

EXCEL ENGINEERING COLLEGE

(Autonomous) Approved by AICTE, New Delhi& Affiliated to Anna University, Chennai Accredited by NBA, NAAC with "A+" and Recognized by UGC (2f & 12B) KOMARAPALAYAM–637303

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING M.Tech. Computer Science and Engineering (5 Years Integrated) REGULATION 2023 I to X Semesters Curriculum

	ISEN	IESTER							
Code No.	Course	Category	Р	erioo /Wee	ds ek		Maximum Marks		
			L	Т	Ρ	С	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
	Theory with Pra	ctical Cou	rse(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
	Mandato	ry Course							
23MC101	Induction Programme	MC	2	Wee	eks	0	100	-	100
	TOTAL		13	1	8	18	400	300	700

	II SEN	MESTER								
Codo No	Courses	Cotomorry	Periods /Week			0	Maximum Marks			
Code No.	Course	Category	L	Т	Ρ	C	СА	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	1	0	4	40	60	100	
	Theory with Pr	actical Cou	rse(s)						
23EE201	Basics of Electrical and Electronics Engineering	ES	3	0	2	4	50	50	100	

23EC201	Digital Principles and System Design	ES	3	0	2	4	50	50	100
	Practica	l 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
	Mandate	ory Course							
23MC201	Environmental Sciences	MC	2	0	0	0	100	-	100
23ENE01	Effective Communication Skills	MC	2	0	0	0	100	-	100
	TOTAL		19	2	8	21	540	360	900

	III SEMESTER																						
			Pe /	Periods /Week		Periods /Week		Periods /Week		Periods /Week		Periods /Week		Periods /Week		Periods /Week		Periods /Week			Maximum M		Marks
Code No.	Course	Category	L	т	Р	С	СА	FE	Total														
Theory Cour	se(s)								•														
23MA301	Discrete Structures	BS	3	1	0	4	40	60	100														
23MCS301	Operating Systems	PC	3	0	0	3	40	60	100														
23MCS302	Design and Analysisof 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 usingJava and UML	PC	3	0	2	4	50	50	100														
Practical Co	urse(s)																						
23MCS305	Operating Systems Laboratory	PC	0	0	3	2	60	40	100														
23MCS306	Analysis of Algorithms Laboratory	PC	0	0	3	2	60	40	100														
AUDIT COUF	SE																						
23ACXX	Audit Course I	AC	2	0	0	0	100	0	100														
	TOTAL		17	1	8	21	430	370	800														

	IV SEM	ESTER								
Code No.	Course	Category	Periods /Week				Maximum Marks			
	Course	oategory	L	Т	Ρ	С	СА	FE	Total	
Theory Cours	e(s)									
23MA401	Applied Probability	BS	3	1	0	4	40	60	100	
23MCS401	Database Management Systems	PC	3	0	0	3	40	60	100	

Passed in Board of studies Meeting 10.02.2023

Approved in Academic Council Meeting 13.02.2023

23MCS402	Core Java Programming	PC	3	0	0	3	40	60	100
23MCS403	Enterprise Design Patterns	PC	3	0	0	3	40	60	100
Theory with F	Practical Course(s)								
23ECI401	Microprocessors and Microcontrollers	ES	3	0	2	4	50	50	100
Practical Cou	rse(s)								
23MCS404	Database Management Systems Laboratory	PC	0	0	3	2	60	40	100
23MCS405	Java Laboratory	PC	0	0	3	2	60	40	100
AUDIT COUR	SE								
23ACXX	Audit Course II	AC	2	0	0	0	100	0	100
	TOTAL		15	1	8	21	430	370	800

	V SEMESTER										
Code No	Course	Category	Periods /Week				Maximum Marks				
Code No.	Course	Category	L	Т	Ρ	С	СА	FE	Total		
Theory Cours	e(s)										
23MCS501	Data Warehousingand 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 JSFramework	PC	3	0	0	3	40	60	100		
Theory with F	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 Cou	rse(s)				1		r	1			
23MCS507	JEE and JS FrameworkLaboratory	PC	0	0	3	2	60	40	100		
	TOTAL		18	0	7	22	320	380	700		

VI SEMESTER															
Code No.	Course							Peri Category /W		eriods /Week			Maximum Marks		
	oourse	Galegory	L	Т	Ρ	С	СА	FE	Total						
Theory Course	e(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 P	ractical Course(s)								
23MCS603	Cryptography, Network Security andApplication Security	PC	3	0	2	4	50	50	100
23MCS604	Software Validationand Testing	PC	3	0	2	4	50	50	100
23MCS605	Mobile Application Development	PC	2	0	3	4	50	50	100
Practical Cour	se(s)								
23MCS606	Big Data AnalyticsLaboratory	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 SEM	ESTER							
Code No	Course	Category	Periods /Week			Maximum Marks			
code no.	Course	Category	L	Т	Ρ	С	СА	FE	Total
Theory Course	e(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	Blockchain 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 Cour	se(s)					-			
23MCS704	Blockchain Technology Laboratory	PC	0	0	2	1	60	40	100
23MCS705	IoT and CloudLaboratory	PC	0	0	2	1	60	40	100
	TOTAL		18	0	4	20	360	440	800

	VIII SEM	ESTER				-				
Code No	Course	Category	Pe /	eriods Week			Maximum Marks			
	oourse	Category	L	Τ	Ρ	С	CA	FE	Total	
Theory Course	e(s)									
23MCS801	Microservices and Distributed ComputingArchitecture	PC	3	0	0	3	40	60	100	
23MCSEYY	Open Elective II	OE	3	0	0	3	40	60	100	
23MG801	Banking and Insurance	HS	3	0	0	3	40	60	100	
23MCSEXX	Professional Elective IV	PE	3	0	0	3	40	60	100	
Theory with P	ractical Course(s)									
23MCS802	Machine Learning	PC	3	0	2	4	50	50	100	

23MCS901	Front end Frameworks Engineering	PC	3	0	2	4	50	50	100
Practical Cour	se(s)								
23MCS803	Mini Project II	EEC	0	0	4	2	50	50	100
	TOTAL		18	0	8	22	310	390	700

	IX SEN	NESTER							
Code No.	Course	Category	Periods /Wee k			C	Maximum Marks		
			L	Т	Ρ	Ŭ	СА	FE	Total
Theory Cours					-	-			
23MCSEXX	Professional ElectiveV	PE	3	0	0	3	40	60	100
23MCSEXX	Professional Elective VI	PE	3	0	0	3	40	60	100
Practical Cour	rse(s)								
23MCS902	Project Phase I	EEC	0	0	16	8	50	50	100
EMPLOYABILI	TYENHANCEMENT SKILLS								
23EES001	Employability Enhancement Skills	EES	2	We	eks	2	100	-	100
	TOTAL						230	170	400

X SEMESTER											
Code No.	Course	Category	Periods /Week		eriods /Week		Maximum Marks		Marks		
	000130	culogely	L	Т	Ρ	С	CA	FE	Total		
Practical Cours	se(s)										
23MCS1001	Project Phase II	EEC	0	0	32	16	50	50	100		
	TOTAL					16	50	50	100		

HUMANITIES AND MANAGEMENT COURSES (HSMC)

S No.	Course Code	Course	L/T/P	Contact hrs/week	Credit	Ext/Int	Category
1	23EN101	Business English Communication	2/0/2	4	3	50/50	HSMC
2	23MG801	Banking and Insurance	3/0/0	3	3	60/40	HSMC

BASIC SCIENCE COURSES (BSC)

S No.	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	BSC
2	23PH101	Engineering Physics	3/0/2	5	4	50/50	BSC

3	23MA201	Calculus and Complex Variables	3/1/0	4	4	60/40	BSC
4	23MA301	Discrete Structures	3/1/0	4	4	60/40	BSC
5	23MA401	Applied Probability	3/1/0	4	4	60/40	BSC

ENGINEERING SCIENCE COURSES (ESC)

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	ESC
2	23EE201	Basics of Electrical and Electronics Engineering	3/0/2	5	4	50/50	ESC
3	23EC201	Digital Principles and System Design	3/0/2	5	4	50/50	ESC
4	23ECI401	Microprocessors and Microcontrollers	3/0/2	5	4	50/50	ESC

PROFESSIONAL CORE COURSES (PCC)

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	PCC
2.	23MCS102	C Programming Laboratory	0/0/2	3	1	40/60	PCC
3.	23MCS201	Python Programming	3/0/0	3	3	60/40	PCC
4.	23MCS202	Data Structures	3/1/0	4	4	60/40	PCC
5.	23MCS203	Python Programming Laboratory	0/0/2	3	1	60/40	PCC
6.	23MCS204	Data Structures Laboratory	0/0/2	3	1	60/40	PCC
7.	23MCS301	Operating Systems	3/0/0	3	3	60/40	PCC
8.	23MCS302	Design and Analysis of Algorithms	3/0/0	3	3	60/40	PCC
9.	23MCS303	Computer Architecture	3/0/0	3	3	60/40	PCC
10.	23MCS304	Object Oriented Programming usingJava and UML	3/0/2	5	4	50/50	PCC
11.	23MCS305	Operating Systems Laboratory	0/0/3	3	2	60/40	PCC
12.	23MCS306	Analysis of Algorithms Laboratory	0/0/3	3	2	60/40	PCC
13.	23MCS401	Database Management Systems	3/0/0	3	3	60/40	PCC
14.	23MCS402	Core Java Programming	3/0/0	3	3	60/40	PCC
15.	23MCS403	Enterprise Design Patterns	3/0/0	3	3	60/40	PCC
16.	23MCS404	Database Management Systems Laboratory	0/0/3	3	2	60/40	PCC
17.	23MCS405	Java Laboratory	0/0/3	3	2	60/40	PCC
18.	23MCS501	Data Warehousing and Mining	3/0/0	3	3	60/40	PCC
19.	23MCS502	Artificial Intelligence	3/0/0	3	3	60/40	PCC
20.	23MCS503	JEE Framework	3/0/0	3	3	60/40	PCC
21.	23MCS504	PHP and JS framework	3/0/0	3	3	60/40	PCC
22.	23MCS505	Computer Networks	3/0/2	5	4	50/50	PCC
23.	23MCS506	Agile Technology	3/0/2	5	4	50/50	PCC

24.	23MCS507	JEE and JS Framework	0/0/4	4	2	60/40	PCC
25.	23MCS601	Compiler Design	3/0/0	3	3	60/40	PCC
26.	23MCS602	Big Data Analytics	3/0/0	3	3	60/40	PCC
27.	23MCS603	Cryptography, Network Security and Application Security	3/0/2	5	4	50/50	PCC
28.	23MCS604	Software Validation and Testing	3/0/2	5	4	50/50	PCC
29.	23MCS605	Mobile Application Development	2/0/3	5	4	50/50	PCC
30.	23MCS606	Big Data Analytics Laboratory	0/0/3	3	1	60/40	PCC
31.	23MCS701	Blockchain Technology	3/0/0	3	3	60/40	PCC
32.	23MCS702	Internet of Things	3/0/0	3	3	60/40	PCC
33.	23MCS703	Cloud Computing	3/0/0	3	3	60/40	PCC
34.	23MCS704	Block Chain Technology Laboratory	0/0/3	3	1	60/40	PCC
35.	23MCS705	IoT and Cloud Laboratory	0/0/3	3	1	60/40	PCC
36.	23MCS801	Microservices and Distributed Computing Architecture	3/0/0	3	3	60/40	PCC
37.	23MCS802	Machine Learning	3/0/2	5	4	50/50	PCC
38.	23MCS901	Front end Frameworks Engineering	3/0/2	5	4	50/50	PCC

AUDIT COURSES (AC)

S.No.	Course Code	Course Title	Category
1	23ACI090	English for Research Paper Writing	AC
2	23ACI091	Disaster Management	AC
3	23ACI092	Sanskrit for Technical Knowledge	AC
4	23ACI093	Value Education	AC
5	23ACI094	Constitution of India	AC
6	23ACI095	Pedagogy Studies	AC
7	23ACI096	Stress Management by Yoga	AC
8	23ACI097	Personality Development through Life Enlightenment Skills	AC
9	23ACI098	Essence of Indian Traditional Knowledge	AC

PROFESSIONAL ELECTIVE COURSES (PEC)

S. No	Course Code	Course Title	L/T/P	Contact Hrs/Wk	Credits	Category			
	Computer and Network Security								
1.	23MCS01	Mobile Ad Hoc networks	3/0/0	3	3	PEC			
2.	23MCS02	Mobile Computing	3/0/0	3	3	PEC			
3.	23MCS03	Distributed Systems	3/0/0	3	3	PEC			
4.	23MCS04	Wireless Sensor Networks	3/0/0	3	3	PEC			
5.	23MCS05	Cyber Security and Ethical Hacking	3/0/0	3	3	PEC			
6.	23MCS06	Advanced Databases	3/0/0	3	3	PEC			
7.	23MCS07	Advanced Algorithms	3/0/0	3	3	PEC			
8.	23MCS08	Software Product Management	3/0/0	3	3	PEC			
9.	23MCS09	Information Ethics and Cyber Laws	3/0/0	3	3	PEC			
		Intelligent Systems							

10.	23MCS10	Soft Computing	3/0/0	3	3	PEC
11.	23MCS11	Deep Learning	3/0/0	3	3	PEC
12.	23MCS12	Human Computer Interaction	3/0/0	3	3	PEC
13.	23MCS13	Image Processing and Pattern Recognition	3/0/0	3	3	PEC
14.	23MCS14	Speech and Natural Language Processing	3/0/0	3	3	PEC
15.	23MCS15	Social Network Analysis	3/0/0	3	3	PEC
16.	23MCS16	Optimization Techniques	3/0/0	3	3	PEC
17.	23MCS17	Data Visualization	3/0/0	3	3	PEC
18.	23MCS18	Computer Vision	3/0/0	3	3	PEC
		Thriving Electives				-
19.	23MCS19	Game Theory and its Applications	3/0/0	3	3	PEC
20.	23MCS20	Computing for Digital Media	3/0/0	3	3	PEC
21.	23MCS21	Business Intelligence	3/0/0	3	3	PEC
22.	23MCS22	Quantum Computing	3/0/0	3	3	PEC
23.	23MCS23	Robotics and Embedded Systems	3/0/0	3	3	PEC
24.	23MCS24	Virtual Reality	3/0/0	3	3	PEC
25.	23MCS25	Parallel Computing	3/0/0	3	3	PEC
26.	23MCS26	DevOps	3/0/0	3	3	PEC

Open Elective Courses (OEC) offered to other departments

S.No.	Course Code	Course Title	L	Т	Ρ	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

S.						Cred Seme	lits ester						Credits
N O	Stream	I	II	111	IV	v	VI	VII	VIII	IX	X	Credits	in %
1.	Humanities and Management Courses (HSM)	3							3			6	3%
2.	Basic Science Courses(BS)	8	4	4	4							20	10%
3.	Engineering Science Courses (ES)	3	8		4							15	7.5%
4.	Professional Core Courses(PC)	4	9	17	13	22	19	11	11			106	53%
5.	Professional Elective Courses (PE)						3	6	3	6		18	9%
6.	Open Electives Courses(OE)							3	3			6	3%
7.	Project Work(PW)						1		2	8	16	27	13.5%
8.	Employability Enhancement Skills (EES)									2		2	1%
9.	Mandatory Course (MC)											Non credit	0%
10 Audit courses (AC)												Non credit	0%
	Total	18	21	21	21	22	23	20	22	16	16	200	100%

SCHEME OF CREDIT DISTRIBUTION - SUMMARY

HSS - Humanities and Social 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)
- CA-Continuous Assessment
- **FE-Final Examination**

SEMESTER-I

22MA101		L	Т	Ρ	С
ZJWATUT	LINEAR ALGEBRA AND DIFFERENTIAL CALCOLOS	3	1	0	4
Nature of Course	Basic Sciences				
Pre requisites	Higher secondary mathematics				

Course Objectives

The course is intended to

- 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 by engineers 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
001	Identify the Eigen values, Eigen vectors and apply Cayley- Hamilton	Apply
001.	theorem.	
CO2.	Apply the concept of orthogonal reduction to Diagonalise the given matrix	Apply
<u> </u>	Apply the concept of convergence in the context of sequence and series	Apply
003.	of real numbers.	Арріу
CO4.	Apply functions of two variables with their visualization,	Apply
CO5	Apply the knowledge of differential equation and extreme values of the	Apply
000.	given functions to solve the engineering problems	·

Course Contents:

UNIT I MATRICES

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

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

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

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

UNIT V ORDINARY DIFFERENTIAL EQUATIONS

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

12

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.

- 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

Марр	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								lium		1		Lo	W	

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

	Summative Assessment										
	Continu	nt Tests	Final								
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	Examination (60)							
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							

22MCS101		L T P		С		
2310105101	FROBLEM SOLVING USING C	3	0	0	3	
Nature of Course	Professional Core					
Pre requisites	NIL					

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

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

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

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

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

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.

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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.

- 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/

Марр	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
C	Pos												PSOs		
Cos	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						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										
	Continu	nt Tests	Final								
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	Examination (60)							
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							

22ENE101		L	Т	Ρ	С
ZJENETUT	BUSINESS ENGLISH COMMUNICATION	2	0	2	3
Nature of Course	Humanities				
Pre requisites	Basic English				

The course is intended to

- 1. Develop the listening skills and reading practice using authenticbusiness vocabulary.
- 2. Instill analytical thinking and logical reasoning.
- 3. Enhance LSRW skills inbusiness 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

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

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

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

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

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

9

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.

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

Марр	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
0	Pos													PSOs	
LOS	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										1	3	2	3	
	3	3 High 2 Medium 1										Lo	w		

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

	Summative Assessment							
	Contin	uous Assessmei	nt Tests	Final				
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	Examination (60)				
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				

2204101		L	Т	Ρ	С
2361101		3	0	2	4
Nature of Course	Basic Sciences				
Pre requisites	Fundamentals of Basic Physics				

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

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

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

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

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.

Approved in Academic Council Meeting 13.02.2023

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UNIT V OPTICAL PROPERTIES OF MATERIALS

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

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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-nonuniformbending-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-nonuniformbending-6aMRx
- 3. https://nptel.ac.in/courses/115/105/115105099/#
- 4. https://www.youtube.com/watch?v=uv0LxMoalEQ

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

60-				POs	S									PSOs	5
COS	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	3 High			2		Ν	<i>l</i> ediu	ım		1	L	ow		

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

22MCS102		L	Т	Ρ	С
2310103102	C PROGRAMMMING LABORATORT	0 0	2	1	
Nature of	Professional Core				
Course					
Pre requisites	NIL				

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

TOTAL: 60 Periods

Маррі	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs			
COS	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	3 High					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										

22ME101	Engineering Graphics	L	Т	Ρ	С
		2	0	2	3
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

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)

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

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

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

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.

Approved in Academic Council Meeting 13.02.2023

(3+12)

(3+12)

1

(3+12)

UNIT- IV Projection of Sectioned Solids and Development of Surface

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

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.
- 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

(3+12)

(3+12)

Мар	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
CO2	Pos												PSOs			
COS	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	3 High 2 Medium 1							L	.ow						

Summative assessment													
		Continuous Assessment											
		Fxamination											
Bloom's Level	IAE-I [7.5]	IAE-II [7.5]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	(Theory) [50 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	Т	Ρ	С
		2	0	0	0
Nature of	Mandatory, Non Credit				
Course					
Pre requisites	Completion of Schooling at Higher Secondary Level				

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

Mapping of COs with POs and PSOs

Mapping	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific														
Outcomes (PSOs)															
Pos													PSOs		
COs	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	3 High 2 Medium 1						Low							

		Continuous Assessment (Non-Credit, Mandatory)										
Bloom's Level	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												

SEMESTER – II

23MA201	CALCULUS AND COMPLEX VARIABLES	L 3	Т 1	P 0	C 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	Apply
	Functions	
CO2	Compute double and triple integrals	Apply
000	Apply the concepts of integration in evaluating engineering problems	Apply
003	related to area, volume and vector point functions	
CO4	Identify the concepts of analytic functions and its properties	Apply
004	and apply it in conformal mapping.	
CO5	Determine the singularities and its corresponding residues for the given	Apply
	function	

Course Content:

UNIT-I INTEGRAL CALCULUS

Evaluation of definite integrals using Bernoulli's formula. Beta and Gamma functions- Relation - Evaluation of Integrals

UNIT-II MULTIPLE INTEGRALS

Double and Trible integration in Cartesian coordinates -Area and Volume by Iterated Integrals.

UNIT-III VECTOR CALCULUS

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

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

12

12

12

UNIT-V COMPLEX INTEGRATION

12

Cauchy Integral theorem – Cauchy Integral formula – Laurent's series – singularities and Zeros – Residues – Cauchy Residue theorem.

Text Books:

TOTAL: 60 Periods

- 1. G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 13thEdition, 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.

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

Mappi	Mapping of Course Outcomes (Cos) with Programme Outcomes (Pos) Programme Specific Outcomes (PSOs)														
Cos	Pos													PSOs	
COS	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 High					2		Medi	um		1		Low		

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

Summative Assessment											
	Contin	Final									
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	Examination (60)							
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							

23MCS201		L	Т	Ρ	С
2310103201	FILLON FROGRAMMING	3	0	0	3
Nature of	Professional Core				
Course					
Pre requisites	NIL				

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

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

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

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

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

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

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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.

- 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 o	Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)														
	Pos														
COs	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											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											
	Continu	ous Assessme	Terminal Examination								
Bloom's Category	IAE1 (7.5)	IAE2 (7.5)	IAE3 (10)	(60)							
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							

22MCS202		L	Т	Ρ	C		
2310103202	DATA STRUCTURES	3 1 0 4					
Nature of Course	Professional Core						
Pre requisites	Problem Solving using C						

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

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

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

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

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

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

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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.

- 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/

Марр	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Pos Pos														PSOs		
Cos	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		Mec	lium		1		Low				

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

	Summative Assessment								
	Contin	Continuous Assessment Tests							
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	Examination (60)					
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					

		L	Т	Ρ	С
23EE201	Basics of Electrical and Electronics Engineering	3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

- 1. The course is intended to understand the basic concepts of electrical elements and measuring instruments.
- 2. Gain knowledge of circuit laws.
- 3. Understand the various components used in electrical installations.
- 4. Illustrate the construction and operation of various electrical machines.
- 5. Explore the knowledge on semiconductor and digital circuits

Course Outcomes

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

CO.No.	No. Course Outcome							
CO1	Explain the basic concepts of electrical elements and measuring instruments	Understand						
CO2	Apply various circuit laws for solving complex circuits	Apply						
CO3	Analyze the functions of various components used in electrical systems	Apply						
CO4	Classify the static and dynamic machines and explain their operation.	Apply						
CO5	Understand the basic functionalities of electronic circuits and devices	Apply						

Course Contents:

Unit – I Electrical Elements and Measuring Instruments

Resistance, Inductance, Capacitance, Wires and Cables Ammeter, Voltmeter, Wattmeter, Energy meter, Thermistor and Anemometer

Unit-- II Electrical Circuits and Theorems

Ohm's Law – Kirchoff's Laws – Steady State Solution of DC Circuits – Introduction to AC Circuits– Theorems; Thevinin's, Norton's, Superposition, Maximum power transfer

Unit – III Electrical Installations Devices:

Types of Protection devices: Fuses, MCB, ELCB, equipments for house wiring, simple house wiringand pump motor wiring.

Unit - IV Electrical Machines

Construction and operating characteristics: DC Motor, Single Phase Transformer, Three phase Induction motor, Single phase induction motors, Synchronous Motor, and Stepper Motor.

Unit – V Semiconductor Devices and Digital Electronics

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion

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Total: 45 Periods

Text Books

- **1.** D P Kothari and I.J Nagarath, "Electrical Machines Basic Electrical and Electronics Engineering", McGraw Hill Education(India) Private Limited, Third Reprint,2016.
- 2. Leonard S Bobrow, "Foundations of Electrical Engineering", Oxford University Press, 2013.
- **3.** Thereja .B.L., "Fundamentals of Electrical Engineering and Electronics ", S. Chand & Co. Ltd., 2008.

Reference Books:

- 1. Laszlo Solymar, Donald Walsh, Richard R. A. Syms, "Electrical Properties of Materials", Oxford University press, 2014.
- 2. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 2014.
- 1. T.K.Nagsarkar and M.S.Sukhija, "Basic of Electrical Engineering", Oxford University Press, 2011.
- 2. Mehta V K, "Principles of Electronics", S.Chand& Company Ltd, (1994).

Mapping o	of Cou	rse C	Outco	omes	(CO	s) w O	ith Pro utcom	ograi nes (F	nme PSOs	Outo S)	come	es (Po	Os) Progr	amme	Specifi	ic
POs									PSOs							
COs	1	2	3	4	5	6	7	8	9	10	11	12	1	2		3
CO1	3	3	2										3	1		2
CO2	3	3	2										3	1		2
CO3	3	3	2										3	1		2
CO4	3	3	2										3	1		2
CO5	3	3	2										3	1		2
	3	High				2	Mediu	Jm				1	Low			

Formative assessment								
Bloom's Level	Bloom's Assessment Component							
Understand	Quiz / Presentation/Tutorial	5						
Understand	Assignment/Video presentation	5	15					
	Attendance	5						

	Summative Assessment								
	Continuo	ous Assessmer	Terminal Examination						
Bloom's Category	IAE 1	IAE 2	IAE 3	Terminal Examination					
Biooni s category	(7.5)	(7.5)	(10)	(60)					
Remember	10	10	10	20					
Understand	10	10	10	20					
Apply	30	30	30	60					
Analyze									
Evaluate									
Create									

2050201		L	Т	Ρ	С
2020201	DIGITAL PRINCIPLES AND STSTEM DESIGN	3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Electronic Devices				

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

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

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

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

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

UNIT V Memory Devices And Digital Integrated Circuits

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

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.

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Total :45 periods

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.

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

Mapping of	Mapping of Course Outcomes (COs) with Program Outcomes (POs) Program Specific Outcomes (PSOs)														
								Pos						PSO	s
COs	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	1	-	-	-	-	-	-	-	3	3	-
CO4	3	3	3	3	-	-		-	-	-	-	-	3	3	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-	3	3	-
	3		H	igh		2			Mediu	m		1		Low	1

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

	summative Assessment									
	Continuc	ous Assessmen	Terminal							
Bloom's Category	IAE I	IAE II (7.5)	IAE III	Examination (60)						
	(7.5)	(7.5)								
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						

22MC6202		L	Τ	Ρ	С				
2310103203		0	0	2	1				
Nature of	Professional Core								
Course	roressional Core								
Pre requisites	C Programming Laboratory								

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

Mappi	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
6				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	3 High					Medium 1					Low			

Summative assessme	Summative assessment based on Continuous and End Semester Examination												
Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [40 marks]											
Remember													
Understand	10	30											
Apply	20	50											
Analyze	20	20											
Evaluate	0	0											
Create	0	0											

22MC6204		L	Τ	Ρ	С
2310103204	DATA STRUCTURES LABORATORT	0 0	2	1	
Nature of Course	Professional Core	•			
Pre requisites	C Programming Laboratory				

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

Mappi	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific														
Outcomes (PSOs)															
<u> </u>	POs														
COS	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	3 High					Medium 1			1		Low			

Summative assessmer	t based on Continuous and End	Semester Examination
Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [40 marks]
Remember		
Understand	10	30
Apply	20	50
Analyze	20	20
Evaluate	0	0
Create	0	0

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22MC201		L		Р	C
231016201	ENVIRONMENTAL SCIENCES	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

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

UNIT II BIODIVERSITY

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

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

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

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.

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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:

- 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.

- 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

Марр	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
0	Pos													PSOs		
LUS	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	2 Medium				1	Low					

Summative Assessment											
	Continuous Assessment Tests										
Bloom's Category	IAE-I (7.5)	IAE-II (7.5)	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								

					С
ZJENEUT	EFFECTIVE COMMUNICATION SKILLS	2	0	0	0
Nature of	E (Theory skill based)				
Course	E (Theory Skill Dased)				
Pre requisites	Basics of English Language				

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 and communication.

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 of fluency and comprehensibility.	Apply
CO3	Communicate effectively in personal and professional situations.	Apply
CO4	Demonstrate oral presentations and receive feedback on their performance.	Apply
CO5	Acquire reading fluency skills through extensive reading.	Analyze

Course Content:

UNIT I

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

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

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

UNIT IV

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

UNIT V

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				
COS	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	3 High			2		Medi	ium		1		Lo	W		

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						