First Year
Scheme & Syllabus
(2023 Scheme)

SCHEME AND SYLLABUS

Computer Science and Engineering
Stream

GLOBAL ACADEMY OF TECHNOLOGY
Autonomous institution affiliated to VTU, Belagavi.
Raja Rajeshwari Nagar, Bengaluru-560098.

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)
Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023 – 24)

I SEMESTER B.E. (PHYSICS GROUP) – CSE Stream (CSE/ISE/AD/AI/CS(AM))

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT11A	MATHEMATICS I FOR CSE STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23PHY12A	APPLIED PHYSICS FOR CSE STREAM (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	ESC	23CSE13	PRINCIPLES OF PROGRAMMING USING C (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
4	ESC-1	23ESC14B	INTRODUCTION TO ELECTRICAL ENGINEERING	EEE	EEE	3	0	0	50	50	100	3
5	ETC-1	23ETC15A	INTRODUCTION TO AI	AI&DS	ANY	3	0	0	50	50	100	3
6	AEC	23EGH16	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23KSK17/ 23KBK17	SAMSKRUTIKA KANNADA / BALAKE KANNADA	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	17	2	4	350	350	700	20

Note: ASC- Applied Science Course, ESC- Engineering Science Course, ETC – Emerging Technology Course, PLC – Programming Language Course, , HSMC- Humanity, Social Science and Management course, AEC – Ability Enhancement Course.

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Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023– 24)

I SEMESTER B.E. (CHEMISTRY GROUP) – CSE Stream (CSE/ISE/AD/AI/CS(AM))

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT11A	MATHEMATICS I FOR CSE STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23CHE12A	APPLIED CHEMISTRY FOR CSE STREAM (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	ESC	23CSE13	PRINCIPLES OF PROGRAMMING USING C (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
4	ESC-1	23ESC14A	INTRODUCTION TO ELECTRONICS AND COMMUNICATION	ECE	ECE	3	0	0	50	50	100	3
5	ESC	23MEG15	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
6	HSMC	23IDT16	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23CIP17	INDIAN CONSTITUTION	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	16	2	6	350	350	700	20

Note: ASC- Applied Science Course, ESC- Engineering Science Course, ETC – Emerging Technology Course, PLC – Programming Language Course, , HSMC- Humanity, Social Science and Management course, AEC – Ability Enhancement Course

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Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023 – 24)

II SEMESTER B.E. (PHYSICS GROUP) – CSE Stream (CSE/ISE/AD/AI/CS(AM))

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT21A	MATHEMATICS II FOR CSE STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23PHY22A	APPLIED PHYSICS FOR CSE STREAM (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	PLC-2	23PLC23A	ADVANCED PROGRAMMING IN C (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
4	ESC-2	23ESC24B	INTRODUCTION TO ELECTRICAL ENGINEERING	EEE	EEE	3	0	0	50	50	100	3
5	ETC-2	23ETC25A	INTRODUCTION TO AI	AI&DS	ANY	3	0	0	50	50	100	3
6	AEC	23EGH26	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23KSK27/ 23KBK27	SAMSKRUTIKA KANNADA / BALAKE KANNADA	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	17	2	4	350	350	700	20

Note: ASC- Applied Science Course, ESC- Engineering Science Course, ETC – Emerging Technology Course, PLC – Programming Language Course, , HSMC- Humanity, Social Science and Management course, AEC – Ability Enhancement Course

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GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)
Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023 – 24)

II SEMESTER B.E. (CHEMISTRY GROUP) – CSE Stream (CSE/ISE/AD/AI/CS(AM))

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT21A	MATHEMATICS II FOR CSE STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23CHE22A	APPLIED CHEMISTRY FOR CSE STREAM (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	PLC-2	23PLC23A	ADVANCED PROGRAMMING IN C (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
4	ESC-2	23ESC24A	INTRODUCTION TO ELECTRONICS AND COMMUNICATION	ECE	ECE	3	0	0	50	50	100	3
5	ESC	23MEG25	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
6	HSMC	23IDT26	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23CIP27	INDIAN CONSTITUTION	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	16	2	6	350	350	700	20

Note: ASC- Applied Science Course, ESC- Engineering Science Course, ETC – Emerging Technology Course, PLC – Programming Language Course, , HSMC- Humanity, Social Science and Management course, AEC – Ability Enhancement Course

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Engineering Science Courses (ESC-1 / ESC-2)					Credits	Emerging Technology Courses (ETC-1 / ETC-2)						Credits
Code	Title	L	T	P		Code	Course Title	L	T	P		
23ESC14A/24A	INTRODUCTION TO ELECTRONICS AND COMMUNICATION	3	0	0	3	23ETC15A/25A	INTRODUCTION TO AI	3	0	0		3
23ESC14B/24B	INTRODUCTION TO ELECTRICAL ENGINEERING	3	0	0	3	23ETC15B/25B	INTRODUCTION TO EMBEDDED SYSTEM	3	0	0		3
23ESC14C	INTRODUCTION TO C PROGRAMMING (INTEGRATED)	3	0	2	4	23ETC15C/25C	RENEWABLE ENERGY SOURCES	3	0	0		3
23ESC14D/24D	ENGINEERING MECHANICS	3	0	0	3	23ETC15D/25D	INTRODUCTION TO DRONES	3	0	0		3
						23ETC15E/25E	INTRODUCTION TO AUTOMATION & ROBOTICS	3	0	0		3
						23ETC15F/25F	WASTE MANAGEMENT	3	0	0		3

Programming Language Courses (PLC-1 / PLC-2)					Credits
Code	Title	L	T	P	
23PLC23A	ADVANCED PROGRAMMING IN C (INTEGRATED)	3	0	2	4
23PLC23B	INTRODUCTION TO PYTHON PROGRAMMING (INTEGRATED)	3	0	2	4

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Course: Mathematics I for CSE stream

| Course Code	23MAT11A	CIE Marks	50
Hours/Week (L: T: P)	3:2:0	SEE Marks	50
No. of Credits	4	Examination Hours	03

Course Objectives

To enable students to apply the knowledge of Mathematics in various fields of engineering by making them to learn the following:

CLO1	Solution of system of equations and Eigen values
CLO2	Polar curves, Curvature and Radius of curvature
CLO3	Partial derivatives and Jacobians
CLO4	Vector differentiation

Content	No. of Hours/ RBT levels
Module 1 Rank of a matrix by elementary row transformations. Eigen values and Eigen vectors. Consistency of linear system of equations. Solution of linear system of equations: Gauss elimination, Gauss Jordan and Gauss-Seidel methods.	10 Hours L2, L3
Module 2 Successive Differentiation; standard results. Fundamental Theorems: Rolle's theorem, Lagrange mean value theorem, Cauchy's mean value theorem and Taylor's theorem. Expansion of functions: Maclaurin's series.	10 Hours L2, L3
Module 3 Evaluation of indeterminate forms. Polar Curves: Angle between radius vector and tangent, angle between two curves. Pedal equation. Curvature and Radius of Curvature for Cartesian and polar curves.	10 Hours L2, L3
Module 4 Function of two or more variables, Partial derivatives, Differentiation of composite functions. Jacobians (direct examples). Taylor's theorem for functions of two variables. Maxima and Minima of functions of two variables.	10 Hours L2, L3
Module 5 Differentiation of vectors, velocity and acceleration. Scalar and vector point functions. Gradient, directional derivative; divergence and curl, physical interpretation of divergence and curl.	10 Hours L2, L3
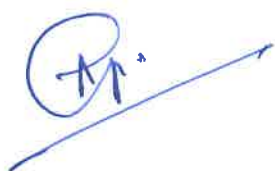
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Course Outcomes

Upon completion of this course, student will be able to:

CO11.1	Apply knowledge of matrices to test the consistency and solve system of linear equations.
CO11.2	Demonstrate the understanding of fundamental theorems of calculus.
CO11.3	Solve problems related to curvature, maxima & minima and Jacobians.
CO11.4	Compute Gradient, Divergence and Curl of a scalar/vector field.

Text books:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th Edition, 2017.
2. Higher Engineering Mathematics, B.V. Ramana, Tata McGraw-Hill, 2006

References:

1. Advanced Engineering Mathematics, E. Kreyszig, John Wiley & Sons, 10th Edition, 2016.
2. Higher Engineering Mathematics, H.K. Dass and Er. Rajnish Verma, S. Chand publishing, 1st edition, 2011.
3. A Text Book of Engineering Mathematics, N.P.Bali and Manish Goyal, Laxmi Publications, 6th Edition, 2014.
4. Calculus, James Stewart, Cengage Publication, 7th Edition, 2012.

Scheme of Examination:

Semester End Examination (SEE):

SEE Question paper is to be set for 100 marks and the marks scored will be proportionately reduced to 50. There will be two full questions (with a maximum of three sub questions) from each module carrying 20 marks each. Students are required to answer any **five full questions** choosing at least **one full question from each module.**

Continuous Internal Evaluation (CIE):

Three Tests are to be conducted for 40 marks each. Average of Marks scored in all three tests is added to test component. CIE is executed by way of quizzes / Alternate Assessment Tools (AATs), and three tests. **Some possible AATs:** seminar/assignments/ mini-projects/ concept videos/ partial reproduction of research work/ group activity/ any other.

Typical Evaluation pattern for regular courses is shown in Table 1.

Table 1: Distribution of weightage for CIE & SEE of Regular courses

	Component	Marks	Total Marks
CIE	CIE Test-1	40	50
	CIE Test-2	40	
	CIE Test-3	40	
	Assignments	10	
SEE	Semester End Examination	50	50
Grand Total			100

CO/PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO11.1	3	2	1									3
CO11.2	3	2	1									3
CO11.3	3	2	1									3
CO11.4	3	2	1									3
Average	3	2	1									3

Low-1: Medium-2: High-3

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GLOBAL ACADEMY OF TECHNOLOGY
(Autonomous Institute Affiliated to VTU)
DEPARTMENT OF PHYSICS
APPLIED PHYSICS FOR CSE STREAM (INTEGRATED)
(Effective from the academic year: 2023-24)

Semester	I/II	CIE Marks	50
Subject Code	23PHY12A/22A	SEE Marks	50
Hours/Week (L: T: P)	3:0:2	Examination Hours	03
No. of Credits: 04				

Course Objectives: The course will enable the students to

1	Learn the basic concepts in Physics which are very much essential in understanding and solving Engineering related challenges.
2	Make the students gain practical knowledge to correlate with the theoretical studies.
3	Achieve perfectness in experimental skills and ability to develop and fabricate engineering and technical equipment.

Content	No. of Hours/ RBT levels
Module 1	8 hrs/L3
LASERs & Optical fibers **LASERs:** Interaction of radiation with matter, Einstein's coefficients, Requisites and condition for lasing action, semiconductor LASER, application of lasers in measurement of pollutants in the atmosphere, bar code, numerical problems. **Optical fibers:** Total internal reflection, angle of acceptance and numerical aperture (NA). Modes of propagation, V number and types of optical fibers. Attenuation mechanisms, attenuation coefficient, applications, merits and de-merits, numerical problems.	
Pedagogy	Chalk & Talk, multimedia presentation
Module 2	8hrs/L3
Quantum mechanics Wave-particle dualism, de Broglie hypothesis, de Broglie wavelength of an accelerated electron, Heisenberg's uncertainty principle, application of HUP (Non-existence of electrons inside the nucleus), significance and properties of wave function, Schrodinger's time independent wave equation, eigen functions & eigen	

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values for a particle in one dimensional potential well of infinite height, numerical problems.		
Pedagogy	Chalk & Talk, multimedia presentation	

Module 3	8 hrs/L3

Introduction to quantum computing

Distinction between classical and quantum computing. Young's double slit experiment. Need for quantum computers. Moore's law & its end. Concept of qubit and its properties. Representation of qubit by Bloch sphere. Single and two qubits. Extension to N qubits.

Dirac representation and matrix operations:

Matrix representation of 0 & 1 states, Pauli matrices and their operations on $|0\rangle$ and $|1\rangle$ states. Conjugate and transpose of a matrix. Probability, quantum superposition, normalization rule. Orthogonality, orthonormality. Numerical problems

Quantum gates:

Single qubit gates: Quantum NOT gate, Pauli – X, Y & Z gates, Hadamard gate, T gate.

Pedagogy	Chalk & Talk, multimedia presentation	

Module 4	8 hrs/L3

Electrical properties of materials

Quantum free electron theory: Assumptions of quantum free electron theory, Density of states(qualitative), expression for Fermi energy, Fermi factor & its temperature dependence, success of quantum free electron theory, numerical problems.

Superconductivity: Introduction, Temperature dependence of resistivity, Meissner's effect, critical field, Temperature dependence of critical field. Types of superconductors, SQUIDs, Maglev vehicles.

Pedagogy	Chalk & Talk, multimedia presentation	

Module 5	8 hrs/L2

Semiconductors & devices:

Fermi level in intrinsic & extrinsic semiconductors, expression for conductivity. Hall effect, expression for Hall coefficient, and its applications. Photodiode and power responsivity, four probe method to determine resistivity, phototransistor, photoelectric sensor, Charge coupled (CCD) sensors and detectors, Thermal-based optical sensors, Passive IR sensors, numerical problems.

Pedagogy	Chalk & Talk, multimedia presentation	

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SL. No.	Experiments	No. of Hours/ RBT levels
1	Spring constant in series and parallel combination	2 /L3
2	Wavelength of light emitted by LEDs	2/L3
3	Frequency response in series and parallel LCR circuits	2/L3
4	Energy gap of a semiconductor	2 / L2
5	Acceptance angle and numerical aperture of an optical fiber	2 / L2
6	Rigidity modulus using Torsional pendulum	2/L2
7	Fermi energy of a conductor	2 / L2
8	Dielectric constant of a dielectric material	2 / L3
9	Photo diode characteristics	2 / L3
10	Wavelength of LASER using diffraction grating	2 / L2

Course Outcomes: The students will be able to:

CO1	Apply the concepts of LASERs and optical fibers and, their applications.
CO2	Interpret the concepts of quantum mechanics & utilize in electrical properties of materials and quantum computing.
CO3	Illustrate the steps involved in the working of semiconducting devices.

Textbooks:

1. A text book of Engineering Physics, Avadhanulu M N, Kshirasagar P G & Arun Murthy TVS, 11th edition, S Chand Ltd, New Delhi (2018).
2. A detailed textbook of Engineering Physics, Basavaraju S P, Subhas Publishers (2018).
3. Gaur & Gupta, Engineering Physics, Dhanpath Rai publications (2017)
4. Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac L. Chuang, Cambridge Universities Press (2010).
5. Quantum Computing – A Beginner's Introduction, Parag K Lala, Indian Edition, Mc Graw Hill (2020).
6. Quantum Computing for Everyone, Chris Bernhardt, The MIT Press Cambridge, Massachusetts London, England (2019).
7. Actuators, and Their Interfaces: A multidisciplinary introduction (2nd Edition) Nathan Ida Publisher: Institution of Engineering and Technology (2014) ISBN 1613530064, 9781613530061

Reference books:

1. Arthur Beiser, Shobhit Mahajan, Rai Choudhury S, Concepts of Modern Physics (SIE) | 7th Edition Paperback Tata Mc Graw Hill Edu Pvt. Ltd, New Delhi (2017).

2. Pillai S O, Solid State Physics, Multicolour Ed, New Age International publishers (2020).
3. David Griffiths, Introduction to Electrodynamics, 4th Ed. Cambridge Univ. Press (2017).
4. Laud B B, Lasers & non-linear optics, 3rd Ed., New Age International publishers (2011).
5. Engineering Physics lab manual – Department of Physics, Global Academy of Technology

Web links and Video Lectures (e-Resources):

LASER: https://www.youtube.com/watch?v=WgzynezPiyc

Superconductivity: https://www.youtube.com/watch?v=MT5Xl5ppn48

Optical Fiber: https://www.youtube.com/watch?v=N_kA8EpCUQo

Quantum Mechanics: https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s

Quantum Computing: https://www.youtube.com/watch?v=jHoEjvuPoB8

Quantum Computing: https://www.youtube.com/watch?v=ZuvCUU2jD30

NPTEL Superconductivity: https://archive.nptel.ac.in/courses/115/103/115103108/

NPTEL Quantum Computing: https://archive.nptel.ac.in/courses/115/101/115101092

Virtual LAB: https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

Virtual LAB: https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1

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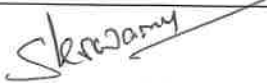
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PRINCIPLES OF PROGRAMMING USING C (INTEGRATED)

Subject Code	23CSE13	CIE Marks	50
Hours/Week (L: T: P)	3:0:2	SEE Marks	50
Total Hours	40	Examination Hours	3
No. of Credits: 4			

Course Learning Objectives:

The course will enable students to:

CLO1	Understand the steps in the development of a computer program and the structure of a C-language program
CLO2	Understand how decisions are more, design and implement programs with functions
CLO3	Understand basic loop concepts and write programs that use the appropriate loop construct for a given problem
CLO4	Understand the basic concepts and uses of arrays and pointers

CONTENTS	# of Hours / RBT Levels
MODULE 1 **INTRODUCTION TO COMPUTER PROGRAMMING** **Introduction to Computers:** Computing Systems, Computing Environments, Computer Languages, Creating and Running Programs, System Development **Introduction to the C Language:** Structure of a C Program, Identifiers, Types, Variables, Constants, Input/Output, Programming Examples. **Textbook: T1** Chapters: 1 and 2.	08 Hours L2
MODULE 2 **STRUCTURE OF A C PROGRAM AND FUNCTIONS** **Structure of a C Program:** Expressions, Precedence and Associativity, Side Effects, Type Conversion, Statements. **Functions:** Designing Structured Programs, Functions in C, User-Defined Functions. **Textbook: T1** Chapters: 3 and 4.1 to 4.3.	08 Hours L2
MODULE 3 **FUNCTIONS CONTD. AND SELECTION – MAKING DECISIONS** **Functions:** Inter-Function Communication, Standard Functions, Scope, Programming Example – Incremental Development.	08 Hours L3

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Selection – Making Decisions: Logical Data and Operators, Two-Way Selection, Multiway Selection, More Standard Functions, Incremental Development Part II. **Textbook: T1** **Chapters: 4.4 to 4.7 and 5.**	
MODULE 4 **REPETITION** **Repetition:** Concept of a loop, Pretest and Post-test Loops, Initialization and Updating, Event- and Counter-Controlled Loops, Loops in C, Loop Examples, Other Statements Related to Looping, Looping Applications, Recursion, Programming Example – The Calculator Program. **Textbook: T1** **Chapter: 6**	**08 Hours** **L3**
MODULE 5 **INTRODUCTION TO ARRAYS AND POINTERS** **Arrays:** Concepts, Using Arrays in C, Inter-Function Communication **Pointers:** Introduction, Pointers for Inter-Function Communication **Textbook: T1** **Chapter: 8.1 to 8.3, 9.1 and 9.2**	**08 Hours** **L3**

Laboratory Component

List of Experiments

1. Write a C program to create a customer's bill for a small restaurant. The restaurant sells only six different items: Idly, Vada, Dosa, Coffee, Tea, and Fruit Juice. The unit prices are Rs. 40, Rs. 20, Rs. 50, Rs. 15, Rs. 15, and Rs. 30, respectively. The program must read the quantity of each item ordered from the keyboard. It then calculates the cost of each item, the subtotal and the total cost after a 5% GST. The input data consist of a set of integers representing the quantities of each item sold. These integers must be input into the program in a user-friendly way.

2. Write a C program to compute the real roots of a quadratic equation ($ax^2 + bx + c = 0$). The program is to prompt the user to enter the constants a, b, and c. It is then to display the roots based on the following rules:
   a.   It both a and b is zero, there is no solution.
   b.   If a is zero, there is only one root (-c/b).
   c.   If the discriminate ($b^2 - 4ac$) is negative, there are no real roots.
   d.   For all other combinations, there are two roots.

3. Write a C program that reads a series of numbers and calculates the average, geometric mean, and harmonic mean.

4. Write a C program that determines a student's grade. It reads three test scores (between 0 and 50) and calls a function that calculates and returns a student's grade based on the following rules:
   a. If the average score is 90% or more, the grade is A.
   b. If the average score is 70% or more and less than 90%, it checks the third score. If the third score is more than 90%, the grade is A; otherwise, the grade is B.
   c. If the average score is 50% or more and less than 70%, it checks the average of the second and the third scores. If the average of the two is greater than 70%, the grade is C; otherwise, it is D.
   d. If the average score is less than 50%, then the grade is F.

5. Write a C program that asks the user to enter the current date and a person's date of birth in the form day, month, year. The program then calculates the person's age in integral years. Use separate functions to enter the dates, calculate the person's age, and print the results.

6. Write a C program that computes Sin(x) using Taylor series approximation. Compare the result with the built-in library function.

7. Write a C program to accept the number as a parameter through a user defined function and find its factorial by using recursion.

8. Write a C program that uses a function that tests if every element of array A is equal to its corresponding element in array B. The function is to return true if all elements are equal and false if at least one element is not equal.

9. Write a C program that uses a function that reverses the elements of an array so that the last element becomes the first, the second from the last becomes the second, and so forth.

10. Write a C program that uses pointers to add, subtract, multiply and divide two numbers.

Course Outcomes: Upon successful completion of this course, student will be able to

CO13.1	Understand problem solving steps and construct algorithm/pseudocode/flow chart that can be converted into a program.
CO13.2	Write appropriate functions to perform repetitive tasks in any application.
CO13.3	Write programs that need decision making and looping constructs for a given problem.
CO13.4	Store and retrieve data in arrays.
CO13.5	Understand the concept and use of pointers in writing programs.

Textbooks:
1. Computer Science - A Structured Programming Approach Using C, Behrouz A. Forouzan and Richard F. Gilberg, 3rd Edition, Cengage Learning India Pvt. Ltd., 2007, ISBN-10:81-315-00363-1

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Reference Books:

1. The C Programming Language, Kernighan B. W. and Dennis M. Ritchie, 2nd Edition, Pearson Education India, 2015, ISBN: 978-93-3254-944-9
2. Let us C, Yashvant P. Kanetkar, 16th Edition, BPB Publications, 2019, ISBN: 978– 93-8728-449-
3. Programming in C, Reema Thareja, 2nd Edition, Oxford University Press, 2015, 978-0-19-9456147

E-Books / Web References

1. https://en.wikibooks.org/wiki/A_Little_C_Primer

MOOCs

1. http://lms.vtu.ac.in/econtent/courses/BS/14CPL16/index.php
2. https://nptel.ac.in/courses/106/105/106105171/
3. https://www.coursera.org/learn/c-for-everyone

Mapping of CO-PO:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO13.1	3	3	2	1	1			1	2	1		1	2	
CO13.2	3	3	2	1	1			1	2	1		1	2	
CO13.3	3	3	2	1	1			1	2	1		1	2	
CO13.4	3	3	2		1			1	2	1		1	2	
CO13.5	3	3	2		1			1	2	1		1	2	
Average	3	3	2	1	1			1	2	1		1	2	

Low-1: Medium-2: High-3

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SEMESTER –I/II

SUBJECT: Introduction to Electrical Engineering

Subject Code	23ESC14B/24B	CIE Marks	50
Hours /Week	3:0:0	SEE Marks	50
Total Hours	40	Examination Hours	03
No. of Credits:3			

Course Learning Objectives:

CLO 1	Analysis of DC circuits.
CLO 2	Analysis of single phase AC circuits.
CLO 3	Explain the three phase circuit and three phase Synchronous Generators .
CLO 4	Understand the principle of operation, construction of single-phase transformer and three phase Induction motor.
CLO 5	Understand the importance of Green energy systems, Electric vehicles and necessity of earthing

Contents	No. of Hours / RBT Levels
Module – 1: DC Circuits: Basics concepts, Ohm's law, Kirchhoff's laws, analysis of series, parallel and series parallel circuits excited by independent voltage sources only. Power and energy in resistor. Analysis of Two loop circuits by Loop or mesh current method. **(Two loop circuits only)**	8/L3
Module – 2: Single Phase AC Circuits **Basics Terminology:** Generation of sinusoidal voltage, frequency of generated voltage, average value, root mean square value, form and peak factors. **Analysis of Circuits:** Voltage and current relationship, with phasor diagrams, in R, L, C, R-L, R-C and R-L-C series circuits. Concept of apparent, real, and reactive powers. Significance of power factor.	8/L4
Module – 3: Three Phase AC Circuits and Synchronous Generator Three Phase AC Circuits: Advantages of three phase systems, Generationof three phase voltages, meaning of phase sequence, Relationship betweenline and phase quantities for balanced star and delta connections for balancedloads. **Synchronous Generator:** Principle of operation and construction of Synchronous Generator, types and EMF equation **(Excluding the derivation and Calculation of winding factors).**	8/L2
Module – 4: Single-phase Transformer and Three Phase Induction Motor **Single-phase Transformer:** Principle of operation and construction, types, EMF equation, losses and efficiency calculations (Condition for maximum efficiency excluded). **Three phase Induction Motor:** Principle of operation and construction, types, concept of rotating magnetic field, slip and significance of slip, Advantages and applications. **(Numerical problems on slip calculations only)**	8/L2
Module – 5: Green Energy Sources and Electric vehicles **Green Energy Sources:** Solar and Wind energy generation systems. **Introduction to Electric vehicles:** Overview and block diagram approach to electric vehicles. **Earthing:** Necessity of Earthing and Types of Earthing.	8/L2

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Text Books

1.	Basic Electrical Engineering	Kulshreshtha. D.C	Tata McGrawHill	2012

Reference Books

1.	Basic Electrical Engineering	V. K. Mehta, Rohit Mehta	S Chand	2017
2.	Fundamentals of Electrical and Electronics Engineering	Samarjit Ghosh	PHI Learning	2007
3.	Hughes Electrical and Electronic Technology	John Hiley, Keith Brown, Ian Mckenzie Smith	Pearson Education	Tenth Edition Revised 2020
4.	Basic Electrical and Electronics Engineering	S. K. Bhattacharya	Pearson Education	2011
5.	A Text Book of Electrical Technology – Volume 1 (Basic Electrical Engineering) in SI system of units BL Theraja	BL. Theraja AK. Theraja	S. Chand	1999
6.	Electrical Engineering Fundamentals	Vincent Deltoro	Pearson	2015
7.	Non -Conventional Energy Resources	Sobh Nath Singh	Pearson Education	2017

COs	Statement	Bloom's Cognitive level	POs/PSOs
CO1	Apply fundamental laws to DC circuits.	Apply	PO1, PO2, PO12
CO2	Analyze the behaviour of single phase AC circuits.	Analyze	PO1, PO2, PO12
CO3	Explain three phase AC circuits and synchronous generator.	Understand	PO1, PO2, PO12
CO4	Explain the constructional features, working of single phase transformer and three phase induction motor.	Understand	PO1, PO2, PO12
CO5	Discuss the working of green energy systems, electric vehicles and types of earthing.	Understand	PO1, PO2, PO12

Scheme of Examination:

Semester End Examination (SEE):

SEE Question paper is to be set for 100 marks and the marks scored will be proportionately reduced to 50.

There will be two full questions (with a maximum of four sub questions) from each module carrying 20 marks each. Students are required to answer any **five full questions** choosing at least **one full question from each module.**

Continuous Internal Evaluation (CIE):

Three Tests are to be conducted for 40 marks each. The average of the three tests are taken for computation of CIE final marks.

CIE is executed by way of quizzes / Alternate Assessment Tools (AATs), and three tests.

Some possible AATs: seminar/ assignments/term paper/ open ended experiments/ mini-projects/
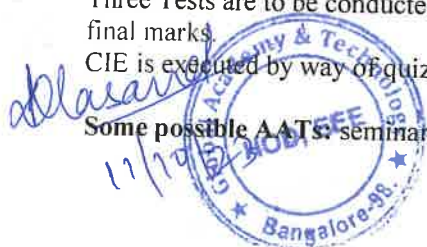
concept videos/ partial reproduction of research work/ oral presentation of research work/ group activity/ developing a generic toolbox for problem solving/ report based on participation in create-athon/ make-a-thon/ code-a-thon/ hack-a-thon conducted by reputed organizations/ any other.

Table 2: Distribution of weightage for CIE & SEE of Regular courses

	Component	Marks	Total Marks
CIE	CIE Test – 1	40	
	CIE Test – 2	40	
	CIE Test – 3	40	50
	Quiz / assignment/group discussion/presentation/mini projects	10	
SEE	Semester End Examination	100	50
	Grand Total		100

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	2	-	-	-

11/10/23.

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SUBJECT: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Semester:	I / II	CIE Marks:	50
Course Code:	23ETC15A/25A	SEE Marks:	50
Hours/Week (L:T:P):	3 : 0 : 0	Duration of SEE (Hours):	3 hrs.
Type of Course	ETC	Credits	3

Prerequisites: **None**

Course Learning Objectives: The course will enable students to:

CLO1	To interpret various concepts like agents, environment in applications to AI.
CLO2	To understand and compare the various search strategies used by the agents.
CLO3	To relate and contrast different learning paradigms and understand the data.
CLO4	To understand the applications of AI in the development of Expert System.

CONTENTS	No. of Hours	RBT Level
Module 1: Introduction to AI What is AI? History of AI, Agents and Environments, Structure of Agents, Types of Agents: Simple reflex agents, Model-based reflex agent, Goal-based agents, Utility-based agents, Learning agents. **Textbook 1: Chapter 1 and 2**	8	L2
Module 2: Search Algorithms Search strategies, Best First Search, A*, AO*, Hill Climbing, Generate & Test, Alpha-Beta pruning, Min-max search, **Textbook 1: Chapter 3**	8	L2
Module 3: Data preprocessing Types of Data: Structured and Unstructured Data, Quantitative and Qualitative Data, Four Levels of data (Nominal, Ordinal, Interval, Ratio Level). Data Transformation: Handling imbalanced data, Handling time series data, Function, Power and Quantile transformers. Use cases: Collect the data from the sensors and process using Arduino. **Textbook 3: Chapter 3**	8	L2
Module 4: Feature Engineering and Learning Feature Engineering: Processes, Techniques Forms of Learning: Introduction to Supervised, Unsupervised, Semi Supervised, Self-Supervised, Weakly Supervised and Reinforcement Learning. Use cases **Textbook 3: Chapter 7**	8	L2
Module 5: Expert Systems What an expert system is; how it works and how it is built, basic components of an expert system, Expert System Architectures, Examples of Expert Systems. Rule-based Expert systems: Structure of rule based expert system, Conflict resolution, Uncertainty Management, Advantages & disadvantages of rule-based.Fuzzy based expert System (Mamdani and Sugeno Fuzzy Inference Systems) **Textbook 2: Chapter 20**	8	L2

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COURSE OUTCOMES (CO): Upon completion of this course, student will be able to:

CO1	Elucidate the reasons behind AI for being an important field of study, and understand the types of agents, environments, and their relationships
CO2	Describe the Informed search algorithms that make up the fundamental building blocks of AI.
CO3	Understand the importance of preprocessing, types of data, and data transformation.
CO4	Understand different forms of learning and the importance of the structure of the data used by the agent.
CO5	Explore the application of AI ideas in the development of expert systems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2							2	3	
CO2	3	3	3		2							2	3	
CO3	3	3	3		2							2	3	
CO4	3	3	3		2							2	3	
CO5	3	3	3		2							2	3	
Average	3	3	3		2							2	3	

High-3: Medium-2: Low-1

Note: Kindly discuss the relevant case studies.

Textbooks:
1. Artificial Intelligence – A Modern Approach‖, by Stuart J. Russell and Peter Norvig, 3rd EditionPearson 2015.
2. Artificial Intelligence – E. Rich and Knight, 3rd Edition, McGraw Hill International, 2016.
3. Data preprocessing in Data Mining - Salvador García, JuliánLuengo Francisco Herrera, Springer.

Reference Books:
1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, CliffordStein, 3rd Edition, PHI.

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COURSE: COMMUNICATIVE ENGLISH

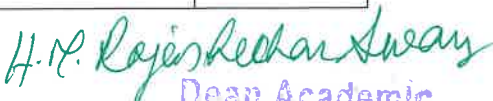| Course Code	23EGH16/26	CIE Marks	50
Hours/Week (L: T: P)	1:0:0	SEE Marks	50
No. of Credits	1	Examination Hours	3 hours

Course Objectives

To enable students to apply the knowledge of various forms of communication of English language in of engineering by making them to learn the following:

CLO1	Enhance the effective writing practices.
CLO2	Incorporate strong reading skills.
CLO3	Demonstrate efficient listening skills.
CLO4	Learn different styles of speaking.

Content	No. of Hours/RBT levels
Module 1- Writing Section Academic writing module: Responses to the academic writing module are short essays or general reports, addressed to an educated non-specialist audience. There are two compulsory tasks. Task 1 requires 150 words, and looking at a diagram, table, or data and to present the information in their own words. Task 2 requires at least 250 words, students to be presented with a point of view, argument, or problem and asked to provide general factual information, present a solution, justify an opinion, evaluate ideas and evidence, etc. It includes two tasks wherein the topics are of general interest and relatable for candidates applying for an undergraduate or postgraduate program. • For your first task, you will be handed a paper that would contain either a diagram, table, or graph. You will be required to recapitulate and define the given data in your own words. You may be asked to explain a certain data entry, process the given information, or a flowchart to logically arrive at a conclusion. • In the next task, you need to write an essay as a response to your deduction from the given data and support your argument with relevant examples, through the given data. Please note that the writing style should be strictly formal.	3/L3
Module 2- Reading Section This includes three long paragraphs which can be either descriptive, factual or analytical. These paragraphs are basically excerpts taken from newspapers, research works, journals, books, or even magazines.	3/L3
Module 3 - Listening Section	3/L3

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The Listening module is divided into four sections. The first two conversations are concerned with social needs, while the last two are concerned with situations more closely related to education. **Sections 1 and 2 are about every day, social situations** • Recording 1: The first recording would have a conversation between two people set in an everyday social context. • Recording 2 – The second recording would happen to be a monologue set in an everyday social context. **Sections 3 and 4 are about educational and training situations** • Recording 3 – The following recording would be a conversation between four people set in an educational or training context. • Recording 4 – And the final recording would be a monologue on an academic subject	
Module 4 - Speaking Section The Speaking section is like a structured interview with an emphasis on general speaking skills. **Part 1 introduction and interview (4–5 minutes)** For the first five minutes, you will be asked some mundane questions about yourself such as family, home, studies, hobbies and interests, and so on. **Part 2 long turn (2–3 minutes)** Next, a flash card will be handed over that would contain a certain topic. You will be given a minute or two to familiarize yourself with the topic as you would need to speak on that topic for about two minutes. Post your speech **Part 3 discussions (5–6 minutes)** Deeper questions and abstract discussions would take place based on the given topic and your speech. You will get the opportunity to explore your given topic and delve into deeper issues.	3/L3

Course Outcomes

Upon completion of this course, student will be able to:

CO1	Write concisely using effective practices.
CO2	Read comprehension effectively and decipher required information.
CO3	Listen to audio from various settings and decode information.
CO4	Practically demonstrate good speaking skills.

Text books:
1. The Official Guide to IELTS: https://www.cambridge.org/us/cambridgeenglish/official-exam-preparation-materials/product/official-cambridge-guide-ielts.
2. Barron's IELTS: International English Language Testing System: https://www.worldcat.org/title/barrons-ielts-international-english-language-testing-system/oclc/1080598431?referer=di&ht=edition

References:
1. Check Your English Vocabulary for IELTS: https://www.bloomsbury.com/us/check-your-english-vocabulary-for-ielts-9781472947376/
2. McGraw-Hill Education 6 IELTS Practice Tests With Audio: https://www.mhprofessional.com/test-prep-study-guides/language/9780071845151-usa-mcgraw-hill-education-6-ielts-practice-tests-with-audio-group

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2				2		1		2		2
CO2	2	2				2		1		2		2
CO3	2	2				2		1		2		2
CO4	2	2				2		1		2		2
Average	2	2				2		1		2		2

Low-1: Medium-2: High-3

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Theory - 01 Credit Course

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Course Title:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		
Course Code:		CIE Marks	50
Course Type (Theory/Practical /Integrated	**23KSK17/27**'	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KSK17/27) will enable the students,

1. ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು - ಅಂದರೆ ಕವಿ-ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.
3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)

1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು
   ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

	Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (23KSK17/27 ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

At the end of the course the student will be able to:

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):

Two Unit Tests each of 30 Marks (duration 01 hour)

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

Two assignments each of 20 Marks

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others. The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs. (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks

Semester End Examinations (SEE)

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour**. The student must secure a minimum of 35% of the maximum marks for SEE.

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

1. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
2. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

HEAD OF THE DEPARTMENT
Dept of Science & Humanities
Global Academy of Technology
Rajarajeshwari N... Bengaluru-98

H.M. Rajashekhar Swamy

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2

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ <u>ನಿಗದಿಪಡಿಸಿದ</u> ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Course Title:	ಬಳಕೆ ಕನ್ನಡ		
Course Code:	'23KBK17/27	CIE Marks	50
Course Type (Theory/Practical /Integrated	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KBK17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರುವ ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಉಪಯೋಗಿಸಬೇಕು.

2. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

3. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನು ತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತಿ ಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.

4. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣ ಗೊಂಡಿರುವ ಭಾಷ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.

5. ಭಾಷಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

Module - 1
<div align="right">(03 hours of pedagogy)</div>

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.

2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription

3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

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Module - 2	(03 hours of pedagogy)

1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns
2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Colour Adjectives, Numerals

3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –Predictive Forms, Locative Case

Module - 3	(03 hours of pedagogy)

1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals
2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು -Ordinal numerals and Plural markers
3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –Defective/Negative Verbs & Colour Adjectives

Module- 4	(03 hours of pedagogy)

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು
   Permission, Commands, encouraging and Urging words (Imperative words and sentences)
2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು
   Accusative Cases and Potential Forms used in General Communication

3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು -
   Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs
4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ-
   Comparitive, Relationship, Identification and Negation Words

Module - 5	(03 hours of pedagogy)

1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs
2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms

3. Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation

Course outcome (Course Skill Set)
ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

At the end of the course the student will be able to:

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than

26.10.2022

35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):
Two Unit Tests each of 30 Marks (duration 01 hour)
- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

Two assignments each of 20 Marks

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others.. The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs. (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks
Semester End Examinations (SEE)
SEE paper shall be set for **50 questions, each of the 01 mark.** The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

1. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

2. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions,
- ✓ Seminars and assignments

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GLOBAL ACADEMY OF TECHNOLOGY
(Autonomous Institute Affiliated to VTU)
DEPARTMENT OF CHEMISTRY
APPLIED CHEMISTRY FOR CSE STREAM (INTEGRATED) FOR I/II SEM
(Effective from the academic year: 2023-24)

Course Code	23CHE12A/22A	CIE Marks	50
Hours/Week (L: T: P)	3:0:2	SEE Marks	50
No. of Credits	04	Examination Hours	03

Course Learning Objectives: The course will enable the students to

CLO1	Know the fundamental concepts of Chemistry which are very much **essential in** day-to-day life, in industries and in research and development to solve Engineering related challenges.
CLO2	Impart **Practical skills** for better understanding of theoretical concepts.

Content	No. of Hours/ RBT levels
Module-1: Electrode system and Battery Technology **Energy conversion**: Basic concepts of Electrochemistry-Single electrode potential, EMF, Free energy, Electrochemical cells-definition & types, Nernst equation (No derivation), numericals, Reference Electrodes-Calomel electrode-construction & working. Ion selective electrode-Introduction, Glass electrode, determination of pH using glass electrode. Concentration cells. Numerical problems on EMF and concentration cells. **Battery Technology:** Introduction, Basic concepts, battery Characteristics (Voltage, Capacity & Shelf life), Classification of Batteries-Primary, Secondary, and reserve batteries. Construction, working and applications of Sodium battery and Li-Ion battery (Lithium batteries).	08 Hours/ L2
Pedagogy: Chalk and talk method, power point presentation, Videos. Display of electrodes model in class.	
Self-study: Construction & working of Zinc Air battery	
Module-2: Chemistry of Electronic Materials **Conductors, Semiconductors and Insulators:** Introduction, Band theory and examples. **Semiconductors:** production of electronic grade silicon by Czochralski process, Refining-Zone refining process, construction working and applications of PV-cell. **Display Systems:** Liquid crystals (LC's) - Introduction, classification, properties and application of Liquid Crystal Displays (LCD's), molecular ordering in nematic, smectic and columnar type liquid crystals Photoactive and electroactive materials, Light emitting electrochemical cells. Nanomaterials (QLED's) and organic materials (OLED's) used in optoelectronic devices. **Super Capacitors:-** Introduction, types (pseudo and asymmetric capacitor), applications	08 Hours/ L2
Pedagogy: Chalk and talk method, power point presentation,	
Self study: Doping-Defintion & methods	

Module 3: Electrochemical sensors and Corrosion Engineering **Electrochemical Sensors:** Introduction, Principle, instrumentation of potentiometric sensors: its application in the estimation of Iron, Optical sensors (Colorimetric): its application in the estimation of the copper., conductometry-principle, applications Mixture of acids VS strong base) **Corrosion science and Engineering:** Definition, Electrochemical theory of corrosion, Types of corrosion-differential metal, differential aeration corrosion, Factors affecting the rate of corrosion (Ratio of anode & cathode, Nature of corrosion product, pH & Temperature), Corrosion Penetration Rate (CPR), numerical. Corrosion control-Cathodic protection-sacrificial anode & Impressed current method. Metal finishing-introduction, technological importance, Electroplating-Introduction, Electroplating of chromium. Electroless plating: Introduction, Electroless plating of copper on PCB.	08 Hours/ L2,L3
Pedagogy: Chalk and talk method, power point presentation. Conduction of live experiments in laboratory.	
Self study: Galvanic series & Concept of biosensors	
Module 4: Polymer and Water technology **Polymers -** Introduction, Molecular weight - number average and weight average molecular weight, PDI-definition andnumerical. Synthesis, properties, and application of PMMA, PU.**Polymer composites** Kevlar Fibre and Carbon fibre- Synthesis, Properties & applications**Conducting polymers** - Introduction, synthesis and conducting mechanism of polyaniline and applications. **Biodegradable polymers** - Introduction, Polyglycolic acid - synthesis, degradation and uses. **Water technology:** Determination of total hardness of water, determination of COD and numericals on COD, desalination by reverse osmosis method, sewage treatment.	08 Hours/ L2, L3
Pedagogy: Chalk and talk method, power point presentation.	
Self study: Concepts of Nano Polymer composites	
Module 5: Nanomaterials, Environmental Chemistry and E-Waste Management **Nanomaterials:** Introduction to nanomaterials, synthesis: top-down and bottom-up approaches. Chemical methods of synthesis-solution combustion and hydrothermal methods. Carbon based nano materials-Graphene, Carbon nano tubes & Fullerences. Applications of nanomaterials. **Environmental chemistry:** Air pollutants: Sources, effects and control of primary air pollutants-Carbon monoxide, oxides of nitrogen and sulphur. **E-Waste Management:** introduction, Chemical composition of E-waste, sources, types, effects of e-waste on environment and human health. Recycling and Recovery-Hydrometallurgical extraction & Pyro metallurgical methods. Recycling of Li-ion batteries. Extraction of copper from E-waste.	08 Hours/ L2, L3
Pedagogy: Chalk and talk method, power point presentation. Seminar by students on topic Environmental Chemistry.	
Self study: Importance of Global warming & Rain water harvesting	

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PRACTICAL MODULE

SL. No.	Experiments	No. of Hours/ RBT levels
	Part- A: Instrumental Experiments	
1	Determination of pKa of vinegar using pH sensor (Membrane electrode - Glass electrode).	2/L3
2	Estimation of FAS in the given solution potentiometrically	2/L3
3	Determination of amount of HCl and CH_3COOH present in a mixture by conductometry.	2/L3
4	Estimation of Copper in the effluent from Electroplating industry by optical sensor (colorimetric method).	2/L3
	Part-B: Volumetric Experiments	2/L3
1	Determination of Chemical oxygen demand of industrial waste water.	2/L3
2	Determination of percentage of copper in brass solution by Iodometric method.	2/L3
3	Determination of Total hardness of given water sample by rapid EDTA method.	2/L3
4	Determination of Nickel in nickel sulfate solution using EDTA by complexometric method.	2/L3

SL. No.	Experiments	No. of Hours/ RBT levels
	Part-C: Demonstration (any Three) - Offline/ Virtual	
1	Determination of Viscosity coefficient of a liquid using viscometer.	2/L3
2	Design an experiment to Identify the presence of proteins in given Sample.	2/L3
3	Determination of percentage of Iron present in haematite ore sample using external indicator	2/L3
4	Searching suitable PDB file and target for molecular docking.	2/L3
5	Synthesis of ZnO Nano material by Sol Gel/Solution combustion method.	2/L3

Course Outcomes: Upon successful completion of this course, student will be able to:

CO1	**Understand** the concept of electrochemical energy systems and Electronic materials & its applications in engineering filed.
CO2	**Investigate** about various sensors, it's application and concept of corrosion for technological applications.
CO3	**Analyze** the knowledge of Polymers, Nano materials & concept of water for various environmental issues.
CO4	**Apply** the knowledge of chemistry to investigate engineering materials by volumetric and instrumental methods

Textbooks:

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi,2013-2nd Edition.
2. Engineering Chemistry, Satya Prakash &Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Textbook of Eng. Chemistry, Shashi Chawla, Dhanpat Rai &Co.(P)Ltd.
4. Essentials of Physical Chemistry, Bahl & Tuli, S. Chand Publishing.
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry-I,D. Grour Krishana, Vikas Publishing
7. A Textbook of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand &Company Ltd., 12th Edition, 2011.
8. A Textbook of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I.K. International Publishing house. 2nd Edition,2016.
9. Text Book of Polymer Science, F.W.Billmeyer, John Wiley & Sons, 4th Edition,1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A.Ozin & A.C.Arsenault,RSC Publishing,2 005.
11. Corrosion Engineering, M.G. Fontana,N.D. Greene, McGraw Hill Publications, NewYork,3rd Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGrawHill,2019.
13. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell,2012
14. Supercapacitors: Materials, Systems, and Applications, MaxLu, Francois Beguin, Elzbieta Frackowiak, Wiley-VCH;1st edition,2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIAPACIFICBUSINESSPRE SS Inc., 2017.
16. Dr. H. Panda. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi:10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr.Roopashree B,Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022.
18. High Performance Metallic Materials for Cost Sensitive Applications, F.H.Froes, et al. John Wiley & So ns, 2010.
19. Instrumental Methods of Analysis, Dr. K.R. Mahadik and Dr.L. Sathiya Narayanan, Nirali Prakashan,2020.
20. Polymer Science, VR Gowariker, NV Viswanathan, Jayadev, Sreedhar, NewageInt.Publishers,4th Edition, 2021
22. Engineering Chemistry, PC Jain & Monica Jain, Dhanpat Rai Publication,2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.
24. Nanotechnology Principles and Practices, SulabhaK Kulkarni, Capital Publishing Company,3rd Edition 2014.
25. Principles of nanotechnology, Phanikumar, Sci tech publications, 2nd Edition,2010.
26. Chemistry for Engineering Students, B.S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O.G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, MaliniS, KS Anantha Raju, CBS publishers Pvt Ltd., 29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Ra I &Co.

Reference books:

1. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4th Edition, 1999.
2. M.G. Fontana, N.D. Greene, Corrosion Engineering, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma & M.S. Pathania, S. Nagin Chand & Co., 41 Edition, 2004.

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4. G.A. Ozin& A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials". RSC Publishing, 2005.
5. Bansal R.K., A Text Book of Engineering Mechanics, Laxmi Publications; 6th edition, 2015.
6. G.H Jeffery, J Bassett, J Mendham and R.C. Denney Vogel's A.I. A text book of quantitative analysis, Dorling Kindersley (India) Pvt., Ltd. 35th edition, 2012.
7. Gary D Christian, Analytical Chemistry, Wiley India, 6th edition, 2015.
8. T. Pradeep, A Textbook of Nanoscience and Nanotechnology, McGraw Hill Education (India) Pvt., Ltd., 1st edition, 2015.

Weblinks and Video Lectures (e-Resources):
- http://libgen.rs/
- https://nptel.ac.in/downloads/122101001/
- https://nptel.ac.in/courses/104/103/104103019/
- https://ndl.iitkgp.ac.in/
- https://www.youtube.com/watch?v=faESCxAWR9k
- https://www.youtube.com/watch?v=j5Hml6KN4TI
- https://www.youtube.com/watch?v=X9GHBdyYcyo
- https://www.youtube.com/watch?v=1xWBPZnEJk8
- https://www.youtube.com/watch?v=wRAo-M8xBHM

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SEMESTER – I/II

COURSE: COMPUTER AIDED ENGINEERING DRAWING

Course Code	23MEG15/25	CIE Marks	50
Hours/Week (L: T: P)	2 : 0 : 2	SEE Marks	50
No. of Credits	3	Examination Hours	03

Overview: The course is designed for the I/II Semester Engineering students of all branches. It covers fundamental concepts and principles of engineering drawing with the emphasis on use of drafting software. Engineering drawing is a graphical medium of expression of technical details without the barrier of a language and termed as universal language of engineers. Engineering drawings are important in conveying useful information to other engineers with standardized conventions, rules, and regulations. The end goal of an engineering drawing is to convey all the required technical information that will allow a manufacturer to produce any kind of component in all the fields of engineering.

Course Objectives: At the end of the course, the student should be able to

CLO1	Understand the concept of BIS conventions in Engineering drawing.
CLO2	Apply the theoretical concepts to sketch orthographic projections in different positions.
CLO3	Understand the concepts of isometric projections of combination of solids.
CLO4	Use CAD tools for creation of Engineering drawings.

CONTENT	No. of Hours/ RBT levels
Module 1: Introduction to Engineering Drawing & Orthographic Projections of points and lines BIS conventions and standards. Introduction to drafting software, Planes of projection, reference line, Quadrants and conventions employed. **Projections of points** in all the four quadrants. **Projections of straight lines (First angle projection only):** Introduction, Line inclined to both the planes, true and apparent lengths, true and apparent inclinations to reference planes. *Application problems as demonstration only.*	10 Hours L3
Module 2: Projections of plane surfaces (First angle projection only): Introduction, Projections of regular plane surfaces–triangle, square, rectangle, pentagon, hexagon and circle - inclined to both the planes (change of position method only).	09 Hours L3

Module 3: Projections of Solids	
Introduction, Type of solids, Projections of right regular prisms like square, hexahedron(cube), pentagon, hexagon and pyramids like square, pentagon, hexagon, cone & tetrahedron in different positions (Inclined to both HP and VP).	**12 Hours** **L3**
Module 4: Isometric Projection (using isometric scale only)	
Introduction, Isometric scale, Isometric projection of combinations of solids (Maximum of two solids) like cube, regular prisms, cylinders, pyramids, cone, tetrahedron, frustum of pyramids, cone & sphere. *Demonstration of 3D solid models of prisms and pyramids using modelling software.*	**09 Hours** **L3**

*Problems from the above modules must be practiced on computer aided drafting software.

COURSE OUTCOMES: The students will be able to

CO1:	Demonstrate competence in the basics of orthographic projections of points, lines and planes.
CO2:	Sketch the orthographic projections of solids inclined to both horizontal & vertical planes.
CO3:	Generate isometric projections of various combinations of solids.
CO4:	Demonstrate 2D drafting of lines, planes & solids using solid edge software.

Textbooks:

1. K.R. Gopala Krishna, Sudhir Gopalakrishna, Engineering Graphics, Subhas Publishers, Bangalore, 40th edition, 2018-19.
2. N.D. Bhatt, Engineering Drawing, Charotar Publishing House, Gujarat, 53rd edition, 2014

References:

1. Luzadder Warren J., Duff John M., Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, Pearson India, 2015.
2. P. L. Varghese, Engineering Graphics McGraw Hill Education (India) Pvt. Ltd, and New Delhi, 2013.
3. N.S. Parthasarathy & Vela Murali, Engineering Drawing, Oxford University Press, 2015.

ASSESSMENT: CIE Assessment:

Particulars	Marks
Test 1 (Module 1 and Module 2) - @ 8 week	30
Test 2 (Module 3 and 4) - @ 14 weeks	30
Average of Test 1 & Test 2	30
Periodic Evaluation of Sketch Book	20
Total Marks	**50**

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SEE Assessment:

Maximum of **THREE QUESTIONS** will be set for **SEE** as per the pattern given below:

Scheme of Evaluation:

Modules	Marks Allocated
Module 1 & 2: Projection of Points, Lines **Or** Projection of Planes	30
Module 3: Answer any **ONE** question out of **TWO** Questions from Projection of solids	40
Module 4: Answer any **ONE** question out of **TWO** Questions from Isometric Projections	30
Total Marks	100

Question No.	Solutions and sketching in the sketch book	Computer Printout	Total Marks
1	15	15	30
2	20	20	40
3	15	15	30
Total Marks	**50**	**50**	**100**

Note: Students have to submit the computer printouts and the hand drawn sketches at the end of the examination for evaluation.

CO/PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	2	-	-	-	-	1	-	-
CO2	3	-	-	-	2	-	-	-	-	1	-	-
CO3	3	-	-	-	2	-	-	-	-	1	-	-
CO4	3	-	-	-	2	-	-	-	-	1	-	-

Low - 1: Medium - 2: High - 3

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Semester I / II
Innovation & Design thinking

Course Code	23IDT16/26	CIE Marks	50
Hours/Week (L: T: P)	1:0:0	SEE Marks	50
No. of Credits	1	Examination Hours	1 hour

Course Objectives

CLO1	To explain the concept of customer-oriented innovation approach
CLO2	To generate and develop creative ideas
CLO3	To understand various approaches and methods onto business process

Content	No. of Hours/RBT levels
Module - 1 **Design Thinking** Introduction, Principles of Design Thinking, process of Design Thinking, problem space and solution space. Understand the problem statement: PESTEL Analysis, Trend Impact Analysis, Delphi method, Ishikawa diagram, Root conflict analysis, Field maps. Empathetic design: Nine dimensions of descriptive observations, methods for Empathetic design - Artifact Analysis, Cognitive Walkthrough, Empathy map, Heuristic Evaluation, Customer Journey, Mystery Shopping, Behavioural Mapping & Tracking	6 / L3
Module -2 Defining the problem – Persona, jobs- to-be-done methods Ideate phase, stages, Internal and external sources of information, Creative principles, Intuitive Creative Techniques, Systematic Analytical Techniques, Evaluation of Ideas. Prototype phase, Minimum viable product, Methods to analyse prototypes. Testing Phase, methods of testing, conducting interviews, Conduct surveys, Kano model, desirability testing.	6 / L3

Course Outcomes
Upon completion of this course, student will be able to:

CO 1	Describe design thinking process used to solve problems by focusing on the needs of the customer.
CO 2	Analyse the problem to ascertain its context and origins and gain a better understanding of the prospective customers
CO 3	Analyse the data gathered during understand and observation stages to define the problem statement
CO 4	Create ideas and solutions for the problem that has been specified
CO 5	Create a prototype by validating assumptions and ideas that can be tested by the user.

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Textbooks:

1. Handbook of Design Thinking: Tips & Tools for how to design thinking by Christian Mueller-Roterberg, Kindle Direct Publishing
2. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
3. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press, 2009.

References:
1. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.

Web links and Video Lectures (e-Resources)
1. www.tutor2u.net/business/presentations/./productlifecycle/default.html
2. https://docs.oracle.com/cd/E11108_02/otn/pdf/. /E11087_01.pdf
3. https://www.mindtools.com/brainstm.html
4. https://designthinkingforeducators.com/design-thinking/

CO – PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	-	-	-	-	-	-	-	-	-	-	2
CO 2	2	2	2	-	-	-	-	-	-	-	-	2
CO 3	2	2	2	-	-	-	-	-	-	-	-	2
CO 4	2	2	2	-	-	-	-	-	-	-	-	2
CO 5	2	2	2	-	-	-	-	-	-	-	-	2
Average	2	2	2	-	-	-	-	-	-	-	-	2

Low-1: Medium-2: High-3

Theory - 01 Credit Course

Indian Constitution

Course Title:	Indian Constitution		
Course Code:		CIE Marks	50
Course Type (Theory/Practical /Integrated)	**23CIP17/27**	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

Course objectives :

The course **INDIAN CONSTITUTION (23CIP17/27 ')** will enable the students,

1. To know about the basic structure of Indian Constitution.
2. To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3. To know about our Union Government, political structure & codes, procedures.
4. To know the State Executive & Elections system of India.
5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution.

Teaching-Learning Process

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.

(i) Direct instructional method (Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools), (iii) Blended learning (Combination of both), (iv) Enquiry and evaluation based learning, (v) Personalized learning, (vi) Problems based learning through discussion.

(ii) Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills.

Module-1	(03 hours of pedagogy)

Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly.

Module-2	(03 hours of pedagogy)

Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.

Module-3	(03 hours of pedagogy)

Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive : Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet.

Module-4	(03 hours of pedagogy)

Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.

Module-5	(03 hours of pedagogy)

State Executive and Goverjer, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.

Course outcome (Course Skill Set)

At the end of the course ~~~~~~~~~ the student will be able to:

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

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Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):

Two Unit Tests each of 30 Marks (duration 01 hour)

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

Two assignments each of 20 Marks

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others.. The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs. (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks

Semester End Examinations (SEE)

SEE paper shall be set for **50 questions, each of the 01 mark.** The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

Suggested Learning Resources:

Textbook:

1. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. **"Introduction to the Constitution of India",** (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference Books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu"** - for **Students & Youths** by Justice HN Nagamohan Dhas, Sahayana, kerekon.
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics"**, Prentice –Hall, 2004.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions
- ✓ Seminars and assignments

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2

ADVANCED PROGRAMMING IN C (INTEGRATED)

Subject Code	23PLC23A	CIE Marks	50
Hours/Week (L: T: P)	3:0:2	SEE Marks	50
Total Hours	40	Examination Hours	3
No. of Credits: 4			

Course Learning Objectives:

The course will enable students to:

CLO1	Understand the classical approaches to sorting arrays and write programs that search arrays
CLO2	Write programs that access data through pointers
CLO3	Understand the concepts of strings and write programs that use the string functions
CLO4	Able to create and use enumerated types, unions, and structures in programs, write programs that read and write text/binary files, bit-wise operators, and preprocessor commands.

CONTENTS	# of Hours / RBT Levels
MODULE 1 **ARRAY & POINTER APPLICATIONS** **Array Applications:** Frequency Arrays, Histograms, Random Number Permutations, Sorting, Searching, Two-Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages **Pointer Applications:** Arrays and Pointers, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointer to void and to functions. **Textbook: T1** Chapters: 8.4 to 8.9 and 10, Appendix I	08 Hours L3
MODULE 2 **STRINGS** **Strings:** String Concepts, C Strings, String Input/Output Functions, Arrays of Strings String Manipulation Functions, String/Data Conversion, A Programming Example – Morse Code. **Textbook: T1** Chapter: 11	08 Hours L3
MODULE 3 **ENUMERATED, STRUCTURE, AND UNION TYPES**	
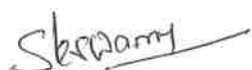
The Type Definition, Enumerated Types, Structure, Unions, Programming Application **Textbook: T1** **Chapter: 12**	**08 Hours** **L3**
MODULE 4 **TEXT AND BINARY INPUT/OUTPUT** **Text Input/Output:** Files, Streams, Standard Library Input/Output Functions, Formatting Input/Output Functions, Character Input/Output Functions **Binary Input/Output:** Text versus Binary Streams, Standard Library Functions for Files, Converting File Type, File Program Examples. **Textbook: T1** **Chapter: 7 and 13**	**08 Hours** **L3**
MODULE 5 **ADVANCED C TOPICS** **Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators, Masks. **Preprocessor Commands:** File Inclusion, Macro Definition, Conditional Compilation, Other Commands **Command-Line Arguments:** Defining Command-Line Arguments, Using Command-Line Arguments **Storage Classes and Type Qualifiers:** Storage Classes, Type Qualifiers **Textbook: T1** **Chapter: 14, Appendix G, H, J**	**08 Hours** **L3**

Laboratory Component

List of Experiments

1. Write a C program that uses a function that creates a two-dimensional matrix representing the Pascal triangle. In a Pascal triangle, each element is the sum of the element directly above it and the element to the left of the element directly above it (if any).

2. Write a C program using functions to read a set of N integers into an array, build a frequency array and print data in histogram.

3. Write a C program that creates an array of N random integers in the range 1 to 100 and then, using the sequential search, searches the array N times using randomly generated targets in the same range. At the end of the program, display the following statistics:
   a.   The number of searches completed.
   b.   The number of successful searches.
   c.   The percentage of successful searches.
   d.   The average number of tests per search.

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4. Write a C program using functions to read a list of random N integers into an array, sort them using bubble sort technique and print the sorted list.

5. Write a C program using functions to reach values from keyboard into a two-dimensional array. create two one-dimensional arrays that contain row and column averages.

6. Write a C program that uses a function to reverse the elements of an array in place. The function must accept only one pointer value and return void.

7. Write a C program that uses a function that inserts a string into another string at a specified position. It should return a positive number if it is successful or zero if it has any problems, such as an insertion location greater than the length of the receiving string. The first parameter is the receiving string, the second parameter is the string to be inserted, and the third parameter is the insertion (index) position in the first string.

8. Write a C program that uses a function that accepts the structure representing a point (a point in a plane can be represented by its two coordinates, x and y) and returns an integer 1, 2, 3, or 4 that indicates in which quadrant the point is located.

9. Write a C program that will read a text file and count the number of alphabetic characters, punctuation characters, and white space characters in the file. At the end of the file, the program is to display an appropriate report.

10. Write a C program that uses a function that copies the contents of a binary file of integers to a second file. The function must accept two file pointers and return an integer (zero representing a processing error and nonzero indicating successful completion).

Course Outcomes: Upon successful completion of this course, student will be able to

CO23A.1	Write programs using the concept of arrays
CO23A.2	Implement pointers in applications with dynamic memory requirements
CO23A.3	Create string processing applications
CO23A.4	Create and use enumerated types, unions, and structures in programs
CO23A.5	Write programs that read and write text/binary files, bit-wise operators and preprocessor commands.

Textbooks:

1. Computer Science - A Structured Programming Approach Using C, Behrouz A. Forouzan & Richard F. Gilberg, 3rd Edition, Cengage Learning India Pvt. Ltd., 2007, ISBN-10:81-315-00363-1

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Reference Books:

1. The C Programming Language, Kernighan B. W. and Dennis M. Ritchie, 2nd Edition, Pearson Education India, 2015, ISBN: 978-93-3254-944-9

2. Let us C, Yashvant P. Kanetkar, 16th Edition, BPB Publications, 2019, ISBN: 978– 93-8728-449-

3. C: The Complete Reference, Herbert Schildt, 4ᵗʰ Edition, McGraw Hill Education, 2017, ISBN: 978-0070411838

4. Head First C: A Brain-Friendly Guide, David Friffiths, and Dawn Friffiths, O'Reilly, 2012

E-Books / Web References

1. https://progforperf.github.io/Expert_C_Programming.pdf

MOOCs

1. http://lms.vtu.ac.in/econtent/courses/BS/14CPL16/index.php

2. https://nptel.ac.in/courses/106/105/106105171/

Mapping of CO-PO:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO23A.1	3	3	3	1	2			2	2	1		1	2	1
CO23A.2	3	3	3	1	2			2	2	1		1	2	1
CO23A.3	3	3	3	1	2			2	2	1		1	2	1
CO23A.4	3	3	3	1	2			2	2	1		1	2	1
CO23A.5	3	3	3	1	2			2	2	1		1	2	1
Average	3	3	3	1	2			2	2	1		1	2	1

Low-1: Medium-2: High-3

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SEMESTER – I/II

Course: INTRODUCTION TO ELECTRONICS AND COMMUNICATION

Course Code	23ESC14A/24A	CIE Marks	50
Hours/Week (L: T: P)	3:0:0	SEE Marks	50
Credits	03	Examination Hours	03

Course Learning Objectives: Students will be taught;

CLO1	Operation of a Semiconductor diode and its applications
CLO2	Biasing circuits for transistor (BJT) as an amplifier
CLO3	Op-amps and its applications.
CLO4	Number systems and basic Logic circuits.
CLO5	Oscillators and basics of Communication system.

Content	No. of Hours/ RBT levels
Module 1 **Semiconductor Diode and Applications:** Introduction, V-I Characteristics of PN Junction diode, Diode current equation, Effect of temperature on diode characteristic, ideal diodes, Practical /Real diode, Diode applications, working of Half wave rectifier, Center tapped Full Wave Rectifier-Operation, Advantages and Disadvantages, Full Wave Bridge Rectifier-Operation, advantages and disadvantages, Filters, Capacitor filter. (Text1: 5-1 to 5-7, 5-9, 5-10, 8-1, 8-2, 8-7, 8-12, 8-13,8-17 8-26, 8-27 & 8-29)	**8 Hours** L2
Module 2 **BJT Biasing:** Introduction, DC operating point and Load Line, Methods of Transistor Biasing - Fixed/Base Bias and Voltage Divider Bias (Text 1: 12-1,12-2, 12-3,12-4, 12-10,12-11, 12-17). **Single Stage BJT amplifier:** Introduction, Classification of amplifier and Transistor as an Amplifier, RC Coupled amplifier, Transformer Coupled amplifier and Direct Coupled amplifier. (Text 1: 16-1, 16-2, 16-3, 18-4, 18-6, 18-7, 18-10, 18-12, 18-13, 18-15,18-18,18-19).	**8 Hours** L2
Module 3 **Op-Amps and its Applications:** Introduction, modes of operation, Op-Amp parameters - Gain, input resistance, Output resistance, CMRR, slew rate, Bandwidth, input offset voltage, input bias Current and Input Offset Current. Applications- Inverting amplifier, Non-Inverting Amplifier, Voltage Follower, Summer, Differential/Difference amplifier, Integrator and Differentiator. (Text 1: 29-1 to 29-13, 30-3 & 30-5)	**8 Hours** L3

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Module 4	8 Hours
Binary Systems: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, 1's & 2's Complements. (Text 2: 1.2, 1.3, 1.4 & 1.5) **Boolean Algebra and Logic Circuits:** Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Realization of Boolean expressions. Adders- Half adder, Full adder (Text 2: 2.1 to 2.7, 4.3.1 & 4.3.2)	L2

Module 5	8 Hours
Sinusoidal Oscillators: Introduction, Classification of Oscillators, Nature of Sinusoidal oscillations, Oscillatory circuit, Barkhausen criterion, Tuned oscillators –BJT based Hartley and Colpitts (Text 1: 25-1, 25-3, 25-5, 25-6, 25-9, 25-10, 25-14 & 25-15). **Communication Systems:** Introduction, Radio frequency Spectrum, Modulation, Need for modulation, Methods of Modulation/schemes, Amplitude Modulation: – Percentage Modulation, Upper and Lower frequencies and side bands, Mathematical analysis of a Modulated Carrier Wave, Power relation in an AM Wave. (Text 1:32-1,32-3 32-5, 32-7, 32-8, 32-9, 32-10, 32-11, 32-12, 32-13, 32-14)	L3

COURSE OUTCOMES: Upon completion of this course, student will be able to:

CO1	Apply the knowledge of diodes as a rectifiers.
CO2	Analyze the biasing circuit for transistor as an amplifier
CO3	Explain the operation of Op-Amp circuits for various applications.
CO4	Apply Boolean algebra in logic circuits synthesis.
CO5	Explain the concept of Oscillator and Communication system.

Textbooks:
1. Dr. R.S. Sedha, "Electronic Circuits", S Chand and Company Pvt Ltd, 3rd Revised edition, Reprint 2020.
2. Morris Mano, "Digital Logic and Computer Design", Prentice Hall India Publication, Second Impression-2017.
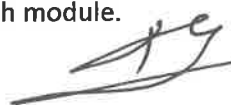
Reference books:
1. Robert L. Boylestad, "Electronic Devices and Circuit Theory", Prentice Hall of India Pvt Ltd., 11th edition,2015, 2020 reprint.
2. David A Bell, "Electronic Devices and Circuits", Oxford University Press, Fifth Edition.

Scheme of Examination:
Semester End Examination (SEE):
SEE Question paper is to be set for 100 marks and the marks scored will be proportionately reduced to 50. There will be two full questions (with a maximum of three sub questions) from each module carrying 20 marks each. Students are required to answer any **five full questions** choosing at least **one full question** from each module.

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Continuous Internal Evaluation (CIE):

Three Tests are to be conducted for 40 marks each. Average of Marks scored in all three tests is added to test component. CIE is executed by way of quizzes / Alternate Assessment Tools (AATs), and three tests. **Some possible AATs:** Seminar/assignments/ mini-projects/ concept videos/ partial reproduction of research work/ group activity/ any other. Typical Evaluation pattern for regular courses is shown in Table 1

Table 1: Distribution of weightage for CIE & SEE of Regular courses

	Component	Marks	Total Marks
CIE	CIE Test-1	40	50
	CIE Test-2	40	
	CIE Test-3	40	
	Assignments	10	
SEE	Semester End Examination	50	50
Grand Total			100

CO-PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	1	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	1	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	1	-	1	-	-
CO4	3	2	-	-	-	-	-	-	-	1	-	1	-	-
CO5	3	2	-	-	-	-	-	-	-	1	-	1	-	-
Average	3	2	-	-	-	-	-	-	-	1	-	1	-	-

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Course: Mathematics II for CSE Stream

Course Code	23MAT21A	CIE Marks	50
Hours/Week (L: T: P)	3:2:0	SEE Marks	50
No. of Credits	4	Examination Hours	03

Course Objectives

To enable students to apply the knowledge of Mathematics in various fields of engineering by making them to learn the following:

CLO1	Multiple integrals and Beta-Gamma functions
CLO2	Vector integration
CLO3	First and higher order ordinary differential equations
CLO4	Partial differential equations

Content	No. of Hours/ RBT levels
Module 1 Multiple integrals: Evaluation of double integrals by direct evaluation, change of order and change of variables. Evaluation of triple integrals. Beta and Gamma functions; relation between beta and gamma functions - simple problems.	10 Hours L2, L3
Module 2 Line integrals, Green's theorem in the plane, Stoke's theorem: Relation between line and surface integrals, Gauss Divergence theorem: Relation between surface and volume integrals- simple problems.	10 Hours L2, L3
Module 3 Differential Equations of first order and first degree: Variable separable, Linear equations, Bernoulli's equation, Exact and reducible to exact differential equations. Equations of first order and higher degree (solvable for p only).	10 Hours L2, L3
Module 4 Linear differential equations with constant coefficients -Inverse differential operators, method of variation of parameters. Cauchy's and Legendre's Linear differential equations.	10 Hours L2, L3
Module 5 Formation of partial differential equations. Solution by direct integration, linear equations of first order. Homogeneous linear equations with constant coefficients. Method of separation of variables.	10 Hours L2, L3

Course Outcomes

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Upon completion of this course, student will be able to:

CO21.1	Evaluate double and triple integrals
CO21.2	Evaluate definite integrals using beta and gamma functions

CO21.3	Evaluate integrals using Green's, Stokes and Gauss divergence theorem
CO21.4	Solve linear and nonlinear ordinary differential equations
CO21.5	Solve partial differential equations

Text books:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th Edition, 2017.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill, 2006

References:

1. Advanced Engineering Mathematics, E. Kreyszig, John Wiley & Sons, 10th Edition, 2016.
2. H.K. Dass and Er. Rajnish Verma: Higher Engineering Mathematics, S. Chand publishing, 1st edition, 2011.
3. A Text Book of Engineering Mathematics, N. P. Bali and Manish Goyal, Laxmi Publications, 6th Edition, 2014.
4. Calculus, James Stewart, Cengage Publication, 7th Edition, 2012.

Scheme of Examination:

Semester End Examination (SEE):
SEE Question paper is to be set for 100 marks and the marks scored will be proportionately reduced to 50. There will be two full questions (with a maximum of three sub questions) from each module carrying 20 marks each. Students are required to answer any **five full questions** choosing at least **one full question from each module.**

Continuous Internal Evaluation (CIE):
Three Tests are to be conducted for 40 marks each. Average of Marks scored in all three tests is added to test component. CIE is executed by way of quizzes / Alternate Assessment Tools (AATs), and three tests. **Some possible AATs:** seminar/assignments/ mini-projects/ concept videos/ partial reproduction of research work/ group activity/ any other.
Typical Evaluation pattern for regular courses is shown in Table 2.

Table 2: Distribution of weightage for CIE & SEE of Regular courses

	Component	Marks	Total Marks
CIE	CIE Test-1	40	50
	CIE Test-2	40	
	CIE Test-3	40	
	Assignments	10	
SEE	Semester End Examination	50	50
Grand Total			100

CO/PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO21.1	3	2	1									3
CO21.2	3	2	1									3
CO21.3	3	2	1									3
CO21.4	3	2	1									3
CO21.5	3	2	1									3
Average	3	2	1									3