 60 Periods

Passed in Board of studies Meeting

CHAIRMAN - BOARD OF STUDIES

Approved in Academic Council Meeting

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	2	1	-	-	-	-	2	1	2	2	2	2	3
CO2	3	3	1	1	-	-	-	-	1	1	1	3	1	2	2
CO3	2	1	3	1	-	-	-	-	1	1	2	3	3	3	3
CO4	3	1	3	3	-	-	-	-	1	2	3	3	2	1	2
CO5	3	2	1	1	2	-	-	-	3	3	3	1	3	1	3
	3	High				2	Medium				1	Low			

Summative assessment based on Continuous and End Semester Examination

Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember		
Understand	10	30
Apply	20	50
Analyze	20	20
Evaluate	0	0
Create	0	0

23MC201	ENVIRONMENTAL SCIENCES	L	T	P	C
		2	0	0	0
Nature of Course Basic Sciences					
Pre requisites Basics in Environmental Sciences					

Course Objectives

The course is intended to
1. Study about the structure and components of different ecosystems.
2. Know about biodiversity and its values.
3. Learn the integrated themes on various natural resources.
4. Gain knowledge on the different type of pollutions and their control methods.
5. Create awareness about the current environmental issues and the social problems.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1.	Explain the different types of ecosystem and the biotic and abiotic components involved in it.	Understand
CO2.	Discuss the values, threats and conservation of biodiversity	Understand
CO3.	Discuss the importance of natural resources and their conservation	Understand
CO4.	Explain the causes, effects and control methods of environmental pollutions.	Understand
CO5.	Explain the social and environmental issues	Understand

Course Contents:

UNIT I   ECOSYSTEM   6

Eco system- Food chain, Food webs and Ecological pyramids. Structure and components of Forest ecosystem, Aquatic eco system - Marine ecosystem

UNIT II   BIODIVERSITY   6

Introduction, Values of Biodiversity, Threats to Biodiversity-Endangered and Endemic species, Hotspots in India - Western ghats and the Himalayas. Conservation of biodiversity- insitu and exsitu conservation.

UNIT III   NATURAL RESOURCES   6

Introduction- Forest resources: use and abuse, hazards of major human activities in forest, water resources, over utilization of water, dams - benefits and problems. Mineral resources-use and exploitation, environmental defects of mining. Food resources- World food problems- Role of an individual in the conservation of natural resources.

UNIT IV   ENVIRONMENTAL POLLUTION   6

Definition, Causes, Effects and Control measures of Air pollution- acid rain, greenhouse effect, global warming, ozone layer depletion, Water pollution, Soil pollution, Noise pollution, Light pollution – Role of individual in prevention of pollution.

UNIT V   SOCIAL ISSUES AND THE ENVIRONMENT   6

Sustainable development- Water conservation-Rain water harvesting, E-waste management- Role of information technology in environment and human. Principles of Green chemistry- Emission standards-ISO 14001 Standard, Awareness of Covid-19.

Passed in Board of studies Meeting   Approved in Academic Council Meeting

CHAIRMAN - BOARD OF STUDIES

Total: 30 Periods

Text Books:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2017.
2. Rajagopalan, R, 'Envrionmental studies- from Crisis to Cure", Oxford University Press, 2015.

Reference Books:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 3rd edition,Pearson Education,2021.
   ErachBharucha, "Textbook of Environmental Studies", Universities Press(I) Pvt, Ltd, Hydrabad, 2015.
2. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD,Delhi,2014.
3. Dharmendra S. Sengar, 'Environmental law', prentice hall of India Pvt Ltd, New Delhi, 2007.

Additional References:

1. http://www.nptel.ac.in/courses/111105035
2. http://www.nptel.ac.in/courses/111105035
3. https://nptel.ac.in/courses/103107084
4. https://nptel.ac.in/courses/105107176

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	**Pos**												**PSOs**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	2						2		
CO2						2	2						2		
CO3						2	2							2	
CO4						3	3						2		
CO5						3	3						2		
	3		High			2		Medium			1		Low		

Summative Assessment						
Bloom's Category	**Continuous Assessment Tests**					
	IAE-I (5)	IAE-II (10)	IAE-III (10)	Assignment (10)	Quiz (10)	Attendance (5)
Remember	10	10	10			
Understand	20	20	20			
Apply	0	0	0			
Evaluate	0	0	0			
Create	0	0	0			

Passed in Board of studies Meeting   Approved in Academic Council Meeting

CHAIRMAN - BOARD OF STUDIES

23EN201	EFFECTIVE COMMUNICATION SKILLS	L	T	P	C
		2	0	0	0
Nature of Course	E (Theory skill based)				
Pre requisites	Basics of English Language				

Course Objectives

The course is intended to

1. Become self-confident individuals by mastering interpersonal skills, teammanagement skills, and leadership skills.
2. Develop effective communication skills.
3. Train students to use the language with confidence and without committingerrors.
4. Improve the fluency of the students when speaking English.
5. Focus on pronunciation, dialect, intonation, interaction, practice andcommunication.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Aware the correct usage of English grammar in speaking.	Apply
CO2	Improve their speaking ability in English both in terms offluency and comprehensibility.	Apply
CO3	Communicate effectively in personal and professionalsituations.	Apply
CO4	Demonstrate oral presentations and receive feedback ontheir performance.	Apply
CO5	Acquire reading fluency skills through extensive reading.	Analyze

Course Content:

UNIT I 6

Vocabulary Building- Connecting Phrases- Exercises and Activities- Conversation Practices- Greetings-exchanging ideas - Asking for information - questioning techniques / answering techniques - Getting people to do things - requesting/agreeing/refusing – Common Expressions (Individual).

UNIT II 6

Talking about Favorites - Talk Show - Impromptu Speaking- Personal Interest - Talking about Past Events and Future / Talking about Everyday Life (Family, Hobbies, Work, Travel and Current Events).

UNIT III 6

Listening- Trials of a Good Listener- Listening to Texts, Listening for Specific Purpose — Communication with Critical Thinking and Creativity - Role Play.

UNIT IV 6

Personality Development- Manners and Etiquettes. Building Confidence and Developing Presentation Skills-Activity- Group Discussion.

UNIT V 6

Story Telling - Use of Charts and Graphs - Persuasive Speech- Handling Criticism -Justifying Opinions – Conflict - Resolution-Situational Role Play - News reading and Pronunciation – Comprehension - Intuitive Approach.

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List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Vocabulary Building	CO1	Apply
2	Common Expressions	CO1	Apply
3	Talk Show	CO2	Apply
4	Impromptu Speaking	CO2	Apply
5	Listening	CO3	Apply
6	Role Play	CO3	Apply
7	Presentation Skills	CO4	Apply
8	Group Discussion	CO4	Apply
9	Story Narration	CO5	Analyze
10	Comprehension	CO5	Analyze

TOTAL: 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1
CO2	-	-	-	-	-	-	-	-	1	3	-	-	-	-	2
CO3	-	-	-	-	-	-	-	-	2	3	3	-	-	-	3
CO4	-	-	-	-	-	-	-	-	3	3	-	-	-	-	3
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1

3	High	2	Medium	1	Low

Summative assessment based on Continuous and End Semester Examination

Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember	0	0
Understand	0	0
Apply	10	20
Analyze	20	30
Evaluate	0	0
Create	20	50

Passed in Board of studies Meeting   Approved in Academic Council Meeting

CHAIRMAN - BOARD OF STUDIES

23MA302	PROBABILITY AND STATISTICS (Common to AIDS, BME, CSBS, CSE, IT & M.TECH. CSE)	L	T	P	C
		3	0	2	4

Nature of Course	Basic Sciences
Pre requisites	Foundation of Mathematics

Course Objectives

The course is intended to

1. Learn the fundamental concepts of random variables.
2. Acquire essential knowledge of random variables necessary for subsequent studies in digital communication.
3. Develop an understanding of hypothesis testing for both small and large samples.
4. Familiarize students with the basic concepts of experimental design types used in engineering.
5. Study classification types and principles of statistical quality control.
6. Utilize statistical methods to analyze data, infer patterns, and make informed decisions.

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Construct the concepts of a random variables and Probability distributions.	Apply
CO2	Examine the functions of multiples random variable.	Apply
CO3	Implement hypothesis testing techniques for small and large samples.	Apply
CO4	Predict the design of experiments in the field of engineering by the concept of classification..	Apply
CO5	Identify the sampling distribution and statistical techniques	Apply
CO6	Utilize data infer patterns and mastery in statistical reasoning and application.	Apply

Course Contents:

MODULE - I	UNIVARIATE RANDOM VARIABLES	9

Random Variables – Discrete & Continuous random variables – Probability distributions – Discrete Probability Distributions: Binomial and Poisson probability distributions – Continuous Probability Distributions: Uniform and Exponential Probability distributions.

MODULE - II	BIVARIATE RANDOM VARIABLES	9

Joint distributions – Marginal distributions – Covariance – Correlation Coefficient – linear regression – Central limit theorem (Statement only).

CHAIRMAN-BOARD OF STUDIES

MODULE - III	STATISTICAL HYPOTHESIS TESTING	9

Distribution of samples – Parameter Estimation – Statistical hypothesis – Large sample tests relying on Normal distribution for individual mean and mean difference - Test utilizing t for mean - Chi-square test for Goodness of fit.

MODULE - IV	EXPERIMENTAL DESIGN AND ANALYSIS	9

One way and two way classifications – Completely randomized design – Randomized block design – Latin square design.

MODULE - V	STATISTICAL QUALITY CONTROL	9

Control charts for measurements (Mean and Range charts) – Control charts for attributes (p, c and np charts) – Tolerance limits – Acceptance sampling.

Total: 45 Periods

Text Books:

1. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 5th Edition, 2018.
2. Oliver.C.Ibe, 'Fundamentals of Applied Probability and Random Processes", Elsevier India, 3rd Edition, 2021.
3. Freund John, E and Miller, Irvin, "Probability and Statistics for Engineering", Prentice Hall, 5th Edition2022.

Reference Books:

1. Bali N.P and Manish Goyal, "A Text book of Engineering Mathematics", Lakshmi Publications Pvt Ltd, 10th Edition, 2020.
2. Ronald E. Walpole, Raymond H. Myersand Sharon L. Myers "Probability and Statistics for Engineers and scientists ", Pearson India ,14th Edition, 2021.
3. Jay L.Devore," Probability and Statistic for Engineering and the Sciences", Cengage Learning, 10th Edition, 2021.

Additional References:

1. https://onlinecourses.nptel.ac.in/noc21_ma74/preview
2. https://onlinecourses.swayam2.ac.in/cec21_ma02/preview
3. https://onlinecourses.nptel.ac.in/noc22_mg31/preview
4. https://onlinecourses.nptel.ac.in/noc20_ge05/preview

Laboratory Components using MATLAB:

S.No.	List of Experiments	CO Mapping	RBT
1	Poisson distribution	1	Apply
2	Uniform distributions	1	Apply
3	Marginal Distributions	2	Apply
4	Correlation Coefficient	2	Apply

CHAIRMAN-BOARD OF STUDIES

Passed in Board of Studies Meeting on 08.07.2024   Approved in Academic Council Meeting on 20.07.2024

5	Individual mean by Student's t - test	3	Apply
6	Goodness of fit by Chi – Square test	3	Apply
7	One way classification	4	Apply
8	Two way classification	4	Apply
9	Control Chart for Variables using Mean Chart	5	Apply
10	Control Chart for Variables using Range Chart	5	Apply

Total: 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	Pos												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	2	2	-	-	-	-	-	-	-	-	2	-
CO2	3	2	2	3	-	-	-	-	-	-	-	-	2	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-	2	-
CO4	3	2	3	3	-	-	-	-	-	-	-	-	1	-
CO5	3	2	2	3	-	-	-	-	-	-	-	-	2	-
	3	High			2	Medium					1	Low		

Bloom's Level	Summative Assessment						
	Continuous Assessment						Final Examination (Theory) [50]
	Theory			Practical			
	IAE I (5)	IAE II (10)	IAE III (10)	Attendance [5]	Rubric based [10]	Model Exam [10]	
Remember	10	10	10				10
Understand	10	10	10		40	40	30
Apply	30	30	30		60	60	60
Analyze							
Evaluate							
Create							

CHAIRMAN-BOARD OF STUDIES

23MCS301	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core (PC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Know about operating systems principles and its operations
2. Understand the mechanisms of the operating systems like process management, processsynchronization.
3. Acquaint with memory management techniques
4. Implement file system, storage structures used in OS and protection principles

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Enumerate the basic concepts of operating systems	Remember
CO2	Illustrate the concepts of CPU scheduling and Process synchronization in some analytical problems	Apply
CO3	Interpret the synchronization concepts of OS	Understand
CO4	Investigate the principles of memory management	Apply
CO5	Identify appropriate file system and disk organizations for a variety of computing scenario	Apply
CO6	Examine the features of I/O systems	Understand

Course Contents

Module – I	OPERATING SYSTEM OVERVIEW	9

Operating System Structure – Operations – Process Management – Memory Management – Storage Management – Protection and Security -Operating System Services – User and Operating System Interface – System Calls – Types of System Calls – System Programs. Process Scheduling – Operations on Processes – Inter-process Communication.

Module – II	PROCESS MANAGEMENT	9

Overview of threads – Multicore programming-Multithreading Models – Threading Issues - process scheduling – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Synchronization – The Critical-Section Problem – Peterson's Solution Synchronization Hardware – Semaphores – Classic problems of Synchronization – Monitors. Case Study: Linux Scheduling.

Module – III	MEMORY MANAGEMENT	9
System Model – Deadlock Characterization – Methods for Handling Deadlock – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock - Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table-Segmentation.		
Module – IV	FILE SYSTEM	9
File-access methods-directory-file system mounting-file sharing-protection-File system implementation-file system structure-file system implementation-directory implementation-allocation methods-free-space management-efficiency and performance-comparison of UNIX and windows.		
Module – V	I/O SYSTEM	9
Mass storage structure -overview of mass storage structure-disk structure-disk attachment-disk scheduling algorithms-swap space management-stable storage implementation-tertiary storage structure-I/O Hardware- application I/O interface-kernel I/O subsystem-transforming I/O requests to hardware operations-streams.		

Total : 45 Periods

Text Books

1. Andrew S. Tanenbaum, "Modern Operating Systems", Fifth Edition Prentice Hall of India Pvt. Ltd, 2023.

2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley & Sons (Asia) Pvt. Ltd, Tenth Edition, 2018.

Reference Books

1. Harvey M. Deitel, "Operating Systems", Pearson Education Pvt. Ltd, Third Edition, 2021.

2. William Stallings, "Operating System", Pearson Education, Ninth Edition, 2019.

Additional References

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2			3							2		3
CO2	3	2			3							2		3
CO3	3	2			3							2		3
CO4	3	2			3							2		3
CO5	3	2			3							2		3
CO6	3	2			3							2		3

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

3- High	2- Medium	1- Low	

Passed in Board of Studies Meeting   CHAIRMAN-BOARD OF STUDIES   Approved in Academic Council Meeting

Formative Assessment			
Blooms Taxonomy	**Assessment Component**	**Marks**	**Total marks**
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examinations (IAE) (40)**			**Final Examinations (FE)**
	IAE – I (5)	**IAE – II (10)**	**IAE – III (10)**	**(60)**
Remember	20			20
Understand	30	30	30	60
Apply		20	20	20
Analyse				
Evaluate				
Create				

23MCS302	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core (PC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. To understand and choose the appropriate algorithm design technique for a specified application.
2. To solve problems using algorithm design techniques such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
3. To analyze the impact of algorithm design techniques on each application solved.
4. To introduce and understand NP classes

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Understand the basics of algorithmic problem solving methods	Remember
CO2	Apply algorithm analysis techniques for a given algorithms	Understand
CO3	Compare various graph traversal techniques	Understand
CO4	Examine algorithm design techniques for a given application of graphs and dynamic programming	Analyze
CO5	Study different algorithms for solving a given problem using backtracking	Analyze
CO6	Develop application using chosen algorithm technique	Apply

Course Contents

Module – I	INTRODUCTION	9

Fundamentals of algorithmic problem solving – problem types – Analysis framework - Analysis of recursive algorithms through recurrence relations - Substitution method- Recursion tree method and Masters' theorem – Algorithm visualization.

Module – II	DIVIDE AND CONQUER	9

Brute-Force- Sequential Search- Brute-Force string matching- Divide and Conquer Method -Multiplication of large integers-Strassen's Matrix Multiplication - Greedy Technique - Job sequencing with deadlines - Knapsack problem-All pairs shortest path problem - Travelling sales person problem – Reliability design.

Module – III	GRAPHS AND DYNAMIC PROGRAMMING	9

Graphs -Breadth first search and traversal - Depth first search and traversal - Spanning trees, connected components - bi-connected components - Articulation points - Dynamic Programming-General method - applications - optimal binary search trees.

Module – IV	BACKTRACKING	9

Backtracking methods - Applications- n-queen problem - Sum of subsets problem - Graph coloring and Hamiltonian cycles - Branch and bound - Travelling sales person problem- 0/1 knapsack problem- LC branch and bound solution-FIFO branch and bound solution.

Module – V	NP-HARD AND NP-COMPLETE PROBLEMS	9

Non-Deterministic Algorithms: The Classes NP - Hard And NP- NP Hard Problems- Clique Decision Problem -Chromatic Number Decision Problem- Cook's Theorem.

Total : 45 Periods

Text Books

1. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, "Introduction to Algorithms", Fourth Edition, Prentice Hall of India,New Delhi, 2021.

2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Fourth Edition, Pearson Education Asia, 2019.

Reference Books

1. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", third edition,Pearson Education Asia,2012.

2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of ComputerAlgorithms",3rd edition.Pearson Education Asia, 2014.

3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, Hyderabad, 2008.

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2			3							2		3
CO 2	3	2			3					1		2		3
CO 3	3	2			3					1		2		3
CO 4	3	2			3					1		2		3
CO 5	3	2			3					1		2		3
CO 6	3	2			3					1		2		3

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

3- High	2- Medium	1- Low

Formative Assessment			
Blooms Taxonomy	**Assessment Component**	**Marks**	**Total marks**
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examinations (IAE) (40)**			**Final Examinations (FE)**
	IAE – I (5)	**IAE – II (10)**	**IAE – III (10)**	**(60)**
Remember	20			20
Understand	30	30	30	60
Apply		20	10	20
Analyse			10	
Evaluate				
Create				

23MCS303	COMPUTER ARCHITECTURE	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core (PC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Impart knowledge on basic concepts of computer architecture
2. Know about the design of the computer.
3. Familiarize the basic CPU operations.
4. Help students in understanding various memory devices.
5. Facilitate students in learning IO communication

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Examine the operation of a digital computer	Remember
CO2	Describe data representation, instruction formats and the Operations.	Understand
CO3	Illustrate the fixed point and floating-point arithmetic for ALU operation	Apply
CO4	Articulate the design aspects of control unit and pipeline performance	Apply
CO5	Summarize the concept of various memories.	Understand
CO6	Demonstrate the concept of interfacing and organization of multiple processors	Understand

Course Contents

Module – I	BASIC STRUCTURE OF COMPUTER	9

Computer types-Functional units- Basic operational concepts- Von Neumann Architecture- Bus Structures-Software-Performance and metrics – Instructions and instruction sequencing – Instruction set architecture – Addressing modes- Basic I/O Operation

Module – II	PROCESSING UNIT	9

Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control – computer arithmetic - Addition and Subtraction – Multiplication Algorithm – Division Algorithm – Floating Point Arithmetic operations – Decimal Arithmetic Unit – Decimal Arithmetic Operations.

Module – III	MEMORY SYSTEM	9
Memory– Types-Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.		
Module – IV	PIPELINING	9
Parallel processing – Pipe lining-Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.		
Module – V	INPUT OUTPUT ORGANIZATION	9
Accessing I/O devices – Programmed Input/output -Interrupts – Direct Memory Access – Interface circuits – Standard I/O Interfaces (PCI, SCSI and USB) - I/O devices and processors.		

Total : 45 Periods

Text Books

1. William Stallings, "Computer Organization and Architecture- designing for performance", 11th edition, Prentice Hall, 2020.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", 5th edition, Elsevier, 2019.

Reference Books

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", sixth edition, McGraw-Hill, 2011
2. John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 2002

Additional References

1. https://www.classcentral.com/course/swayam-computer-organization-and-architecture-a-pedagogical-aspect-9824
2. **NPTEL** - https://onlinecourses.nptel.ac.in/noc20_cs64/

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)														
COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1										1	2	2
CO2	2	1	1									1	2	2
CO3	2	1	1									1	2	2
CO4	2	1	1							2			2	2
CO5	2	1	1							2			2	2
CO6	2	1	1							2			2	2
	3- High			2- Medium			1- Low							

Formative Assessment			
Blooms Taxonomy	**Assessment Component**	**Marks**	**Total marks**
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examinations (IAE) (40)**			**Final Examinations (FE)**
	IAE – I (5)	**IAE – II (10)**	**IAE – III (10)**	**(60)**
Remember	20			20
Understand	30	30	40	60
Apply		20	10	20
Analyse				
Evaluate				
Create				

23MCS304	OBJECT ORIENTED PROGRAMMING IN JAVA	L	T	P	C
		3	0	2	4
Nature of Course	Professional Core (PC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Understand the basic concepts and fundamentals of platform independent object oriented language.
2. Demonstrate skills in writing programs using exception handling techniques and Multi threading.
3. Understand streams and efficient user interface design techniques.

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Analyze problem and identify classes, objects and the relationships among them	Remember
CO2	Examine the applications of polymorphism and multithreading	Understand
CO3	Investigate applications using various types of Inheritance and Interfaces	Understand
CO4	Develop applications or programs using strings and collection	Apply
CO5	Create programs using files and streams in java	Apply
CO6	Implement an application and make use of object oriented concepts for its implementation	Apply

Course Contents

Module – I	INTRODUCTION	9
OOP–Features-Applications- Java Fundamentals -Data Types- Variables and Arrays - Operators-Control Statements – Class –Objects- Access Specifiers -Methods –Constructors- Type Conversion.		
Module – II	POLYMORPHISM AND MULTITHREADING	9
Polymorphism - Abstract classes and method-Overloading-Overriding-final methods and classes – Inheritance – Interface – Thread-Thread Life Cycle -Creating Threads - Thread Priorities - Synchronizing Threads - Inter-thread Communication.		
Module – III	EXCEPTION HANDLING	9
Exceptions & Errors- Types of Exception- Control Flow in Exceptions- JVM Reaction to Exceptions- Use of try- catch-finally- throw- throws in Exception Handling- In-built and User Defined Exceptions - Checked and Un-Checked Exceptions.		

Module – IV	STRING HANDLING AND COLLECTION FRAMEWORK	9
String Constructors-String Operations-Generic classes and methods- Collection Framework - List-Array List- Linked List - Set-Hash Set-Linked Hash Set - Queue-Priority Queue - Map-Hash Map – Sorted Map-Tree Map.		

Module – V	STREAM HANDLING	9
Streams -I/O Stream - Byte Stream- Character Stream- File –File I/O Stream –Byte Array I/O Stream- File Reader and Writer – Char Array Reader and Writer.		

Total : 45 Periods

LIST OF EXPERIMENTS

1. Develop simple programs in java using classes and methods.
2. Implement method overloading and method overriding in java
3. Create an application using multiple threads
4. Implement collections like List, Set, Queue, Map in java.
5. Develop java programs to access and perform various operations in file contents.
6. Implement the given use case/project using various Object oriented concepts in java

Text Books

1. Herbert Schildt, "Java the Complete Reference", 13th edition Tata Mc Graw Hills, 2023.
2. Paul Deitel and Harvey Deitel, —"Java How to Program (Early Objects)", 11th Edition, Pearson Prentice Hall 2018.

Reference Books

1. E.Balaguruswamy,"Programming with Java", 7th Edition, TMH, 2023.
2. Timothy Budd, "An Introduction to Object-Oriented Programming", Third Edition, Pearson Education, 2008.

Additional Reference

https://www.javatpoint.com/java-tutorial

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2		3					2		2		3
CO 2	3	2	2		3					2		2		3
CO 3	3	2	2		3					2		2		3
CO 4	3	2	2		3					2		2		3
CO 5	3	2	2		3					2		2		3
CO 6	3	2	2		3					2		2		3

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

3- High	2- Medium	1- Low

Passed in Board of Studies Meeting   Approved in Academic Council Meeting

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Bloom's Level	Summative Assessment						
	Continuous Assessment						Final
	Theory			Practicals			
	IAE-I [5]	IAE-II [10]	IAE-III [10]	Attendance [5]	Rubric Based CA [10]	Model Examination [10]	Examination (Theory) [50]
Remember	10	10	10		20	20	10
Understand	40	20	10		20	20	40
Apply		20	30		30	30	50
Analyze					30	30	
Evaluate							
Create							

23MCS305	OPERATING SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2
Nature of Course	Practical				
Prerequisites	Nil				

Course Objectives

The course is intended to
1. Understand commands of shell programming and its usage.
2. Learn and use CPU scheduling algorithms and various memory management methods
3. Acquire the creation of different virtual machines in a hypervisor.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Practise various shell programs	Apply
CO2	Illustrate inter-process communication	Apply
CO3	Implement CPU scheduling algorithms.	Apply
CO4	Compare performance of various memory management methods	Apply
CO5	Implement deadlock avoidance algorithms.	Apply
CO6	Develop a virtual machine	Create

S.No	List of Exercises	CO Mapping	RBT
1.	Develop programs for process creation and communication. a. Write simple shell programs. b. Creation of process and child process c. Demonstration of inter-process communication d. Creation of Zombie and Orphan process e. Creation of threads	CO1	Understand
2.	Simulation of the CPU scheduling algorithms	CO2	Apply
3.	Demonstration of Semaphores	CO2	Apply
4.	Implementation of Producer-Consumer problem	CO3	Apply
5.	Simulation of Bankers algorithm for deadlock avoidance	CO3	Analyze
6.	Creation of virtual machine in a hypervisor	CO5	Analyze

Total : 60 Periods

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	2										3	2
CO 2	3	3	2										3	2
CO 3	3	3	2										3	2
CO 4	3	3	2										3	2
CO 5	3	3	2										3	2
CO 6	3	3	2										3	2
	3- High				2- Medium				1- Low					

Summative assessment based on Continuous and End Semester Examination

Bloom's Level	Rubric based Continuous Assessment [50marks]	End Semester Examination [50marks]
Remember		
Understand	10	10
Apply	20	20
Analyze	20	20
Evaluate		
Create		

23MC301	DESIGN THINKING	L	T	P	C
		1	2	0	3
Nature of Course	Mandatory Course (MC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Render an in-depth Understanding on various aspects of Innovation, Creativity, evolving business models, incubation and entrepreneurship.
2. Come up with exposure to design thinking for designing innovative solutions.
3. Understand innovation and its applications in different spheres.

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Explain the fundamentals of Design Thinking and innovation	Apply
CO2	Empathize and examine model action plan.	Analyze
CO3	Describe the principles of innovation and idea generation for product design	Apply
CO4	Employ design thinking techniques for given tasks	Apply
CO5	Envisage the design thinking techniques for solving problems in various sectors.	Create
CO6	Exhibit their ideas and prototype by applying acquired knowledge	Create

Course Contents

Module – I	INTRODUCTION	9
Thinking and Behaviour – Types of thinking– Concrete – Abstract- Convergent-Divergent-Creative- Analytical-Sequential and Holistic thinking – Chunking Triangle – Context Grid – Examples – Case Study .		
Module – II	DESIGN THINKING	9
Design thinking process – Human element of design thinking – case study		
Module – III	INNOVATION	9
Difference between Creativity and Innovation – Examples of innovation –Being innovative.		
Module – IV	PROCESS OF STRATEGIC INNOVATION	9
Identify Blocks for creativity and innovation – overcoming obstacles – Case Study		
Module – V	INNOVATION PROJECT PROPOSAL PRESENTATION	9
Project proposal contents, economic input, ROI		

Total : 45 Periods

Passed in Board of Studies Meeting   *Approved in Academic Council Meeting*

CHAIRMAN-BOARD OF STUDIES

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 2	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 3	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 4	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 5	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 6	3	3	3	3	3	2	2		3	3	3	3	3	3
	3- High				2- Medium				2- Low				

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment [50marks]	End Semester Examination [50marks]
Remember		
Understand		
Apply	30	10
Analyze	10	10
Evaluate		
Create	10	40

Assessment Component	Internal Marks	External Marks	Total marks
Internal Project reviews	20		
Project report	10	50	100
Demonstration & Viva – voce	20		

Passed in Board of Studies Meeting

CHAIRMAN-BOARD OF STUDIES

Approved in Academic Council Meeting

Guidelines for Tutorial Hours:

1. The students should meet at least 50 people belonging to various strata of life and talk to them / make field visits to identify a minimum of100 society related issues, problems for which they need solutions and categorize them and upload along with details of people met.

2. The students should apply design thinking to the selected solution, apply the engineering & scientific tinge to it. Participate in "design week" celebrations upload the weeks learning out come.

3. The students should perform literature survey on selected problem statement and prototype.

4. The students should exhibit project presentation on problem identification, solution, and innovations-expected results – Interim review with PPT presentation.

23MA401	NUMERICAL METHODS (Common to AIDS ,BME, CSBS, CSE, ECE, EEE, IT and M.Tech CSE)	L	T	P	C
		3	0	2	4

Nature of Course	Basic Sciences
Pre requisites	Foundations of Mathematics

Course Objectives

The course is intended to

1. Introduce the basic concepts of algebraic and transcendental equations.
2. Indicate the Numerical techniques of interpolation in various intervals.
3. Learn the concept of numerical techniques of differentiation and integration.
4. Study the numerical techniques in solving ordinary differential equations.
5. Provide the Numerical techniques in solving one dimensional and two dimensional heat equations.
6. Acquire proficiency in employing computational techniques to solve mathematical problems efficiently and accurately.

Course Outcomes

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

Co. No.	Course Outcome	Bloom's Level
CO1	Demonstrate the algebraic and transcendental equations.	Apply
CO2	Perform the numerical techniques of interpolation and error approximations in various Intervals.	Apply
CO3	Compute the numerical techniques of differentiation and integration for engineering problems.	Apply
CO4	Classify the numerical techniques for solving first order ordinary differential equations.	Apply
CO5	Illustrate the solution of boundary value problems.	Apply
CO6	Utilize computational techniques to solve mathematical problems efficiently and accurately.	Apply

Course Contents:

Module – I	SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	9

Solution of Algebraic and Transcendental equations – Newton - Raphson method- Solution of linear system of equations -Gauss elimination method – Gauss Jordan method – Iterative methods of Gauss Jacobi method and Gauss Seidel method.

Module – II	INTERPOLATION AND APPROXIMATION	9

Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation – Interpolation with equal intervals – Newton's interpolation formulae.

CHAIRMAN-BOARD OF STUDIES

Module – III	NUMERICAL DIFFERENTIATION AND INTEGRATION	9

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal and Simpson's 1/3 rules – Two point and three point Gaussian quadrature formulae.

Module – IV	NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS	9

Single step methods: Euler's method – Fourth order Runge - Kutta method for solving first order equations – Shooting Method – Multi step methods: Milne's predictor corrector methods for solving first order equations.

Module – V	BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS	9

Finite difference techniques for the solution of two dimensional Laplace's equations on rectangular domain – One dimensional heat flow equation – Bender Schmidt method by explicit – Crank Nicholson methods.

Total: 45 Periods

Text Books:

1. Grewal B.S, and Grewal J.S, " Numerical methods in engineering and science "Khanna Publishers, 10th Edition, 2015.
2. Burden, R.L. and Faires, J.D, "Numerical Analysis" Cengage Learning, 9th Edition, 2016.
3. Gupta, S.K., "Numerical Methods for Engineers", New Age Publishers, Third Edition, 2015.

Reference Books:

1. Sankara Rao. K., "Numerical Methods for Scientists and Engineers", Prentice Hall of India Pvt. Ltd, New Delhi, 4th Edition, 2017.
2. Sastry, S.S., "Introductory Methods of Numerical Analysis", PHI Learning pvt Ltd, 5th Edition, 2015.
3. Jain, M.K., Iyengar, S.R.K. and Jain, R.K., "Computational Methods for Partial Differential Equations", New Age Publishers, 2016.
4. Curtis F.Gerald, Patrick.O. Wheatley, "Applied Numerical Analysis", Pearson Education, 8th Edition, 2022.

Additional References:

1. https://nptel.ac.in/courses/111/107/111107105
2. https://nptel.ac.in/courses/127/106/127106019
3. https://archive.nptel.ac.in/content/storage2/courses/122104018/node126.html

Laboratory Components using MATLAB:

S.No	List of Excercises	CO Mapping	RBT
1	Gauss Elimination Method	1	Apply
2	Gauss Seidel Method	1	Apply
3	Lagrange's Interpolation Formula	2	Apply

CHAIRMAN-BOARD OF STUDIES

4	Newton's Forward and Backward difference formula	2	Apply
5	Trapezoidal Rule	3	Apply
6	Simpson's 1/3 rd rule	3	Apply
7	Euler's Method	4	Apply
8	Runge – Kutta Method	4	Apply
9	Finite Difference Method	5	Apply
10	Bender Schmidt method	5	Apply

Total: 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1	-	-	-	-	-	-	-	-		2		
CO2	3	2	2	-	-	-	-	-	-	-	-		2		
CO3	3	2	1	-	-	-	-	-	-	-	-		2		
CO4	2	2	1	-	-	-	-	-	-	-	-		1		
CO5	3	3	1	-	-	-	-	-	-	-	-		2		
CO6	3	2	2	-	-	-	-	-	-	-	-		2		
	3	High				2	Medium					1	Low		

Bloom's Level	Summative Assessment						Final Examination (Theory) [50]
	Continuous Assessment						
	Theory				Practical		
	IAE I (5)	IAE II (10)	IAE III (10)	Attendance [5]	Rubric based [10]	Model Exam [10]	
Remember	10	10	10				10
Understand	10	10	10		40	40	30
Apply	30	30	30		60	60	60
Analyze							
Evaluate							
Create							

CHAIRMAN-BOARD OF STUDIES

23MCS401	DATABASE MANAGEMENTSYSTEM	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core (PC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Understand the concept of DBMS and ER Modeling.
2. Explain the normalization, Query optimization and relational algebra.
3. Apply the concurrency control, recovery, security and indexing for the real time data.

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO1	Design relational schema using database design principles	Remember
CO2	Construct ER Model for a given database application.	Apply
CO3	Identify the key constraints for relations and devise queries using SQL	Understand
CO4	Study the concepts of transactions and concurrency control	Understand
CO5	Employ storage and indexing techniques to access and generate user reports for a database.	Apply
CO6	Familiarize on emerging database technologies.	Understand

Course Contents

Module – I	INTRODUCTION	9
Database- Types-applications-Purpose of database systems-Views of data- Database Development Life cycle- Architecture of DBMS- Overview of query processing- Relational Databases- Relational model-Database schema-Keys-Formal Relational Query Languages.		
Module – II	**DATABASE DESIGN**	9
Logical Database Design-Different approaches in Logical design-ER Modeling-ER notations-Steps in ER modeling- Physical database design-Converting ER Model to Relational Database Design-Normalization-Functional Dependency 1NF,2NF,3NF –BCNF.		
Module – III	**STRUCTURED QUERY LANGUAGE**	9
SQL –DDL-DML- Constraints- Triggers – Views-Set operations- Nested Queries-Aggregation - Complex integrity constraints - Active databases.		
Module – IV	**TRANSACTION MANAGEMENT**	9
Transactions - Concept and purpose - ACID properties and their necessity - Transaction Schedules - Conflicts and Aborts -Serializability - Recoverability-Concurrency Control-lock based protocols - 2-phase locking -Timestamp based protocols - Deadlock .		

Module – V	STORAGE AND INDEXING	9
	Storage - File structure - File Organization – RAID- Indexing - Clustered and Non Clustered Indices - B-tree and B+-tree - Hashing –types-Modern Database Systems.	

Total : 45 Periods

Text Books

1. Abraham Silberschatz, Henry Korth, and S. Sudarshan, "Database System Concepts", 7th Edition, McGraw-Hill, 2021.
2. R. Elmasri and S. Navathe, "Fundamentals of Database Systems", 7th Edition, Pearson Education, 2016.

Reference Books

1. Thomas M. Connolly and Carolyn E. Begg, "Database Systems - A Practical Approach to Design, Implementation and Management", Sixth edition, Pearson Education, 2014.
2. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

Additional References

https://onlinecourses.nptel.ac.in/noc17_cs33/course
http://www.db-book.com
http://nptel.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design
www.w3schools.com/sql/

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2			3								2	3
CO 2	3	2			3								2	3
CO 3	3	2			3								2	3
CO 4	3	2	1		3		3						2	3
CO 5	3	2	1		3		3						2	3
CO 6	3	2	1		3		3						2	3

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

3- High	2- Medium	1- Low

Formative Assessment			
Blooms Taxonomy	Assessment Component	Marks	Total marks
Remember	Quiz	5	
Understand Apply	Tutorial class / Assignment	5	15
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Examinations (IAE) (40)			Final Examinations (FE)
	IAE – I (5)	IAE – II (10)	IAE – III (10)	(60)
Remember	10	10		20
Understand	30	40	30	60
Apply	10		20	20
Analyse				
Evaluate				
Create				

23MCS402	Theory of Computation	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core (PC)				
Pre requisites	23MA301-Discrete Structures				

Course Objectives

The course is intended to

1. Provide the comprehensive insight into theory of computation by understanding grammar, languages and other elements of modern language design
2. Develop capabilities to design and develop formulations for computing models.
3. Introduce students to the mathematical foundations of computation including automata theory.

Course Outcomes

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

CO.No	Course Outcome	Bloom's Level
CO 1	Summarize the basic concepts of Finite Automata	Remember
CO 2	Interpret various closure properties of languages in Chomsky hierarchy.	Understand
CO 3	Construct Context Free Grammars to generate strings from a context free language and convert them into normal forms	Apply
CO 4	Identify hierarchy of formal languages, grammars and machines.	Understand
CO 5	Differentiate between computability and non-computability	Understand
CO 6	Distinguish between decidability and undecidability	Analyze

Course Contents

Module – I	**AUTOMATA THEORY**	9

Alphabets - languages - Chomsky hierarchy of languages - Basic Machines- Finite Automata(FA)-Deterministic Finite Automata(DFA)-Non-Deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions- Equivalence of DFA and NFA- NFA to DFA conversion-Applications of finite automata.

Module – II	**REGULAR EXPRESSIONS AND LANGUAGES**	9

Regular Expression - Converting Regular Expression to FA- Converting FA to Regular Expression - Closure and Decision properties of Regular Expression - Equivalence and minimization of Automata.

Module – III	**CONTEXT-FREE GRAMMAR AND LANGUAGES**	9

Context-Free Grammar - Parse Trees - Ambiguity in grammars and languages - Definition of the Pushdown automata - Languages of a Pushdown Automata - Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata-Normal forms for CFG – Chomsky Normal Form – Greibach Normal Form - Closure Properties of CFL.

Module – IV	TURING MACHINES	9

Turing machines - Techniques for Turing machine construction - Turing recognizable and Turing-decidable languages - variants of Turing machines - unrestricted grammars.

Module – V	UNDECIDABILITY	9

Church-Turing thesis - universal Turing machine - universal and diagonalization languages - reduction between languages and Rice's theorem - undecidable problems about languages-PCP. Case Study: Realization of the automaton using JFLAP tool.

Total : 45 Periods

Text Books

1. Kavi Mahesh, "Theory of Computation, A Problem-solving Approach" Wiley India Pvt, Ltd, 2012.
2. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Third Edition, Pearson Education, 2011
3. John C.Martin, "Introduction to Languages and the Theory of Computation", Fifth Edition, Tata McGraw Hill, 2011.

Reference Books

1. Micheal Sipser, "Introduction of the Theory and Computation", 3rd edition,Thomson Brokecole,2012.
2. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003.

Additional References

https://onlinecourses.nptel.ac.in/noc22_cs63/preview

COs	PO's 1	2	3	4	5	6	7	8	9	10	11	12	PSO's 1	2
CO 1	3	3	3	1	2							2	3	2
CO 2	3	3	3	1	2							2	3	2
CO 3	3	3	3	1	2							2	3	2
CO 4	3	3	3	1	2							2	3	2
CO 5	3	3	3	1	2							2	3	2
CO 6	3	3	3	1	2							2	3	2

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

3-High	2-Medium	1- Low

Formative Assessment			
Blooms Taxonomy	**Assessment Component**	**Marks**	**Total marks**
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examinations (IAE) (40)**			**Final Examinations (FE)**
	IAE – I (5)	**IAE – II (10)**	**IAE – III (10)**	**(60)**
Remember	20			20
Understand	30	30	40	60
Apply		20		20
Analyse			10	
Evaluate				
Create				

23MCS403	Software Engineering	L	T	P	C
		3	0	0	3
Nature of Course	Professional Course (PC)				
Pre requisites	23MCS304-Object oriented programming				

Course Objectives

The course is intended to

1. Design a application using UML modeling
2. Test the given application with various testcase using attesting tool
3. Create a application with all the stages of software engineering lifecycle
4. Apply project management and change management

Course Outcomes

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

CO.No	Course Outcome	Bloom's Level
CO 1	Aware of the principles of software engineering	Remember
CO 2	Acquainted with requirement analysis for a project	Understand
CO 3	Know about the designing a project using UML diagrams	Apply
CO 4	Understand the test cases and execute various testing	Understand
CO 5	Analyze the project management strategies	Apply
CO 6	Familiar about software engineering concepts	Understand

Course Contents

Module – I	INTRODUCTION	9

Software-Types-Software Engineering- Failures- Software Process - Software Lifecycle Models - Agile Development - Scrum - Prototyping-UML -Modeling - Modeling with UML .

Module – II	PROJECT MANAGEMENT AND REQUIREMENTS ANALYSIS	8

Project Organization - Project Communication - UML Activity Diagram-requirements Elicitation - Usability - Requirement Analysis - UML Use Case Diagram - UML Analysis - Object Class Diagram.

Module – III	DESIGN	9

System Design -System Design Activities: From Objects to Subsystems- Patterns - Architectural Patterns - UML Component and Deployment Diagram - Object Design - Design Patterns - UML Class and Communication Diagram.

Module – IV	MAPPING MODELS & TESTING	10

Mapping- Models - Overview of Mapping - Mapping Concepts- Mapping Activities - Managing Implementation-Testing- Overview of Testing- Testing Concepts-Faults - Erroneous States - Failures-Test Cases- Test Stubs and Drivers- Corrections-Testing Activities- Component Inspection - Usability Testing-Unit Testing-Integration Testing-System Testing-Managing Testing-Planning Testing-Documenting Testing-Assigning Responsibilities-Regression Testing- Automating testing.

Module – V	MANAGING CHANGE	9

Rationale Management- Overview of Rationale - Rationale Concepts- Rationale Activities - Managing Rationale- Configuration Management - Configuration Management Activities .

Total : 45 Periods

Text Books

1. R.S. Pressman, "Software Engineering – A Practitioner"s Approach", Ninth Edition, McGraw Hill International Edition, 2019.
2. Bernd Bruegge & Allen H. Dutoit, "Object-Oriented Software Engineering", Third Edition, 2014.
3. Ivar Jacobson, "Object-Oriented Software Engineering", Pearson Education, Revised Edition 2009

Reference Books

1. Stephen R.Schach, "Object-Oriented Classical Software Engineering", Mcgraw Hill, Eighth Edition 2010.
2. S. Thangasamy, "Essentials of Software Engineering", Wiley India, First Edition, 2018

Additional References

1. https://onlinecourses.nptel.ac.in/noc23_cs122/preview

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)														
COs	**PO's**												**PSO's**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2				2				2			2	
CO 2	3	3							2	2	2	2	2	
CO 3	3								2	2	3	2	2	
CO 4	3											2		
CO 5	3													
CO 6	3													
	3-High			**2-Medium**			**1- Low**							

Formative Assessment			
Blooms Taxonomy	Assessment Component	Marks	Total marks
Remember	Quiz	5	
Understand	Tutorial class / Assignment	5	15
Apply			
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Examinations (IAE) (40)			Final Examinations (FE) (60)
	IAE – I (5)	IAE – II (10)	IAE – III (10)	
Remember	20			20
Understand	30	40	40	60
Apply		10	10	20
Analyse				
Evaluate				
Create				

23EC408	MICROCONTROLLERS	L	T	P	C
		3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

Course Objectives:

The course is intended to

1. Learn the basics and the inbuilt hardware of microcontroller.
2. Understand the 8051 microcontroller's Timer/Counter and Interrupts
3. Learn the Asynchronous Serial Communication in 8051
4. Learn interfacing concepts for interfacing of the microcontroller with other devices.
5. Comprehend the features of PIC and AVR.

Course Outcomes:

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

CO. No.	Course Outcome	Bloom's Level
CO1	Explain the general architecture of Microcontroller.	Understand
CO2	Summarize the Timer/Counter and Interrupts of 8051.	Understand
CO3	Determine the asynchronous Serial Communication of 8051.	Understand
CO4	Classify the Various memory peripheral interfacing.	Understand
CO5	Design and develop the Various Interfacing in 8051	Apply
CO6	Integrate the different microcontroller architectures.	Understand

Course Contents:

Module – I	Introduction to Microcontroller	9
8051 Brief History, Classification ofMCS-51family based on their features (8051, 8052, 8031, 8751, AT89C51), Pin configuration, Processor Architecture and Instruction Set: Registers of 8051, Inbuilt RAM, Register banks, stack, on chip and external program code memory ROM, power reset and clocking circuits, I/O port structure, Addressing modes, Instruction set and programming.		
Module – II	**Timer/Counter and Interrupts of 8051**	**9**
Introduction, Registers, Different modes, Programming, Interrupt Vs Polling, Types of interrupts, Register used for interrupts initialization, Programming of external interrupts, Timer interrupts.		
Module – III	**Asynchronous Serial Communication and Programming**	**9**
Introduction to serial communication, Data Programming,RS232 standard,RS422 Standard,1488 and 1489 standard, GPIB, Max 232/233 Driver, Serial communication programming.		
Module – IV	**Interfacing with 8051**	**9**
Interfacing and programming of: ADC & DAC, stepper motor,4x4 keyboard matrix, LCD, Interfacing(only)of different types of Memory.		
Module – V	**Advanced Microcontrollers**	**9**
Features of PIC 18 - block diagram of PIC 16 - architecture. Features of AVR- block diagram of AT tiny 25 - block diagram of AT mega 32. - AVR architecture.		
	Total: 45 Periods	

Laboratory Components

S.No	List of Experiments	CO Mapping	RBT
1	Write the assembly language programming for basic arithmetic operations for Microcontrollers of 8051	CO1	Apply
2	Write the assembly language programming for Logical operations for Microcontrollers of 8051	CO2	Apply
3	Write the assembly language programming for sorting and searching of given numbers.	CO3	Apply
4	Write the assembly language programming to generate square wave using 8253.	CO4	Apply
5	Write the assembly language program for the Key board and Display interfacing of 8051.	CO3	Apply
6.	Write the assembly language program for the Stepper motor interfacing of 8051.	CO4	Apply
7.	Write the assembly language programming for interface 8255 with 8051.	CO3	Apply

Total: 30 Periods

Text Books

1. Mazidi,M.A.,Mazidi, J.G.,& McKinlay,R.D."The8051 microcontroller and embedded systems: using Assembly and C" Pearson/Prentice Hall 2007.
2. Predko, M "Programming and customizing the 8051 microcontroller".McGraw-Hill, Inc. 1999.
3. Muhammed Ali Mazeedi(2010) . AVR Microcontroller and Embedded Systems: Pearson Education Ltd.

Reference Books:

1. Ayala, K. J. "The 8051 microcontroller". Penram, India. 1995.
2. Vahid,F.,&Givargis,T.D "Embedded system design: A unified hardware/software introduction" John Wiley & Sons.2001

Additional References:

1. NPTEL-https://nptel.ac.in/courses/106/105/106105163/
2. https://www.youtube.com/playlist?list=PL6PpIMTH29SHgRPDufZhfMRoFwRAlrzOp

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)																
COs	PO's													PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO 7	3	3	1										1	1	1	
CO 8	3	3	3										1	1	1	
CO 9	3	3	3										2	2	2	
CO 10	3	3	2										2	2	2	
CO 11	3	2	2										1	1	1	
CO 12	3	2	2										2	2	2	
	3-High			2-Medium				2- Low								

Bloom's Category	Summative Assessment			
	Internal Assessment Examinations (IAE) (40)			Final Examinations (FE) (60)
	IAE – I (5)	IAE – II (10)	IAE – III (10)	
Remember	10	10	10	10
Understand	40	20	10	60
Apply		10	20	10
Analyse		10	10	20
Evaluate				
Create				

23MCS404	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2
Nature of Course	Practical				
Prerequisites	Nil				

Course Objectives

The course is intended to

1. Implement DDL, DML, DCL and TCL commands
2. Demonstrate views, indexes of database
3. Create and develop an application by integrating database with a front end tool

Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Design and implement database schema using DDL commands	Apply
CO2	Devise queries using DML, DCL commands by employing various constraints.	Apply
CO3	Devise queries using DCL commands by employing various constraints.	Apply
CO4	Develop views of a database and illustrate indexing	Apply
CO5	Illustrate the transaction processing by TCL commands	Apply
CO6	Develop an application by integrating developed database	Analyze

Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1.	Creation of a database and writing SQL queries to retrieve information from the database	CO1	Apply
2.	Creating relational database to set various constraints	CO2	Apply
3.	Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.	CO2	Apply
4.	Creation of Views and Indexes	CO3	Apply
5.	Working on DCL commands	CO3	Analyze
6.	Performing various operations on TCL commands	CO4	Analyze
7.	Integrate front end application with SQL	CO5	Create

Total: 30Periods

Mapping of Course Outcomes(CO) with Programme Outcomes(PO) Programme Specific Outcomes(PSO)

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	2										3	2
CO2	3	3	2										3	2
CO3	3	3	2										3	2
CO4	3	3	2										3	2
CO5	3	3	2										3	2
CO6	3	3	2										3	2
	3	High				2	Medium					1	Low	

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment[50marks]	End Semester Examination [50marks]
Remember		
Understand	10	10
Apply	40	50
Analyze		40
Evaluate		
Create		

23MC402	INNOVATIVE THINKING AND PROTOTYPING LAB	L	T	P	C
		0	0	4	2
Nature of Course	Mandatory Course (MC)				
Pre requisites	23MC301				

Course Objectives

The course is intended to

1. Enable the students to design and build simple applications on their own
2. Help students with innovative ideas in design and team work
3. Create an engaging and challenging environment

Course Outcomes

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

CO. No	Course Outcome	Bloom's Level
CO 1	Identify a practical problems and find a solution	Apply
CO 2	Realize the project management techniques	Analyze
CO 3	Demonstrate their technical report writing and presentation skills	Create

Course Contents

The course will offer the students with an opportunity to gain a basic understanding of computer programs and apply the concepts to design and develop simple applications in any selected domains. As a practical project based course, the students will be taught the concepts using a variety of reference material available in the public domain. While the course will start with formal instruction on problem solving techniques, programming , the major portion of the course will provide the students with ample opportunity to be innovative in design thinking with a range of applications in their chosen domain.

GUIDELINES

1. Practical based learning carrying credits.

2. Multi-disciplinary/ Multi-focus group of 5-6 students.

3. Groups can select to work on a specific tasks, or projects related to real world problems.

4. Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students.

5. The students have to display their model in the project Expo, Ideathon.

6. The progress of the course is evaluated based on reviews and final demonstration of prototype.

Suggested Domains for project

1. Artificial intelligence
2. Web/ Mobile Application Development
3. Data Science
4. Machine Learning
5. IoT
6. Embedded Systems
7. Digital Forensic security.
8. Any contemporary real time problem that was identified by student during Audit Course-I

COs	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 2	3	3	3	3	3	2	2		3	3	3	3	3	3
CO 3	3	3	3	3	3	2	2		3	3	3	3	3	3
	3- High				2- Medium				1- Low				

Mapping of Course Outcomes (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes (PSO's)

Summative assessment based on Continuous and End Semester Examination

Bloom's Level	Rubric based Continuous Assessment [50marks]	End Semester Examination [50marks]
Remember		
Understand		
Apply	20	10
Analyze	20	10
Evaluate		
Create	10	40

Assessment Component	Internal Marks	External Marks	Total marks
Internal Project reviews	20		
Project report	10	50	100
Demonstration & Viva – voce	20		

Passed in Board of Studies Meeting   CHAIRMAN-BOARD OF STUDIES   *Approved in Academic Council Meeting*

23MC401	SOFT SKILLS	L	T	P	C
		2	0	0	0
Nature of Course	Mandatory Course				
Pre requisites	Nil				

Course Objectives
The course is intended to

1. Improve language skills in personal and professional life.
2. Equip students with the vital communication and soft skills to succeed in the highly competitive international arena.
3. Focus on the fundamental soft skills and of their practical social and work place usage.
4. Learn to identify and overcome the barriers in interpersonal relationships.
5. Enhance employability skills and ensure career success.

Course Outcomes
On successful completion of the course the students will be able to

CO.No	Course Outcome	Bloom's Level
CO 1	Relate the significance and fundamental nature of soft skills.	Remember
CO 2	Take part in a wide range of Public speaking and professional group discussions.	Understand
CO 3	Plan one's time effectively and productively, especially at work.	Apply
CO 4	Make use of leadership skills to manage stress &conflict.	Apply
CO 5	Organize presentation effectively and participate in interview with confidence.	Apply

Course Contents

Module – I	INTRODUCTION TO SOFT SKILLS AND INTERPERSONAL COMMUNICATION	6

An Introduction – Definition and Significance of Soft Skills; Interpersonal communication-types of interpersonal communication.

Module – II	PUBLIC SPEAKING AND ORAL COMMUNICATION SKILLS	6

Public Speaking: Skills, Methods, Strategies Group Discussion: Importance, Planning, Elements.

Module – III	TIME MANAGEMENT AND PERSONALITY DEVELOPMENT	6

Time Management – concepts and essentials tips. Personality-development – meaning, SWOT analysis & goal setting- Stress and conflict management.

Module – IV	LEADERSHIP SKILLS AND EMOTIONAL INTELLIGENCE	6

Leadership skills: Concept of Leadership and honing Leadership Skills- Problem-Solving Skills - Group and Ethical Decision-Making. Emotional Intelligence: Strategies to enhance Emotional Intelligence.

Passed in Board of studies Meeting   Approved in Academic Council Meeting

CHAIRMAN - BOARD OF STUDIES

Module – V	INTERVIEW SKILLS	6

Interviewer - Interviewee perspectives - Self Introduction and Presentation: Types, Content and Essential Tips–before, during and after a presentation, Overcoming Nervousness - Mock Interview.

Total : 30 Periods

Text Books

1. Managing Soft Skills for Personality Development–edited by B.N.Ghosh, McGraw Hill India, 2018.
2. Petes S. J., Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw-Hill Education, 2011.
3. English and Soft Skills–S.P. Dhanavel, Orient Black swan India, 2017.

Reference Books

1. Soft Skill Business and Professional Communication Book by Sutapa Banerjee,2016.
2. Communication Skills Book by PushpLata and Sanjay Kumar,2015.
3. Klaus, Peggy, Jane Rohman & Molly Hamaker. The Hard Truth about Soft Skills. London: HarperCollins E-books, 2007.

Web References:

1. https://nptel.ac.in/courses/109/107/109107121/
2. https://onlinecourses.nptel.ac.in/noc22_hs77/preview
3. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1								1	2	3		2			
CO2								1	2	3		2			
CO3								1	2	3		2			
CO4								1	2	3		2			
CO5								1	2	3		2			
	3	High				2		Medium			1	Low			

Bloom's Level	Summative Assessment (Internal Mode)	
	Assessment 1 (50 Marks)	Assessment 2 (50 Marks)
Remember	10	10
Understand	10	10
Apply	30	30
Analyze		
Evaluate		
Create		

Passed in Board of studies Meeting   Approved in Academic Council Meeting

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