DON BOSCO INSTITUTE OF TECHNOLOGY

(Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, Recognised by the Government of Karnataka, NAAC 'A' Grade Accredited)

DEPARTMENT OF SCIENCE & HUMANITIES

(Applicable to CSE / ISE / CSE(AI&ML) / AI&DS / CSE(IoT & Cybersecurity branches)

OUTCOME BASED CURRICULUM & ASSESSMENT

Scheme and Syllabus

I & II Semester

For the 2025 Admitted Batch

Kumbalgodu, Mysuru Road, Bengaluru 560074

Vision of the Institute

To be a center of excellence to transform young minds in technical and management education fostering innovation and entrepreneurial skills with ethical, environmental, and social responsibility.

Mission of the Institute

M1: To impart quality education in order to meet the needs of industry and society.

M2: To collaborate with academia, industry and research institutes to strengthen teaching and learning process.

M3: To promote equitable and harmonious development of students to work in teams.

M4: To imbibe lifelong learning skills and entrepreneurial skills exhibiting leadership.

Core Values

i) Attain excellence in different disciplines by creating, preserving and disseminating knowledge to all aspiring students

ii) Draw inspiration from the Institutions ethos and develop within its members a sense of accountability towards their community, society and the nation at large

iii) Accept the challenges globalization and changing times throw at us to offer high quality education and developmental services in a competitive manner

iv) Provide every opportunity to the Institutions key constituents–its faculty, staff, students and the community–to excel in their domain of expertise and contribute to every task with sincerity

v) Transition from the teacher – centric focus to the learner - centric approach in imparting knowledge

Vision of the Physics Department
To provide foundations of Physics for Engineering applications

Mission of the Physics Department
M1: To impart basic concepts and principles of Physics applied to Engineering Science. **M2:** To imbibe the applications of Physics in the area of Oscillations, Lasers, Optical Fibre, Electrical Conductivity and Semiconductors.

Vision of the Chemistry Department
To provide foundation knowledge in Frontiers of Chemistry with Sustainability and Environmental emphasis.

Mission of the Chemistry Department
M1: To disseminate knowledge of Chemistry in the area of Electrochemistry, Corrosion Science, Engineering Materials, Water Technology, Instrumentation and Green & Sustainable Chemistry. **M2:** To understanding the concepts of alternative energy sources. **M3:** To afford concepts of production and utilization of few Polymers and Nanomaterials.

Vision of the Mathematics Department
Provide mathematical tools and their applications for problem solving in Engineering and Technology.

Mission of the Mathematics Department
M1: To provide the foundation and application in the area of Differential, integral and Vector Calculus, Linear and Partial differential Equations, Linear algebra, transformations applied mathematics. **M2:** To provide the tools for iterative problem solving. **M3:** To provide statistical and probabilistic tools for computation.

Knowledge and Attitude Profile (WK)	
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development
WK8	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9	Ethics, inclusive behaviour and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

Program Outcomes	
PO1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	**Design/development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
PO10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	**Life-long learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

COURSE CATEGORY

Humanities, Social Sciences, and Management Courses	HSMC
Applied Science Courses	ASC
Applied Science Courses Lab	ASCL
Engineering Science Courses	ESC
Emerging Technology Courses	ETC
Professional Core Courses	PCC
Professional Elective Courses	PEC
Open Elective Courses	OEC
Integrated Professional Core Courses	IPCC
Project Work: Dissertation, Mini-project work and Major Project work	PROJ
Seminar	SEM
Internship	INT
Ability Enhancement Courses	AEC
Non Credit Mandatory Courses	NCMC
Audit Course	AC
Programming Language Course	PLC
Programming Language Course Lab	PLCL
Programming Specific Course	PSC
Programming Specific Course Lab	PSCL

INDEX

DON BOSCO INSTITUTE OF TECHNOLOGY
(Autonomous Institution, affiliated to VTU, Belagavi)
Computer Science & Engineering Stream
Scheme of Teaching and Examinations 2025
(Academic year 2025-26)

SEMESTER: I – PHYSICS GROUP

Sl. No	Course Category	Course Code	Course Title	Teaching Department (TD)	Board of Examiner (BoE)	Teaching Hours /Week	SAAE Hours / Semester	Examination			Credits
						L:T:P:S		Duration in hours	CIE:SEE Marks	Total Marks	
1	ASC	B25MAT11B	Calculus & Linear Algebra	Maths	Maths	3:2:0:0	48	03	50:50	100	4
2	ASC	B25PHY12B	Quantum physics for Engineers	Physics	Physics	3:0:0:0	48	03	50:50	100	3
3	ESC	B25CED13B	Computer Aided Engineering Drawing for CSE Stream	ME	ME	2:0:2:0	32	03	50:50	100	3
4	ESC – I	B25ESC14A	Principles of Electrical Engineering	EEE	EEE	3:0:0:0	48	03	50:50	100	3
5	PSC	B25PPC15	Principles of Programming in C	CSE & Allied Dept.	CSE	3:0:0:0	48	03	50:50	100	3
6	ASCL	B25PHYL16B	Engineering Physics Lab for CSE Stream	Physics	Physics	0:0:2:0	-	03	50:50	100	1
7	PSCL	B25POPL17	Programming Lab using C	CSE & Allied Dept.	CSE	0:0:2:0	-	03	50:50	100	1
8	AEC/SDC	B25IDTL18	Innovation and Design Thinking Lab	CSE & Allied Dept.	CSE	0:0:2:0	-	02	50:50	100	1
9	HSMS	B25KSK19/ B25KBK19	Samskrutika Kannada / Balake Kannada	Humanities Dept.	Humanities Dept.	1:0:0:0	16	01	50:50	100	1
10	AEC (NCMC)	B25SKS10	Soft Skills	Humanities Dept.	Humanities Dept.	0:0:0:0	-	-	100:0	100	PP
					TOTAL				**550:450**	**1000**	**20**

AICTE Activity Points: students have to earn 100 Activity Points between 01 to 08 semester

L – Lecture; **T –** Tutorial; **P –** Practical; **S –** Students Academic Activity Engagement Hours, **TD -** Teaching Department **BoE –** Board of Examiner, **ASC-**Applied Science Course, **ESC-** Engineering Science Courses, **ETC-** Emerging Technology Course, **AEC-** Ability Enhancement Course, **HSMS**-Humanity and Social Science and Management Course, **SDC-** Skill Development Course, **CIE–**Continuous Internal Evaluation, **SEE-** Semester End Examination, **IPCC –** Integrated Professional Core Course (Theory Course Integrated with Practical Course); **NCMC-** Non Credit Mandatory Course; **UHV-** Universal Human Values Course	
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Student's Induction Program: Motivating (Inspiring) Activities under the Induction program – The main aim of the induction program is to provide newly admitted students a broad understanding of society, relationships, and values. Along with the knowledge and skill of his/her study, students' character needs to be nurtured as an essential quality by which he/she would understand and fulfill the responsibility as an engineer. The following activities are to be covered in 21 days. Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to Local areas, Familiarization with Department/Branch and Innovation, etc.	
AICTE Activity Points to be earned by students admitted to BE/ B.Tech., day college program (For more details refer to Chapter 6, AICTE Activity Point Program, Model Internship Guidelines): Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4 years Degree programs through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Program. Students transferred from other Universities to the fifth semester are required to earn 50 Activity Points from the year of entry. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, any time during the semester weekends, and holidays, as per the liking and convenience of the student from the year of entry to the program. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, an Eighth Semester Grade Card shall be issued only after earning the required activity points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.	
The Mathematics/Physics/Chemistry courses should be taught by a single faculty member per division, with no sharing of the course (subject) module-wise by different faculty members. The tutorial sessions for the Mathematics course shall be conducted in the Laboratory environment using MAXIMA/MATHEMATICA/PYTHON/SCI LAB/MATLAB software to enhance computational understanding and application skills.	
Programme Specific Courses (PSC): Programme Specific Courses (PSC) are a set of core courses tailored to a specific branch or discipline of engineering in which a student is enrolled (e.g., Mechanical Engineering, Computer Science, Civil Engineering, etc.). These courses are intended to provide students with in-depth knowledge and specialized skills essential for professional competence in the chosen field. Students must select and complete the course from this group that corresponds to their admitted program stream. Similarly, students are also required to choose and pass laboratory courses that are specific to their stream from the Programme Specific Courses Laboratory (PSCL) group.	
Engineering Sciences Courses-I(ESC-I): These courses are designed to broaden the technical knowledge of students beyond their core area of study. These courses enable students to gain a foundational understanding of engineering principles from other stream courses. Students are required to select and complete two courses that are not belong to their admitted program stream. For example, a student admitted to the any programme of the Civil Engineering stream should not select Introduction to Building Sciences but any other two. One course shall be selected under ESC-I and another course under ESC-II. The two courses must be different from the other	
Computer-Aided Engineering Drawing: The courses under this category are stream-specific. Students must select and complete the course that corresponds to their admitted engineering stream.	

Dept. Member Convenor **Head of the Department** **Dean – Academics** **Principal**

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Computer Science & Engineering Stream
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SEMESTER: II – CHEMISTRY GROUP (For the students who have studied Physics group in I Semester)

Sl. No	Course Category	Course Code	Course Title	Teaching Department (TD)	Board of Examiner (BoE)	Teaching Hours /Week	SAAE Hours/ Semester	Examination			Credits
						L:T:P:S		Duration in hours	CIE: SEE Marks	Total Marks	
1	ASC	B25MAT21B	Numerical Methods	Maths	Maths	3:2:0:0	48	03	50:50	100	4
2	ASC	B25CHE22B	Chemistry for Smart Systems	Chemistry	Chemistry	3:0:0:0	48	03	50:50	100	3
3	ETC	B25ETC23	Introduction to AI and Applications	CSE & Allied Dept.	CSE	3:0:0:0	48	03	50:50	100	3
4	ESC-II	B25ESC24B	Principles of Electronics	ECE	ECE	3:0:0:0	48	03	50:50	100	3
5	PLC	B25PLC25B	Introduction to Python Programming	CSE & Allied Dept.	ISE	3:0:0:0	48	03	50:50	100	3
6	ASCL	B25CHEL26	Engineering Chemistry Lab	Chemistry	Chemistry	0:0:2:0	--	03	50:50	100	1
7	PLCL	B25PLCL27B	Python Programming Lab	CSE & Allied Dept.	ISE	0:0:2:0	--	03	50:50	100	1
8	AEC/SDC	B25PRJ28	Interdisciplinary Project Based Learning	CSE & Allied Dept.	ISE	0:0:2:0	--	02	50:50	100	1
9	AEC	B25ENGL29	Communication Skills	Humanities	Humanities	1:0:0:0	16	01	50:50	100	1
10	AEC	B25IC020	Indian constitution & Engineering Ethics	Humanities	Humanities	0:0:0:0	-	-	100:00	100	PP
					TOTAL				**550:450**	**1000**	**20**

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The Mathematics/Physics/Chemistry courses should be taught by a single faculty member per division, with no sharing of the course (subject) module- wise by different faculty members. The **tutorial sessions** for the **Mathematics course** shall be conducted in the Laboratory environment using **MAXIMA/MATHEMATICA/PYTHON/SCI LAB/MATLAB software** to enhance computational understanding and application skills.	
Students admitted to a specific engineering stream are required to select and successfully complete **Applied Mathematics-II** and **Applied Chemistry courses** that are aligned with their program stream. These courses are intended to reinforce the academic foundations and develop the professional competencies relevant to their chosen engineering discipline.	
Engineering Sciences Courses-II(ESC-II): courses designed to broaden the technical knowledge of students beyond their core area of study. These courses enable students to gain a foundational understanding of engineering principles from other disciplines. Students are required to select and complete courses that do not belong to their admitted program stream. For example, a student admitted to the Civil Engineering program must choose courses such as Introduction to Mechanical Engineering or Introduction to Electrical Engineering, rather than Civil Engineering-related subjects. The course selected under Engineering Science Courses – II (ESC-II) must be different from the course chosen under ESC-I and must also not belong to the student's admitted engineering stream.	
For the course ***Interdisciplinary Project based learning*** **(B25PRJ28)**, it is mandatory to form a team comprising students from multiple engineering disciplines. For example, a project team may include students from Mechanical Engineering, Electronics and Communication Engineering (ECE), and Computer Science and Engineering (CSE), working collaboratively to design and implement the project.	

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9	AEC	B25ENGL19	Communication Skills	Humanities	Humanities	1:0:0:0	16	01	50:50	100	1
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5	PSC	B25PPC25	Principles of Programming in C	CSE & Allied Dept.	CSE	3:0:0:0	48	03	50:50	100	3
6	ASCL	B25PHYL26B	Engineering Physics Lab for CSE Stream	Physics	Physics	0:0:2:0	-	03	50:50	100	1
7	PSCL	B25POPL27	Programming Lab using C	CSE & Allied Dept.	CSE	0:0:2:0	-	03	50:50	100	1
8	AEC/SDC	B25PRJ28	Interdisciplinary Project-Based Learning	CSE & Allied Dept.	ISE	0:0:0:2	30	02	50:50	100	1
9	HSMS	B25KSK29/ B25KBK29	Samskrutika Kannada / Balake Kannada	Humanities Dept.	Humanities Dept.	1:0:0:0	16	01	50:50	100	1
10	AEC (NCMC)	B25SKS20	Soft Skills	Humanities Dept.	Humanities Dept.	0:0:0:0	-	-	100:0	100	PP
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Credit Definition: 1 - hour Lecture (L) per week = **1 Credit** 2 – hours Tutorial(T) per week = **1 Credit** 2 - hours Practical / Drawing (P) per week = **1 Credit** 2 - hours Skill Development Actives (SDA) per week = **1 Credit**	04-Credits courses are to be designed for 55-60 hours of Teaching-Learning Session 03-Credits courses are to be designed for 40-45 hours of Teaching-Learning Session 02- Credits courses are to be designed for 25-30 hours of Teaching-Learning Session 01-Credit courses are to be designed for 15 hours of Teaching-Learning sessions
Student's Induction Program: Motivating (Inspiring) Activities under the Induction program – The main aim of the induction program is to provide newly admitted students a broad understanding of society, relationships, and values. Along with the knowledge and skill of his/her study, students' character needs to be nurtured as an essential quality by which he/she would understand and fulfill the responsibility as an engineer. The following activities are to be covered in 21 days. Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to Local areas, Familiarization with Department/Branch and Innovation, etc.	
AICTE Activity Points to be earned by students admitted to BE/ B.Tech., day college program (For more details refer to Chapter 6, AICTE Activity Point Program, Model Internship Guidelines): Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4 years Degree programs through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Program. Students transferred from other Universities to the fifth semester are required to earn 50 Activity Points from the year of entry. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, any time during the semester weekends, and holidays, as per the liking and convenience of the student from the year of entry to the program. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, an Eighth Semester Grade Card shall be issued only after earning the required activity points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.	
The Mathematics/Physics courses shall be taught by a single faculty member per session, with no sharing of the course (subject) modules. The tutorial sessions for the Mathematics course shall be conducted in the Laboratory environment using MATLAB software to enhance computational understanding and application skills	
For the course Interdisciplinary Project (B25PRJ28), it is mandatory to form a team comprising students from multiple engineering disciplines. For example, a project team may include students from Electrical Engineering (EEE), Electronics and Communication Engineering (ECE), and Computer Science and Engineering (CSE), working collaboratively to design and implement the project.	
Programme Specific Courses (PSC): Programme Specific Courses (PSC) are a set of core courses tailored to a specific branch or discipline of engineering in which a student is enrolled (e.g., Mechanical Engineering, Computer Science, Civil Engineering, etc.). These courses are intended to provide students with in-depth knowledge and specialized skills essential for professional competence in the chosen field. Students must select and complete the course from this group that corresponds to their admitted program stream. Similarly, students are also required to choose and pass laboratory courses that are specific to their stream from the Programme Specific Courses Laboratory (PSCL) group.	
Engineering Sciences Courses-I(ESC-I): These courses are designed to broaden the technical knowledge of students beyond their core area of study. These courses enable students to gain a foundational understanding of engineering principles from other stream courses. Students are required to select and complete two courses that are not belong to their admitted program stream. For example, a student admitted to the any programme of the Civil Engineering stream should not select Introduction to Building Sciences but any other two. One course shall be selected under ESC-I and another course under ESC-II. The two courses must be different from the other	
Computer-Aided Engineering Drawing: The courses under this category are stream-specific. Students must select and complete the course that corresponds to their admitted engineering stream.	

Dept. Member Convenor **Head of the Department** **Dean – Academics** **Principal**

ASSESSMENT PATTERN

Alternative Assessment Tool (AAT):

In order to encourage innovative methods while delivering a course, the faculty members have been encouraged to use the Alternative Assessment Tool (AAT). Thus AAT enables faculty to employ innovative methods and design own assessment patterns during the CIE. The AAT enhances the autonomy (freedom and flexibility) of individual faculty and enables them to create innovative pedagogical practices. If properly applied, the AAT converts the classroom into an effective learning space. **Some possible AAT are:** QUIZ / 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 tool-box for problem solving / report based on participation in create-a-thon / make-a-thon / code-a-thon / hack-a-thon conducted by reputed organizations / any other.

Table - 1: Typical distribution of weightage for CIE & SEE for Regular Theory (Non Integrated) Courses.

Assessment	Component	Marks	Reduced to	TOTAL Marks
CIE	Internals - I	40	-	40 (Average of 3 test)
	Internals - II	40	-	
	Internals - III	40	-	
	AAT - I	10	-	10 (Average)
	AAT - II	10	-	
SEE	Semester End Exam	100	50	50
TOTAL MARKS				100

Pattern of SEE Question Paper

Q. #	CONTENTS	MARKS	Reduced to
PART A			
1	Objective type questions / 1 or 2 mark questions covering entire syllabus	15	**50**
PART B			
2 & 3	Module – I : Question 2 or 3	17	
4 & 5	Module – II : Question 4 or 5	17	
6 & 7	Module – III : Question 6 or 7	17	
8 & 9	Module – IV : Question 8 or 9	17	
10 & 11	Module – V : Question 10 or 11	17	
MAXIMUM MARKS FOR SEE THEORY		**100**	

Table - 2: Typical distribution of weightage for CIE & SEE for Practical Courses.

Assessment	Component	Marks	Reduced to	TOTAL Marks
CIE	Lab - Continuous Internal Assessment (Weekly Performance)	30	-	50
	Internal Test	100	20	
SEE	Semester End Exam	100	50	50
TOTAL MARKS				100

Table - 3: Typical distribution of weightage for Integrated Courses.

Assessment	Component	Marks	Reduced to	TOTAL Marks
CIE	Internals - I	40	Average of all 3 tests is considered for 40	40 marks is scaled down to 30
	Internals - II	40		
	Internals - III	40		
	Lab - Continuous Internal Assessment (Weekly Performance)	10	-	20
	Internal Test	50	10	
SEE	Semester End Exam	100	50	50
TOTAL MARKS				100

Pattern of SEE Question Paper

Q. #	CONTENTS	MARKS	Reduced to
PART A			
1	Objective type questions / 1 or 2 mark questions covering entire syllabus	15	**50**
PART B			
2 & 3	Module – I : Question 2 or 3	17	
4 & 5	Module – II : Question 4 or 5	17	
6 & 7	Module – III : Question 6 or 7	17	
8 & 9	Module – IV : Question 8 or 9	17	
10 & 11	Module – V : Question 10 or 11	17	
MAXIMUM MARKS FOR SEE THEORY		**100**	

Table - 4: Typical distribution of weightage for CIE & SEE for ONE CREDIT THEORY COURSE. (L:T:P – 1:0:0) (AEC / SDC courses - Assessment will be Multiple Choice Questions based)

Assessment	Component	Marks	TOTAL Marks
CIE	Internals - I	50	50 (Average)
	Internals - II	50	
SEE	Semester End Exam	50	50
TOTAL MARKS			100

Table - 5: Typical distribution of weightage for NON CREDIT COURSES / AUDIT COURSES (Only CIE)

Assessment	Component	Marks	TOTAL Marks
CIE	Internals - I	50	100
	Internals - II	50	
TOTAL MARKS			100

Table - 6: Typical distribution of weightage for CERTIFICATION COURSES (ONE CREDIT COURSE – provided L:T:P is 0:0:2).

Assessment	Component	Marks	Reduced to	TOTAL Marks
CIE	Lab - Continuous Internal Assessment (Weekly Performance)	30	10	50
	Internal Lab Test	30	10	
	Proctored (Certification) Exam	100	30	
SEE	Semester End Exam	100	50	50
TOTAL MARKS				100

CALCULUS AND LINEAR ALGEBRA

Course Code	B25MAT11B	Total Contact Hours / Week	05	CIE Marks	50
Course Category	ASC	Total SAAE Hours / Semester	48	SEE Marks	50
L:T:P:S	3:2:0:0	Total Notional Learning Hours	120	Total Marks	100
Total Credits	04			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. Apply the concepts of multivariable calculus and vector calculus to compute derivatives, optimize functions, and analyze vector fields for applications in computer science engineering. 2. Solve system of linear equations and determine eigenvalues and eigenvectors using direct and iterative methods. 3. Apply the concepts of vector spaces and linear transformations to problems in computer science engineering. 4. Demonstrate the applications of computer science and allied engineering science using modern ICT tools.

PRE REQUISITES:
Basics of Differentiation and Integration

MODULE #	TOPICS	Hours
1	**CALCULUS** Partial differentiation, total derivative - differentiation of composite functions, Jacobian, Statement of Taylor's and Maclaurin's series expansion for two variables. Maxima and minima for the function of two variables.	9L+6T
2	**VECTOR CALCULUS** Scalar and vector fields, Gradient, directional derivatives, divergence and curl, Introduction to polar coordinates and polar curves, physical interpretation, Solenoidal vector fields, irrotational vector fields and scalar potential. Curvilinear coordinates: Scale factors, base vectors, Cylindrical polar coordinates, Spherical polar coordinates, transformation between cartesian and curvilinear systems, orthogonality.	9L+6T
3	**SYSTEM OF LINEAR EQUATIONS, EIGEN VALUES AND EIGEN VECTORS** Elementary row transformation of a matrix, Echelon form, rank of a matrix. Consistency and solution of system of linear equations, Gauss elimination method, Gauss Jordan method. Eigenvalues and Eigenvectors, modal matrix, diagonalization of the matrix.	8L+6T

4	**VECTOR SPACES** Definition and examples, subspace: definition and examples. linear Combinations, linear span, linearly independent and dependent sets, basis and dimension, row space and column space of a matrix, Coordinates, inner products and orthogonality.	8L+6T
5	**LINEAR TRANSFORMATION** Definition and examples, algebra of linear transformations, matrix of a linear transformation. singular, non-singular linear transformations and invertible linear transformations. rank and nullity of linear transformations, rank-nullity theorem.	8L+6T

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Higher Engineering Mathematics	B. S. Grewal	44^{th}	Khanna Publishers,	2021
2	Linear Algebra and its Applications	Gilbert Strang	4^{th}	Cengage Publications	2022

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Higher Engineering Mathematics	V. Ramana	11^{th}	McGraw-Hill Education	2017
2	A Textbook of Engineering Mathematics	N.P Bali and Manish Goyal	10^{th}	Laxmi Publications	2022
3	Calculus	James Stewart	7^{th}	Cengage Publications	2019
4	Linear Algebra and its Applications	David C Lay	4th	Pearson PublisherS	2018

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	NPTEL	https://nptel.ac.in/courses/111106135
2	NPTEL	https://nptel.ac.in/courses/111105160
3	MOOCs	https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
4	MOOCs	https://ocw.mit.edu/courses/18-02sc-multivariable-calculus-fall-2010

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	To evaluate partial derivatives of composite functions, find Jacobian and Maxima and Minima of functions of two variables..
CO2	To evaluate divergence, curl and gradient, curvilinear coordinates, spherical coordinates and analyse the type of vector field.
CO3	Apply principles of Linear Algebra to solve system of linear equations, determine Eigen values and Eigen vectors and analyse real-world problems.
CO4	To evaluate basis, dimension and classify the vectors into independent or dependent sets
CO5	To obtain the linear transformation of vectors, matrices and verify Rank-Nullity theorem.

CO-PO MAPPING:

CO #	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	2	-	-	-	2	2	-	2
CO2	3	3	-	2	-	-	-	2	2	-	2
CO3	3	3	-	2	-	-	-	2	2	-	2
CO4	3	3	-	2	-	-	-	2	2	-	2
CO5	3	3	-	2	-	-	-	2	2	-	2
AVG	3	3	-	2	-	-	-	2	2	-	2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

The sample strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methodsmay be adopted so that the delivered lessons shall develop students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework, grading assignments, quiz and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
6. Show short related video lectures in the following ways:
   - As an introduction to new topics (pre-lecture activity).
   - As a revision of topics (post-lecture activity).
   - As additional examples (post-lecture activity).
   - As an additional material of challenging topics (pre-and post-lecture activity).
   - As a model solution of some exercises (post-lecture activity).

QUANTUM PHYSICS FOR ENGINEERS

Course Code	B25PHY12B/ B25PHY22B	Total Contact Hours / Week	04	CIE Marks	50
Course Category	ASC	Total SAAE Sours / Semester	48	SEE Marks	50
L:T:P:S	3:0:0:0	Total Notional Learning Hours	90	Total Marks	100
Total Credits	03			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. To study the principles of quantum Physics. 2. To study the electrical properties of materials. 3. To explore the concepts of nano materials and superconductivity and its application. 4. To understand the fundamentals of quantum computing, quantum gates and their role in information processing. 5. To study the essentials of photonics and its application in computer science.

PREREQUISITES
Properties of light, Wave–Particle dualism, Matrices, Basics of Electrical conductivity, Bulk properties of materials

MODULE #	TOPICS	Hours
1	**QUANTUM PHYSICS** Introduction- de Broglie Hypothesis and Matter Waves, de Broglie wavelength (derivation), Heisenberg's Uncertainty Principle and its application (Broadening of Spectral Lines), Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Quantization of Energy States, Waveforms and Probabilities, Frank hertz experiment ,Numerical Problems.	8
2	**QUANTUM THEORY OF CONDUCTORS AND SEMICONDUCTORS** Assumptions and failures of Classical Free Electron Theory, Mechanisms of electron scattering in solids, Mathieson's rule, Assumptions of Quantum Free Electron Theory, Fermi Energy, Fermi Factor, Variation of Fermi Factor with Temperature and Energy, Expression for electrical Conductivity (derivation), Success of quantum free electron theory, Numerical Problems. **Semiconductors:** Fermi level for intrinsic (with derivation) and extrinsic semiconductor (no derivation), Expression for carrier concentration in Intrinsic semiconductor, Law of mass action, Expression for electron and hole concentration in extrinsic semiconductor, Electrical conductivity of a	9

	semiconductor (derivation), Hall effect, Photo Voltaic effect & Solar cells, Light emitting Diode, Numerical problems.	
3	**SUPERCONDUCTIVITY & NANO MATERIALS** **Superconductivity**: Zero resistance state, Temperature dependence of resistivity in conductors and super conductors, BCS theory, Meissner Effect, Critical field, Temperature dependence of critical field, Types of superconductors, Quantum tunneling, Josephson junction, Applications - DC SQUID and MAGLEV Vehicle, Numerical problems. **Nano materials**: Classification and properties of Nano materials, Surface to volume ratio, Synthesis of nanomaterials: Top-down approach - ball milling method and bottom-up approach- sol gel method, Carbon Nano tubes: types and properties, Nano technology in Data Storage, Medical and Agricultural applications (Qualitative).	8
4	**QUANTUM COMPUTING AND GATES** **Principles of Quantum Information & Quantum Computing:** Moore's law - limitation of VLSI, Differences between Classical & Quantum computing, Concept of qubit and its properties, Representation of qubit by Bloch sphere, Brief discussion on types of qubit, Dirac notation **Quantum Gates**: Single Qubit Gates: Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate, Phase gate (S, T), Multiple Qubit Gates: Controlled gate, CNOT Gate (Discussion for 4 different input states), Representation of Swap gate, Controlled -Z gate, Predicting the outputs of various combinations of single and two-qubit gates.	8
5	**PHOTONICS** **LASER**: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Bar code scanner, Photodetectors – Single Photon Avalanche Diode, Superconducting Nanowire Single Photon Detector, Numerical Problems. **Optical Fiber**: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Optical Endoscopy, Fiber Optic Communication, Mach-Zehnder interferometer Numerical Problems.	9

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Engineering Physics	S P Basavaraj	1st	Subhash stores	2018
2	A Textbook of Engineering Physics	M.N. Avadhanulu & P.G. Kshirsagar	10th	S. Chand. & Company Ltd, New Delh	2018
3	Quantum Computing	Parag K Lala	1st	McGraw Hill	2020

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	An Introduction to Lasers theory and applications	M.N. Avadhanulu and P.S. Hemne	1st	S. Chand. & Company Ltd, New Delhi	2012
2	Fundamentals of Fibre Optics in Telecommunication & Sensor Systems	B.P. Pal	2nd	New Age International Publishers.	2005
3	Quantum Computing,	Vishal Sahani	1st	McGraw Hill Education	2007
4	Quantum Computation and Quantum Information	Nielsen, M.A., & Chuang I.L	10th	Cambridge University Press	2010

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Web-link	Physics: http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
2	Web-link	Numerical Aperture of fibre https://bopiitk.vlabs.ac.in/exp/numerical-aperture-measurement
3	Virtual Lab	https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1
4	Video	http://nptel.ac.in
5	Simulation	https://www.myphysicslab.com

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Describe the fundamental principles of the Quantum Physics.
CO2	Analyse the behaviour of electrons in metals and summarize the property of semiconductors.
CO3	Elucidate the concepts of nanomaterials and superconductivity in real life applications.
CO4	Summarize the basic concepts of quantum computing.
CO5	Elucidate the concepts of laser and optical fibres.

CO-PO MAPPING:

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

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1. Chalk and talk for core theory, derivations and step by step explanations.
2. Lecture method (L) need not be only traditional lecture method, but alternative effective teaching method could be adopted to attain the outcomes.
3. Utilize audio-visual aids (e.g., models, videos, PowerPoint presentations), ICT tools, and interactive platforms to enhance comprehension and engagement.
4. Engaging in problem-solving and tutorials aids in the development of analytical skills.
5. Discuss how each concept can be connected to real-world applications and provide specific examples to illustrate their practical relevance.

COMPUTER AIDED ENGINEERING DRAWING FOR CSE STREAM

Course Code	**B25CED13B/ B25CED23B**	**Total Contact Hours / Week**	**04**	**CIE Marks**	**50**
Course Category	**ESC**	**Total SAAE Hours / Semester**	**42**	**SEE Marks**	**50**
L:T:P:S	**2:0:2:0**	**Total Notional Learning Hours**	**90**	**Total Marks**	**100**
Total Credits	**03**			**Exam Duration**	**3 Hrs**

COURSE LEARNING OBJECTIVES
1. To understand the basic principles and conventions of engineering drawing 2. To use drawing as a communication mode 3. To generate pictorial views using CAD software. 4. To understand the development of surfaces 5. Create 3D models of embedded, networking, and IoT devices.

PREREQUISITES
1. Understanding shapes, angles, and basic geometric relationships. 2. Understanding different measurement systems. 3. Familiarity with using a computer is essential for working with CAD software.

MODULE #	TOPICS	Hours
1	**INTRODUCTION** Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves. **Orthographic Projections of Points, Lines and Planes:** Introduction to Orthographic projections, Orthographic projections of points in 1st and 3rd quadrants (2nd and 4th quadrants Concepts only and No Problems for practice). Orthographic projections of lines (Placed in First quadrant only as per BIS) Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (Placed in First quadrant only using change of position method).	9
2	**ORTHOGRAPHIC PROJECTION OF SOLIDS** Orthographic projection of right regular solids (Resting on HP only and inclined to both the planes); Prisms, Pyramids, Cylinders & Cones.	9

3	**SECTION OF SOLIDS** Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (Concepts only and No Problems for practice) **Development of Lateral Surfaces of Solids:** Development of lateral surfaces of right regular Prisms, Pyramids, Cylinders & Cones and their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays.	8
4	**ISOMETRIC PROJECTIONS** Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block. Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.	8
5	**COMPUTER NETWORK DRAWING (For CIE Only)** 2D Network drawing with wired and wireless, Network topology - wired and wireless. 3D Modeling: Raspberry Pi / Arduino boards, Router & switches, IoT devices - Concept of converting to 3D printing format (stl) Concept of Industrial drawing	8

PRESCRIBED TEXT BOOKS:

Sl. #	Book Title	Authors	Edition	Publisher	Year
1	Engineering Visualisation	S.N. Lal & T Madhusudhan	1st	Cengage	
2	Engineering Drawing	Parthasarathy N. S & Vela Murali		Oxford University Press	2015

REFERENCE BOOKS:

Sl. #	Book Title	Authors	Edition	Publisher	Year
1	Engineering Visualisation	S.N. Lal, & T Madhusudhan	1st	Cengage	
2	Computer Aided Engineering Drawing	P.J. Shah		S. Chand	2021
3	Engineering Drawing, Pearson Education	M. B. Shah & B.C. Rana	Revised		2009
4	Technical Drawing with Engineering Graphics	Frederick E. Giesecke, et al.		Prentice Hall	2016

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	VIDEO	https://nptel.ac.in/courses/112104172
2	VIDEO	https://nptel.ac.in/courses/112102304
3	VIDEO	https://nptel.ac.in/courses/112105294
4	VIDEO	https://www.coursera.org/courses?query=3d%20modeling&utm
5	VIDEO	https://www.youtube.com/watch?v=zbqrNg4C98U

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Understand and visualize the Points, lines and planes with manual and computer aided drafting.
CO2	Analyse the shape and size of different of Solids using orthographic projections by manual and computer aided tool.
CO3	Develop the lateral and truncated surfaces of the objects.
CO4	Draw isometric views and convert isometric drawings to orthographic views.
CO5	Create 3D models of embedded, networking, and IoT devices.

CO-PO MAPPING:

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

TEACHING-LEARNING PROCESS:
Pedagogy (General Instructions):

Teaching-Learning (General Instructions):

1. Students should be made aware of powerful engineering communication tool –Drawing.
2. Simple Case studies can be suitably selected by the teacher for hands on practice to induce the feel of fruitfulness of learning.
3. Appropriate Models, Power Point presentation, Charts, Videos, shall be used to enhance visualization before hands on practice.
4. For application problems use very generally available actual objects. (Example: For rectangular prism / object; matchbox, carton boxes, book, etc. can be used. Similarly, for other shapes)
5. Use any CAD software for generating orthographic and pictorial views. Make use of sketch book with graph sheets for manual / preparatory sketching

PRINCIPLES OF ELECTRICAL ENGINEERING

Course Code	B25ESC14A/ B25ESC24A	Total Contact Hours / Week	03	CIE Marks	50
Course Category	ESC	Total SAAE hours / semester	48	SEE Marks	50
L:T:P:S	3:0:0:0	Total Notional Learning Hours	90	Total Marks	100
Total Credits	03			Exam Duration	03 hours

COURSE LEARNING OBJECTIVES
1. To explain the laws used in the analysis of DC and AC circuits. 2. To explain the behaviour of circuit elements in single-phase circuits. 3. To explain the relationship between line and phase parameters in three phase circuits. 4. To explain the construction and operation of transformers, synchronous generator and motors and induction motors. 5. To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.

PREREQUISITES
Solid foundation in Mathematics and Physics

MODULE #	TOPICS	Hours
1	**INTRODUCTION** Conventional and non-conventional energy resources; Power Generation: Hydel, Nuclear, Solar & wind power generation. General structure of electrical power systems using single line diagram approach. **DC Circuits**: Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.	8
2	**A.C. FUNDAMENTALS** Generation of Single Phase AC, Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor, Simple Numerical. **Three Phase Circuits:** Advantages of three phase over single phase; Equation of three phase AC Voltage and current, star and delta connection, relationship between line and phase quantities (exclude derivation), Simple Numerical.	9

3	**DC MOTOR** Principle of operation, back emf and its significance. Torque equation, types of motors, characteristics and Applications of DC motors. Simple numerical. **Three-phase Induction Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor, Slip and its significance, Simple numerical.	8
4	**SINGLE PHASE TRANSFORMERS** Necessity of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. **Three Phase Synchronous Generators:** Principle of operation, Constructional details, Synchronous speed, Frequency of generated voltage, emf equation, Concept of winding factor (excluding the derivation and calculation of distribution and pitch factors), simple numerical.	9
5	**DOMESTIC WIRING** Requirements, Types of wiring: casing and capping. Two way and three-way control of load. **Electricity Bill:** Power rating of household appliances. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	8

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Basic Electrical Engineering	D C Kulshreshtha	1st	Tata McGraw Hill	2019
2	A text book of Electrical Technology	B.L. Theraja	-	S Chand and Company	2014

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Basic Electrical Engineering	D. P. Kothari and I. J. Nagrath	4th	Tata McGraw Hill	2019
2	Principles of Electrical Engineering & Electronics	V. K. Mehta, Rohit Mehta	2nd	S. Chand and Company Publications	2015
3	Fundamentals of Electrical Engineering	Rajendra Prasad	3rd	PHI	2014

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	YouTube	https://www.youtube.com/watch?v=Vd2UJiIPbag&list=PL9RcWoqXmzaLTYUdnzKhF4bYug3GjGcEc
2	SWAYAM	https://onlinecourses.swayam2.ac.in/ntr25_ed120/preview
3	NPTEL	https://onlinecourses.nptel.ac.in/noc25_ee160/preview

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Understand the concepts of various energy resources and electric circuits.
CO2	Apply basic electric laws to solve circuits.
CO3	Discuss the construction and operation of various electrical machines and their applications
CO4	Explain concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	-	-	-	1
CO2	3	3	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	1
CO4	3	3	-	-	-	-	-	-	-	-	1
AVG	3	3	-	-	-	-	-	-	-	-	1

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1. These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.
2. Lecturer method (L) needs not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
3. Use of Video/Animation to explain functioning of various concepts.
4. Encourage collaborative (Group Learning) Learning in the class.
5. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
7. Introduce Topics in manifold representations.
8. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world and when that's possible, it helps improve the students' understanding.

PRINCIPLES OF PROGRAMMING IN C

Course Code	B25PPC15 / B25PPC25	Total Contact Hours / Week	04	CIE Marks	50
Course Category	PSC	Total SAAE Hours / Semester	48	SEE Marks	50
L:T:P:S	3:0:0:0	Total Notional Learning Hours	90	Total Marks	100
Total Credits	03			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. The course aims to provide exposure to problem-solving through programming. 2. It aims to train the student to the basic concepts of the C-programming language. 3. Designed to give the student hands-on experience with the concepts.

PREREQUISITES
Basic knowledge of Computers

MODULE #	TOPICS	Hours
1	**INTRODUCTION TO COMPUTING** Introduction, Components of Computer, Art of Programming through Algorithms and Flowcharts **(Chapter 1)** **Overview of C:** History and importance of C, Basic structure of C program, programming style, executing a C program. **(Chapter 2)** **Constants, Variable and Data Types:** Introduction, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants, declaring variable as constant, declaring variable as volatile. **(Chapter 3)** **Managing Input and Output Operations:** Reading a Character, writing a Character, Formatted Input, Formatted Output. **(Chapter 5)** **Operators and Expressions:** Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity. **(Chapter 4)**	9
2	**PREPROCESSOR** Introduction, File Inclusion, Macro Substitution, Compiler Control Directives **(Chapter 15)**	8

	DECISION MAKING and BRANCHING: Introduction, Decision Making with IF Statement, Simple IF Statement, the IF-ELSE Statement, Nesting of IF-ELSE Statements, The ELSE IF Ladder, The Switch statement, The?: Operator, The goto statement. **(Chapter 6)** **DECISION MAKING and LOOPING:** Introduction, The while Statement, The do statement, The for statement, Jumps in LOOPS. **(Chapter 7)**	
3	**ARRAYS** One-dimensional Arrays, Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Bubble sort, Selection sort, Linear search, Binary search, Two-dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two-dimensional Arrays, Example programs-Matrix Multiplication, Transpose of a matrix. **(Chapter 8)** **CHARACTER ARRAYS and STRINGS:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Putting strings together, Comparison of two strings, String-handling Functions, Example Programs (with and without using built-in string functions) **(Chapter 9)**	9
4	**USER DEFINED FUNCTIONS** User-defined Functions: Need for functions, Elements of User-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments but no Return values, Arguments with Return Values, No Arguments but Returns a Value, Passing Arrays to Functions, Recursion, The Scope, Visibility and Lifetime of variables. **(Chapter 10)** **POINTERS:** Introduction, accessing address of a variable, Declaring Pointer Variables, Initialization of Pointer variables, accessing a Variable through its Pointer, Pointer Expressions, Pointer Increments and Scale Factor, pointers and arrays, pointers and character strings, array of pointers. **(Chapter 12)**	8
5	**STRUCTURES** Introduction, defining a structure, declaring structure variables, accessing structure members, structure initialization, array of structures, structures within structures. **(Chapter 11)** **FILE MANAGEMENT IN C:** Introduction, Defining and opening a file, closing a file, Input/output operations on files, Error Handling during I/O operations, Random access to files, Command line arguments. **(Chapter 13)**	8

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	"Programming in ANSI C"	E. Balaguruswamy	8th Edition	McGraw Hill Education	2019

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	C How to Program	Paul Deitel and Harvey Deitel	9th	Pearson	2024 – First Impression
2	The C Programming Language	Kernighan B.W and Dennis M. Ritchie	2nd	Pearson Education	2015
3	Let Us C	Yashavant P. Kanetkar	Edition 2019	BPB Publications	2019
4	Problem Solving with C	Jacqueline A Jones and Keith Harrow	-	Pearson Education	
5	C Programming for Problem Solving	Dr. N. Guruprasad	1st	Himalaya Publishing House	2018

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Interactive C tutorial	https://www.learn-c.org
2	C Programming Exercises, Practice, Solution	https://www.w3resource.com/c-programming-exercises/
3	COURSERA - C Programming courses	https://www.coursera.org/courses?query=c%20programming
4	Learn C Programming	https://www.edx.org/learn/c-programming

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Develop simple applications in C using basic constructs
CO2	Demonstrate the use of Control structures and preprocessors
CO3	Explore Arrays and User-Defined Functions in Implementing Solutions to Real world Problems
CO4	Describe the concept of Strings, Pointers and Structures.
CO5	Implement functions towards performing operations on Files.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	-	-	-	-	-	-	-	2
CO2	3	3	3	-	-	-	-	-	-	-	2
CO3	3	3	3	-	-	-	-	-	-	-	2
CO4	3	3	3	-	-	-	-	-	-	-	2
CO5	3	3	3	-	-	-	-	-	-	-	2
AVG	3	3	3	-	-	-	-	-	-	-	2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1. Lecture method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
5. Introduce Topics in manifold representations.
6. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
7. Discuss how every concept can be applied to the real world- and when that's possible, it helps to improve the students' understanding

Suggested Pedagogical approaches

1) Mind map
2) Think Pair share
3) Flipped classroom
4) Cross word puzzle
5) Problem based learning

ENGINEERING PHYSICS LAB FOR CSE STREAM

Course Code	B25PHYL16B/ B25PHYL26B	Total Contact Hours / Week	02	CIE Marks	50
Course Category	ASCL	Total SAAE Hours / Semester	NIL	SEE Marks	50
L:T:P:S	0:0:2:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. Analyse practical engineering problems and apply its solutions effectively and meaningfully. 2. To study the essentials of photonics and its application in computer science. 3. To study the electrical properties of materials. 4. To study the essentials of physics for computational aspects like design and data analysis.

PREREQUISITES
Fundaments of Optics, basics of electrical components and circuits.

Expt. #	TOPICS	Hours
1	Determination of wavelength of LASER using Diffraction Grating.	2
2	Determination of acceptance angle and numerical aperture of the given Optical Fiber.	2
3	Determination of Planck's Constant using LEDs.	2
4	Study the I-V Characteristics of the Given Bipolar Junction Transistor.	2
5	Study the Characteristics of a Photo-Diode.	2
6	Study the I-V Characteristics of the Given Zener Diode .	2
7	Study the frequency response of Series & Parallel LCR circuits.	2
8	Identification of circuit elements in a Black Box and determination of values of the components.	2
9	Predicting the outputs of various combinations of single and two-qubit gates using Quantum Simulator.	2
10	Determination the Radius of curvature using Newton's ring (Demonstration).	2
11	Study the I-V Characteristics of the Given Zener Diode using simulation technique .	2
12	Study the frequency response of Series & Parallel LCR circuits using simulation technique.	2

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Engineering Physics with Laboratory Manual	N H Ayachit, P K Mittal	-	I. K. International Publishing House Pvt. Ltd.	2010

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Laboratory Manual in Applied Physics	Hannah Sathyaseelan	3rd Edition	New Age International (p) Limited	2008
2	Engineering Physics	Pro. B V Narayana Rao	1st Edition	Sapna Book House	2006
3	Engineering Physics Lab Manual for CSE Stream, Don Bosco Institute of Technology				

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Virtual Lab	https://vlab.amrita.edu/
2	Simulation	https://www.myphysicslab.com
3	Simulation	https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Apply the principles of optics to determine the parameters like wave length & numerical Aperture
CO2	Acquiring the knowledge about various semiconducting device
CO3	Understanding resonance, designing electrical circuits and identification of electrical components
CO4	Predict simple outcomes using quantum simulations
CO5	Develop the electronic circuits by selecting suitable components

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	-	-	1	-	1	1	-	-	1
CO2	2	2	-	-	1	-	1	1	-	-	1
CO3	2	2	-	-	1	-	1	1	-	-	-
CO4	2	2	-	-	1	-	1	1	-	-	-
CO5	2	2	-	-	1	-	1	1	-	-	-
AVG	2	2	-	-	1	-	1	1	-	-	1

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1. **Pre-Lab Preparation** – Brief introduction of theory, objectives, apparatus, and safety instructions; students answer pre-lab questions to ensure readiness.
2. **Hands-on Experimentation** – Students perform experiments under guidance, focusing on correct use of instruments, data collection, and teamwork.
3. **Data Analysis & Error Estimation** – Students calculate results, plot graphs, and analyze errors to connect outcomes with theory.
4. **Discussion & Application** – Teacher facilitates reflection on results, deviations, and real-world applications of the experiment.
5. **Assessment** – Evaluation through lab records, viva, performance, and clarity of understanding.

LAB EVALUATION PROCESS

1. Continuous Internal Evaluation – 50 marks
2. Semester End Examination - 50 marks

Continuous Internal Evaluation Marks Split up		
Sl. No	**Activity**	**Marks**
1	Average of Weekly Entries	30
2	Internal Examination Reduced to 20	20
TOTAL		**50**

Internal Examination Rubrics				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
Any 2 experiments	10	30	10	50
	10	30	10	50
TOTAL				**100**
NOTE: This 100 will be scaled down to 20				

Semester End Examination (SEE) Rubrics				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
Any 2 experiments	10	30	10	50
	10	30	10	50
TOTAL				**100**
NOTE: This 100 will be scaled down to 50				

PROGRAMMING LAB USING C

Course Code	B25POPL17/ B25POPL27	Total Contact Hours / Week	02	CIE Marks	50
Course Category	PSC	Total SAAE Hours / Semester	NIL	SEE Marks	50
L:T:P:S	0:0:2:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. Introduce to students to the field of programming using C language. 2. To learn problem solving techniques. 3. The students will be able to enhance their analysing and problem solving skills and use the same for writing programs in C 4. To enable the students to debug programs.

PREREQUISITES
C Programming Language

PART A	
Sl. No.	**LIST OF PROGRAMS**
	Get familiarize with simple programs involving the concepts of I/O functions, operators and expressions
1	Write a C program to find roots of a Quadratic equation. Display appropriate messages.
2	Write a C program to find the total no. of digits and the sum of individual digits of a positive integer.
3	Write a C program to find factorial of a number without recursion
4	Write a C program to generate the Fibonacci sequence of first N numbers without recursion
5	Write a C program to find the reverse of a positive integer and check for palindrome or not. Display appropriate messages.
PART B	
6	Write a C program to arrange the elements of an integer array using Bubble Sort algorithm.
7	Write a C program to search for an element in an array using Binary Search algorithm and print appropriate message.
8	Write a C program to input two matrices and perform matrix multiplication on them.
9	Write a C program to check whether the given string is palindrome or not i) Using library functions ii) Without using Library functions.
10	Write a C program to generate Prime numbers in a given range using user defined function.

<table>
<tr><td>11</td><td>Write a C program to count the number of lines, words and characters in a given text.</td></tr>
<tr><td>12</td><td>Write a C program to maintain a record of n student details using an array of structures with four fields - Roll number, Name, Marks and Grade. Calculate the Grade according to the following conditions.

<table><tr><th>Marks</th><th>Grade</th></tr><tr><td>>=90</td><td>O</td></tr><tr><td>>=80</td><td>A+</td></tr><tr><td>>=70</td><td>A</td></tr><tr><td>>=60</td><td>B+</td></tr><tr><td>>=55</td><td>B</td></tr><tr><td>>=50</td><td>C</td></tr><tr><td>>=40</td><td>P</td></tr><tr><td><40</td><td>F</td></tr></table>
Print the details of the student, given the student Roll number as input</td></tr>
</table>

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Apply the concept of Control Structures to solve any given problem.
CO2	Apply the concept of single and multi-dimensional arrays to solve problems related to searching, sorting and matrix operations.
CO3	Apply the concept of strings for writing programs related to character array.
CO4	Write programs using concept of user defined functions.
CO5	Apply concept of structures and files to write programs

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	-	3	-	2	-	3	-	2
CO2	3	3	3	-	3	-	2	-	3	-	2
CO3	3	3	3	-	3	-	2	-	3	-	2
CO4	3	3	3	-	3	-	2	-	3	-	2
CO5	3	3	3	-	3	-	2	-	3	-	2
AVG	3	3	3	-	3	-	2	-	3	-	2

LAB EVALUATION PROCESS

1. Continuous Internal Evaluation – 50 marks
2. Semester End Examination - 50 marks

Continuous Internal Evaluation Marks Split up		
Sl. No	**Activity**	**Marks**
1	Average of Weekly Entries	30
2	CIE Test Reduced to 20	20
TOTAL		**50**

Continuous Internal Evaluation Test				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
PART A	05	20	05	30
PART B	10	50	10	70
TOTAL				**100**
NOTE: This 100 will be scaled down to 20				

Semester End Examination (SEE)				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
PART A	05	20	05	30
PART B	10	50	10	70
TOTAL				**100**
NOTE: This 100 will be scaled down to 50				

INNOVATION AND DESIGN THINKING LAB

Course Code	B25IDTL18	Total Contact Hours / Week	02	CIE Marks	50
Course Category	AEC	Total SAAE Hours / Semester	-	SEE Marks	50
L:T:P:S	0:0:2:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	1			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. Understand the principles and approaches of design thinking. 2. Develop empathy for users and define problem statements in a human-centred design process. 3. Generate ideas, create prototypes, and test solutions using design thinking techniques. 4. Apply design thinking skills to drive product and service innovation. 5. Critically analyse and select effective strategies to overcome creativity barriers in a design thinking process, and apply these strategies to create distinctive and efficient prototypes that address a particular challenge or opportunity.

PREREQUISITES
NIL

MODULE #	TOPICS	Hours
1	**ORIENTATION AND TEAM FORMATION** **Week – 1 & 2:** Introduction to Social Entrepreneurship, Innovation and Design Thinking Group discussion on What is Innovation vs Invention. Why Design Thinking is important. Brief about 5 stages: Empathize – Define – Ideate – Prototype – Test. **Week - 3:** Innovation warm-up activities, forming interdisciplinary teams, Instructions about Next week activities	6
2	**EMPATHY AND FIELD EXPLORATION** **Week - 4 & 5:** Field (any public places of student's interest Eg- Village, Government Office, Industry. R&D institute, NGO etc) visits, stakeholder interviews and interaction. Recording all interaction through handwritten in activity book prescribed by the University.	6
3	**PROBLEM DEFINITION** **Week - 6:** Documentation, categorization and Group discussion on interactions and problems/challenges. **Week – 7 & 8:** Problem framing using "How Might We" approach, Identification of social problems and user insights through affinity Clustering and Problem Tree. Mention of clearly defined challenge statements.	6

4	**IDEATION SPRINT** **Week – 9 & 10:** Presentation by teams on Defined Problems, Brainstorm -ing interactions and Mind Mapping. **Week-11:** Idea Filtering - Shortlist of creative, eco -friendly and feasible ideas. Selection of one Suitable IDEA for next process, Designing/Structuring of Prototype model	6
5	**RAPID PROTOTYPING USING ATAL IDEA LAB/MAKERS SPACE** **Week – 12 & 13**: Building low-fidelity and working models using tools like Arduino, 3D printers, Digital fabrication, electronics kits and recycled materials **Week - 14:** User testing, Feedback collection, Iteration - Observation Notes, Feedback Forms (Designing a business model for impact and scalability, if possible) Preparation of Draft of social venture plan **Final Demo and Social Pitch** **Week - 15 & 16:**Innovation showcase, Poster display, Project pitching to jury Presentation of the project with impact with assessment, prototype, and sustainability plan	6

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Empathize with community problems and define meaningful challenges.
CO2	Apply design thinking principles and multidisciplinary skills to develop user-centric solutions
CO3	Build and test basic prototypes using tools available in the Atal Idea/Tinkering Lab or Makers Space.
CO4	Pitch socially relevant ideas with scalable models.
CO5	Collaborate effectively in diverse teams.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3
AVG	3	3	3	3	3	3	3	3	3	3	3

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1.Activity Based Learning
2.Group discussion, Presentations.
3. one faculty member shall be assigned to group of 60 students or one division.
4. Each group shall contain Min. 4 and Max. 6 students.
5. Nature of the group shall be multidisciplinary. (Group shall be formed by selecting students from all branches)

CIE PARAMETERS (50 MARKS):

Sl. No	CIE Component/Week	Marks	Description
1	Orientation Activities & Communication Skills	5	Participation in Week 1–3 orientation, communication and teamwork skill-building exercises.
2	Empathy & Field Exploration Documentation	10	Quality and completeness of field visit reflections, stakeholder interviews, and activity book.
3	Problem Definition and Framing	10	Clarity of challenge statements, use of "How Might We", Affinity Mapping, Problem Trees.
4	Ideation & Mind Mapping	5	Participation in brainstorming, mind mapping, idea filtering sessions.
5	Prototype Development & Iteration	10	Quality and creativity of prototype/model, user testing, feedback collection, iterations.
6	Final Presentation & Pitch	5	Project pitching, poster presentation, storytelling and scalability model
7	Teamwork, Journal & Engagement	5	Peer and mentor evaluation of participation, teamwork, journal updates.
Total CIE marks		**50**	**Final CIE marks to be considered**

SAMSKRUTIKA KANNADA

Course Code	B25KSK19/ B25KSK29	Total Contact Hours / Week	01	CIE Marks	50
Course Category	HSMC	Total SAAE Hours / Semester	16	SEE Marks	50
L:T:P:S	1:0:0:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	1 Hrs

COURSE LEARNING OBJECTIVES
1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು .
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
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.

MODULE #	TOPICS	Hours
1	ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು 1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ – ಹಂಪ ನಾಗರಾಜಯ್ಯ 2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ ; ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ 3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ ಡಾ . ಎಲ್ .ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ಕೇಶವ ಮೂರ್ತಿ	3
2	ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ 1. ವಚನಗಳು : ಬಸವಣ್ಣ , ಅಕ್ಕಮಹಾದೇವಿ , ಅಲ್ಲಮಪ್ರಭು , ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ , ಜೇಡರದಾಸಿಮಯ್ಯ , ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ 2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ - ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸಿದರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು 3. ತತ್ವ ಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ	3
3	ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ 1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದಕೆಲವು ಭಾಗಗಳು 2. ಕುರುಡು ಕಾಂಚಾಣ ದಾ.ರಾ.ಬೇಂದ್ರೆ 3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು	3
4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ 1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್ 2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	3
5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ 1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ 2. ಮೇಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ	3

PRESCRIBED TEXT BOOKS:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ: ಡಾ. ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್ .ತಿಮ್ಮೇಶ
ಪ್ರಕಟಣೆ : ಪ್ರಸಾ ರಾಂಗ,ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ ಬೆಳಗಾವಿ.
ವಿಶೇಷ ಸೂಚನೆ :
1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ಇರುತ್ತದೆ.
2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ ಮತ್ತು ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನುಕೇಳಲಾಗುವುದಿಲ್ಲ.
3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್ ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನುಸಂಪರ್ಕಿಸಿ.
4. ಮಾದರಿ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ ಮತ್ತು ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ಸೈಟ್ ನೋಡುವುದು.

COURSE OUTCOMES:
ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು

CO #	Course Outcome Statement
CO1	ಕನ್ನಡ ಭಾಷೆ ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ 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, ಜಾನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	-	2	-	2
CO2	-	-	-	-	-	-	-	-	2	-	2
CO3	-	-	-	-	-	-	-	-	2	-	2
CO4	-	-	-	-	-	-	-	-	2	-	2
CO5	-	-	-	-	-	-	-	-	2	-	2
AVG	-	-	-	-	-	-	-	-	2	-	2

TEACHING-LEARNING PROCESS:
Pedagogy (General Instructions):

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.

BALAKE KANNADA

Course Code	B25KBK19/ B25KBK29	Total Contact Hours / Week	01	CIE Marks	50
Course Category	HSMC	Total SAAE Hours / Semester	16	SEE Marks	50
L:T:P:S	1:0:0:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	1 Hrs

COURSE LEARNING OBJECTIVES

1. ಸುಖಕರ ಮತ್ತು ಆರೋಗ್ಯಕರ ಜೀವನಕ್ಕಾಗಿ ಸ್ಥಳೀಯ ಭಾಷೆ ಕಲಿಯುವ ಅವಶ್ಯಕತೆ ಕುರಿತು ಜಾಗೃತಿ ಮೂಡಿಸುವುದು - To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. ಕಲಿಯುವವರು ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸರಿಯಾಗಿ ಕೇಳಿ ಅರ್ಥ ಮಾಡಿಕೊಳ್ಳುವಂತೆ ಮಾಡಲು ಸಹಾಯ ಮಾಡುವುದು - To enable learners to Listen and understand the Kannada language properly.
3. ಅಗತ್ಯವಿರುವಂತೆ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಮಾತನಾಡಲು, ಓದಲು ಮತ್ತು ಬರೆಯಲು ಕಲಿಯುವುದು - To speak, read and write Kannada language as per requirement.
4. ಸರಿಯಾದ ಹಾಗೂ ವಿನಯಪೂರ್ವಕ ಸಂಭಾಷಣೆಗೆ ಕಲಿಯುವವರನ್ನು ತರಬೇತಿ ನೀಡುವುದು – To train the learners for correct and polite conservation.
5. ಕರ್ನಾಟಕ ರಾಜ್ಯ ಹಾಗೂ ಅದರ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಈ ರಾಜ್ಯದ ಸಾಮಾನ್ಯ ಮಾಹಿತಿಯನ್ನು ತಿಳಿದುಕೊಳ್ಳುವುದು. - To know about Karnataka state and its language, literature and General information about this state.

MODULE #	TOPICS	Hours
1	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 ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Form, Interrogative words	3
2	1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns 2. ಗುಣ ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣ ಬಣ್ಣ ವಿಶೇಷಣಗಳು , ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Colour Adjectives, Numerals 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು - ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು - (ಆ, ಅದು, ಅವು ,ಅಲ್ಲಿ) -Predictive Forms, Locative Case	3
3	1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾ ವಾಚಕಗಳು - Dative Cases, and Numerals 2. ಸಂಖ್ಯಾ ಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - Ordinal numerals and Plural markers	3

	3. ನ್ಯೂನ್ಯ /ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು - Defective/Negative Verbs & Colour Adjectives	
4	1. ಅಪ್ಪಣೆ /ಒಪ್ಪಿಗೆ ನಿರ್ದೇಶನ , ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ 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 ಕ್ರಿಯಾಪದಗಳು – Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) ,ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇದಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ - Comparitive, Relationship, Identification and Negation Words	3
5	1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು 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	3

PRESCRIBED TEXT BOOKS:

ಬಳಕೆ ಕನ್ನಡ, ಡಾ. ಎಲ್ .ತಿಮ್ಮೇಶ , ಪ್ರಕಟಣೆ : ಪ್ರಸಾ ರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ :

1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ಇರುತ್ತದೆ.
2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.
3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್ ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
4. ಮಾದರಿ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ ಮತ್ತು ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ಸೈಟ್ ನೋಡುವುದು.

COURSE OUTCOMES:

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು- At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	ಸ್ಥಳೀಯ ಭಾಷೆಯನ್ನು ಕಲಿಯುವ ಅಗತ್ಯವನ್ನು ಅರಿತು ಸುಖರ ಜೀವನ ನಡೆಸುವುದು – To understand the necessity of learning of local language for comfortable life.
CO2	ಅಗತ್ಯಕ್ಕೆ ಅನುಗುಣವಾಗಿ ಕನ್ನಡವನ್ನು ಮಾತನಾಡುವುದು ಓದುವುದು ಮತ್ತು ಬರೆಯುವುದು - To speak, read and write Kannada language as per requirement.
CO3	ತಮ್ಮ ದೈನಂದಿನ ಜೀವನದಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಬಳಸುವುದು – To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	ಕನ್ನಡ ಭಾಷಿಕರನ್ನು ಕೇಳಿ ಅರ್ಥ ಮಾಡಿಕೊಳ್ಳುವುದು - To Listen and understand the Kannada language properly.
CO5	ಸೌಜನ್ಯವಾದ ಸಂಭಾಷಣೆಯಲ್ಲಿ ಕನ್ನಡವನ್ನು ಬಳಸುವುದು – To speak in polite conservation.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	-	2	-	2
CO2	-	-	-	-	-	-	-	-	2	-	2
CO3	-	-	-	-	-	-	-	-	2	-	2
CO4	-	-	-	-	-	-	-	-	2	-	2
CO5	-	-	-	-	-	-	-	-	2	-	2
AVG	-	-	-	-	-	-	-	-	2	-	2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

1. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರುವ ಪಠ್ಯಕ್ರಮವನ್ನು 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 ಸಂಬಂಧಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೋಡಗಿಸತಕ್ಕದ್ದು.
4. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚಿಗೆ ಡಿಜಿಟಲಿಕರಣ ಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.
5. ಭಾವಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

SOFT SKILLS

Course Code	B25SKS10/ B25SKS20	Total Contact Hours / Week	-	CIE Marks	100
Course Category	AEC	Total SAAE Hours / Semester	-	SEE Marks	-
L:T:P:S	0:0:0:0	Total Notional Learning Hours	-	Total Marks	100
Total Credits	PP			Exam Duration	-

COURSE LEARNING OBJECTIVES
1. Apply social skills for clear communication, persuasion, self-awareness, and active listening. 2. Use emotional skills to build confidence, manage stress, and adapt to change. 3. Set ambitious goals, practice empathy, and apply creativity for problem-solving. 4. Demonstrate discipline, time management, and structured problem-solving 5. Work in teams, negotiate, resolve conflicts, and think critically.

PREREQUISITES
NIL

MODULE #	TOPICS	Hours
1	**SOCIAL SKILLS** **Communication:** Principles of clear and effective exchange of ideas in professional and social contexts. **Persuasion:** Techniques to influence and convince through logical, emotional, and ethical appeals. **Self-Awareness:** Identifying personal strengths, weaknesses, opportunities, and challenges (SWOC analysis). **Active Listening:** Paraphrasing, questioning techniques, and demonstrating attentiveness.	3
2	**EMOTIONAL SKILLS I** **Emotional Intelligence (EI):** Recognizing and managing emotions, empathy, relationship management, and conflict resolution. **Stress Management:** Identifying stress triggers, relaxation techniques, work-life balance strategies, and mindfulness practices. **Time Management:** Prioritization (Eisenhower Matrix), setting SMART goals, avoiding procrastination, and effective scheduling. **Adaptability & Resilience:** Handling change, bouncing back from setbacks, and developing a growth mindset.	3
3	**EMOTIONAL SKILLS II** • Ambition & Goal Setting: Defining personal and professional aspirations, creating SMART goals, and aligning actions with long-term vision.	3

	• Sympathy & Empathy: Understanding emotional perspectives, differentiating between the two, and applying them in workplace and social interactions. • Creativity & Innovation: Generating original ideas, problem-solving, and applying creative thinking techniques (mind-mapping, SCAMPER).	
4	**PROFESSIONAL SKILLS I** • **Problem Solving:** Identifying root causes, analysing options, and implementing solutions using methods like 5 Whys and Fishbone Diagram. • **Discipline:** Building consistency, accountability, and professional habits. • **Time Management:** Prioritizing tasks (Eisenhower Matrix), scheduling, avoiding procrastination.	3
5	**PROFESSIONAL SKILLS II** • Collaboration & Teamwork: Working effectively in diverse teams, fostering trust, and achieving shared goals. • Negotiation & Conflict Resolution: Strategies to resolve differences and reach win– win outcomes. • Critical Thinking: The ability to analyze, evaluate, and synthesize information to make well-reasoned decisions	3

REFERENCE BOOKS:

Reference Book #	Book Title	Authors
1	Principles of Scientific and Technical Writing	Pratap K. J. Mohapatra, Sanjib Moulick, © 2025 | Published: December 23, 2024
2	Soft Skills	1e, By Soma Mahesh Kumar © 2024 | Published: June 8, 2023
3	Effective Technical Communication	3e, By Ashraf M. Rizvi, Priyadarshi Patnaik, © 2024 | Published: September 12, 2024
4	Yadav, D. P	*A course in English pronunciation*. Notion Publications

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Google Docs + Voice Typing	https://docs.google.com
2	Learn English	https://learnenglish.britishcouncil.org/
3	Take IELTS	https://www.britishcouncil.in/exam/ielts
4	British Council Apps	Bbc Learn English online Grammar, Learn English Podcasts IELTS Word Power, Bbc learning English grammar online Sounds Right (Phonemic Chart)

COURSE OUTCOMES:

At the end of the Course, student will be able to

CO #	Course Outcome Statement
CO1	Apply social skills for clear communication, persuasion, self-awareness, and active listening.
CO2	Use emotional skills to build confidence, manage stress, and adapt to change.
CO3	Set ambitious goals, practice empathy, and apply creativity for problem-solving.
CO4	Demonstrate discipline, time management, and structured problem-solving
CO5	Work in teams, negotiate, resolve conflicts, and think critically.

CO-PO MAPPING:

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

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

Instructional Design: Each competency is taught and assessed through guided visualizations, reflections, explainers and hands on activities conducted during lab sessions those build both conceptual understanding and real-world application.

Teaching Methodology: TBTL (Task-Based Teaching Learning) – interactive workshops, simulations, peer feedback. Eclectic Approach.

Language Lab: Quicklrn.com.

Experiential Learning Methods: To embed skills, participants get hands-on through: Guided reflections and explainers to connect concepts with relatable real- life situations. Guided visualization to prompt reflection and self-discovery Role-plays and activities to practice behaviors in context Peer discussions to gain diverse perspectives.

Experiential Learning Methods: To embed skills, participants get hands-on through: Guided reflections and explainers to connect concepts with relatable real- life situations Guided visualization to prompt reflection and self-discovery Role-plays and activities to practice behaviours in context Peer discussions to gain diverse perspectives.

Assessment Methods:

Formative: Role-plays, group discussions, peer feedback.

Summative: Presentations, written reflections, problem-solving exercises.

NUMERICAL METHODS

Course Code	B25MAT21B	Total Contact Hours / Week	05	CIE Marks	50
Course Category	ASC	Total SAAE Hours / Semester	48	SEE Marks	50
L:T:P:S	3:2:0:0	Total Notional Learning Hours	120	Total Marks	100
Total Credits	04			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES

Course objectives: The objectives of the course is to

1. Develop the knowledge of numerical methods and apply them to solve differential equations.
2. Analyze computer science and engineering problems applying ordinary differential equations.
3. Apply the knowledge of solving Computer science and engineering problems
4. using numerical methods.

PREREQUISITES

Basics of Differentiation and integration.

MODULE #	TOPICS	Hours
1	**INTRODUCTION TO NUMERICAL METHODS** Errors and their computation: Round off error, Truncation error, Absolute error, Relative error and Percentage error. Solution of algebraic and transcendental equations: Bisection, Regula-Falsi, Secant and Newton-Raphson methods. **Experiential Learning**: 1) Errors and approximation using Python/MATLAB 2) Root finding methods using Python/MATLAB 3) Discussion of GATE-based problems	9L+6T
2	**NUMERICAL SOLUTIONS FOR SYSTEM OF LINEAR EQUATIONS**: Norms: Vector norms and Matrix norms-L1, L2 and L∞, III conditioned linear system, condition number. Solution of system of linear equations: Gauss Seidel method and LU-decomposition method. Eigenvalues and Eigen vectors: Rayleigh power method, Jacobi's method. **Experiential Learning**: 1) Norms, Condition number using Python/MATLAB 2) Gauss Seidel method and Rayleigh power method using Python/MATLAB 3) Discussion of GATE-based problems	9L+6T

3	**INTERPOLATION** Finite differences, interpolation using Newton Gregary forward and Newton Gregory backward difference formulae, Newton's divided difference. Lagrange interpolation formulae, piecewise interpolation-linear and quadratic. **Experiential Learning**: 1) Forward and Backward interpolation using Python/MATLAB 2) Lagrange's interpolation formula using Python/MATLAB 3) Discussion of GATE-based problems	8L+6T
4	**DIFFERENTIAL EQUATIONS OF FIRST AND HIGHER ORDER** Linear and Bernoulli`s differential equations. Exact and reducible to exact differential equations with integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$. Homogeneous and non-homogeneous differential equations of higher order with constant coefficients. Inverse differential operators - e^{ax}, sin(ax+b), cos(ax+b) and x^n. **Experiential Learning**:1) Solving differential equations of first order and higher order using Python/MATLAB 2) Discussion of GATE-based problems	8L+6T
5	**NUMERICAL INTEGRATION AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS** Numerical integration: Trapezoidal, Simpson's 1/3rd, Simpson's 3/8th rule and Weddle's rule. Numerical solution of ordinary differential equations of first order and first degree - Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector method. **Experiential Learning:** 1)Numerical integration using Python/MATLAB 2)Taylor's series method, Modified Euler's method using Python/MATLAB 3)Runge-Kutta method of fourth order using Python/MATLAB 4) Discussion of GATE-based problems	8L+6T

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Numerical methods for scientific and engineering computation	M.K. Jain, S. R. K. Iyenger and R.K. Jain	8th	New Age International Publishers	2022
2	Linear algebra and its applications	David C Lay	5th	Pearson Publishers	2023
3	Higher Engineering mathematics	B S Grewal	44th	Khanna publishers	2021

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Higher Engineering Mathematics	B.V.Ramana	11th	McGraw-HillEducation	2021
2	A Textbook of Engineering Mathematics	N.P.Baliand Manish Goyal	10th	Laxmi Publications	2022
3	Introductory Methods of Numerical Analysis	S. S. Sastry	5th	John Wiley & Sons	2012
4	Applied Numerical Methods with Matlab for Engineers and Scientists	Steven V. Chapra and Raymond P. Canale	3rd	McGraw-Hill	2011

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	NPTEL	https://nptel.ac.in/courses/111105160
2	NPTEL	https://nptel.ac.in/courses/127106019
3	MOOCs	https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
4	MOOCs	https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2012/pages/syllabus/

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Apply numerical methods to solve transcendental equations, perform interpolation, numerical integration.
CO2	To solve system of linear equations and find eigen values and eigen vectors using Rayliegh's power method and Jacobi's method
CO3	Perform interpolation using appropriate numerical formula.
CO4	Perform numerical integration and solve ODE analytically and numerically
CO5	Familiarize with modern mathematical tool namely Python/MATLAB to solve analytical and computational problems.

CO-PO-MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	2	2	-	-	2	2	-	2
CO2	3	3	-	2	2	-	-	2	2	-	2
CO3	3	3	-	2	2	-	-	2	2	-	2
CO4	3	3	-	2	2	-	-	2	2	-	2
CO5	3	3	-	2	2	-	-	2	2	-	2
AVG	3	3	-	2	2	-	-	2	2	-	2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework, grading assignments, quiz, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
6. Show short-related video lectures in the following ways:
    - As an introduction to new topics (pre-lecture activity).
    - As a revision of topics (post-lecture activity).
    - As additional examples (post-lecture activity).
    - As an additional material of challenging topics (pre-and post-lecture Activity)
    - As a model solution of some exercises (post-lecture activity).

CHEMISTRY FOR SMART SYSTEMS

Course Code	B25CHE12B /B25CHE22B	Total Contact Hours / Week	04	CIE Marks	50
Course Category	ASC	Total SAAE Hours / Semester	48	SEE Marks	50
L:T:P:S	3:0:0:0	Total Notional Learning Hours	90	Total Marks	100
Total Credits	03			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES

1. To understand the concepts of Smart Materials in Memory and Display Systems.
2. To study the properties and applications of advanced polymers and Green materials.
3. To apply sustainable energy solutions for energy storage devices.
4. To impart knowledge in chemical Sensors and corrosion control chemistry.
5. To have a basic knowledge in computational chemistry and E-waste management.

PREREQUISITES

A strong foundation in basic chemistry related to Principles of Electrochemistry, Environmental chemistry & Material science.

MODULE #	TOPICS	Hours
1	**SMART MATERIALS IN MEMORY AND DISPLAY SYSTEMS** **Memory Devices:** Introduction, Classification of Electronic Memory Devices, organic semiconductors; Types of organic semiconductors used in memory devices (p-type semiconductor–Pentacene; n-type-Perfluoropentacene), Construction, working and advantages of organic semiconductor chip. **Display Systems:** Introduction, classification of Liquid crystals (LC's), Working Principle of Liquid crystals, properties and applications in Liquid Crystal Displays (LCD's), Properties and applications of Organic Light Emitting Diodes. (OLED's) and Quantum Light emitting diodes (QLED's).	08
2	**ADVANCED POLYMERS AND GREEN MATERIALS** **Polymers:** Introduction, Numerical problems on Number and Weight Average Molecular weight of polymers: Synthesis of Photopolymer resin-(DSMR) for 3D printing applications. Synthesis and properties of PVC for RFID tags. Conducting polymers: Synthesis & conducting mechanism of polyacetylene & commercial applications. **Graphene:** Preparation, properties, commercial application for Graphene-Based Volatile Organic Compounds (VOCs). **Biomaterials:** Introduction, synthesis and properties of Polylactic Acid	08

	(PLA) for touch screen applications. Synthesis and properties of Alginate Hydrogel for Brain- Computer Interfaces (BCIs) applications.	
3	**GREEN CHEMISTRY FOR ENERGY SOLUTIONS** **Advanced Battery Chemistry:** Introduction, Nernst equation (basic overview), Concentration cell and numerical problems. Classification of batteries, Construction, Working & applications of Sodium ion Battery, Construction and working of ultra-small asymmetric super capacitor and its applications in IoT/wearable devices. **Green Chemistry:** Introduction, 12 principles with real life examples, properties and uses of green solvents. Fuel cell, difference between fuel cell and battery, construction and working Solid-oxide Fuel Cell (SOFCs), design and working of photovoltaic Cell (applications& limitations), Hydrogen as a Clean Fuel, Hydrogen Production by Electrolysis of Water (acid and alkaline hydrolysis).	08
4	**CHEMICAL SENSORS AND CORROSION CONTROL** **Sensors:** Introduction, terminologies of Transducer, Actuators and Sensors. Working principle and any four applications of Conductometric sensors (conductometry) and Optical sensors (colorimetry), Electrochemical Sensor for the measurement of Dissolved Oxygen (DO), Electrochemical gas sensors for NOx; Working principle with electrode reactions of Disposable sensors (DS); **Corrosion:** Introduction, electrochemical theory of corrosion, types (differential metal and aeration), Corrosion control: Galvanization and anodization. Vapour corrosion inhibitors for protecting computer circuit boards, Corrosion Penetration Rate (CPR)- Definition, formula and numerical problems.	09
5	**QUANTUM CHEMISTRY, COMPUTATIONAL CHEMISTRY AND E-WASTE MANAGEMENT** **Quantum dots:** Introduction, size dependent properties (Quantum confinement effect, Surface-to- volume ratio & Band gap). Quantum Dot Sensitized Solar Cells (QDSSC's)-Construction and working Principle. **Engineering Applications of Computational Chemistry:** Introduction, organic semiconductors, Cement hydration modelling, metal oxide battery materials, OER/HER reactions modelling, drug property prediction, molecular data mining. **E-waste:** Introduction, sources, Need for e-waste management, Ill effects on Human Health, Artificial intelligence in e-waste management and its	09

	applications. Extraction of gold from e-waste by bioleaching method. Recycling of lithium batteries by direct method.	

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Engineering Chemistry	Jain & Jain	3rd	Jain & Jain, Publisher	2018
2	Analytical Chemistry	G. Chatwal & S. Anand	2nd	Anand, Himalaya Publishing House	2015

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	High Quality Liquid Crystal Displays and Smart Devices	Ishihara, Kobayashi & Ukai	_	IET	2019
2	Green Carbon Quantum Dots: Environmental Applications	Vijay Kumar, Pardeep Singh, Devendra Kumar Singh	_	Springer Nature Singapore,	2024
3	Advanced Metal-Ion Storage Technologies: Beyond Li-ion Batteries	Ranjusha Rajagopalan, Haiyan Wang, Yougen Tang	-	CRC Press	2024
4	Chemical Sensors: Fundamentals of Sensing Materials.	Ghenadii Korotcenkov	-	Momentum Press	2010
5	Introduction to e-Waste Management	Lakshmi Raghupathy,	-	TERI Press	2024

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	NPTEL	https://nptel.ac.in/courses/113/104/113104021/
2	NPTEL	https://nptel.ac.in/courses/103/102/103102103/
3	YouTube	https://www.youtube.com/watch?v=d4QFNWBSZYg
4	YouTube	https://www.youtube.com/playlist?list=PLdlPA9pGVVtZwm0sBEouXiw25bj9WaX
5	YouTube	https://www.youtube.com/@nthyagarajan27

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO1	Understanding various smart materials and their importance, processing techniques, and it's application.
CO2	Work in the interdisciplinary and multi-disciplinary areas of advanced materials and it's applications.
CO3	To impart knowledge in the field of conventional and Non-conventional Energy.
CO4	Apply the law's of Electro chemistry and operational mechanisms for engineering and environmental monitoring.
CO5	Interpret the impact of modern technologies and solutions for sustainable development.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1	-	1	-	1	-	1	-	2
CO2	2	1	1	-	1	-	1	-	1	-	1
CO3	2	1	1	-	1	-	1	-	1	-	1
CO4	2	1	1	-	1	-	1	-	1	-	1
CO5	2	1	1	-	1	-	1	-	1	-	1
AVG	2	1	1	-	1	-	1	-	1	-	1.2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions): These are sample strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective.

1. Tutorial & remedial classes for needy students (not regular T /R).
2. Conducting Make up classes /Bridge courses for needy students.
3. Demonstration of concepts either by building models or by industry visit.
4. Experiments in laboratories shall be executed in blended mode.
5. Use of ICT–Online videos, online courses.
6. Use of online platforms for assignments/ Notes/ Quizzes (Ex.Google classroom, ERP).

INTRODUCTION TO AI AND APPLICATIONS

Course Code	B25ETC13/ B25ETC23	Total Contact Hours / Week	04	CIE Marks	50
Course Category	ETC	Total SAAE Hours / Semester	32	See Marks	50
L:T:P:S	2:2:0:0	Total Notional Learning Hours	90	Total Marks	100
Total Credits	3			Exam Duration	3 hrs

COURSE LEARNING OBJECTIVES

1. Explain the fundamental concepts, history, types, and working principles of Artificial Intelligence.
2. Apply AI algorithms and machine learning models to solve real-world problems.
3. Analyse AI systems to identify their components, working mechanisms, and suitability for specific applications.
4. Evaluate AI techniques for efficiency, ethical implications, and applicability in various domains.
5. Design and develop AI-driven solutions using modern tools, techniques, and prompt engineering strategies.

PREREQUISITES

Nil

MODULE #	TOPICS	Hours
1	**INTRODUCTION TO ARTIFICIAL INTELLIGENCE** Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Limited Memory, Applications of AI, Robotics-an Application of AI. **Textbook 1: Chapter 1 (1.1-1.8)**	08
2	**ARTIFICIAL INTELLIGENCE TECHNOLOGIES** Techniques in AI, Machine Learning Model, Regression Analysis in Machine Learning, Classification Techniques, Clustering Techniques, Naïve Bayes Algorithm, Neural Network. **Textbook 1: Chapter 2 (2.1-2.7)**	08
3	**ARTIFICIALLY INTELLIGENT MACHINE** Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Agent and Environment, Search, Uninformed Search Algorithms, Informed Search Algorithms: Pure Heuristic Search, Best-First Search Algorithm (Greedy Search). **Knowledge Representation**: Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge. **Textbook 1: Chapter 3 (3.1-3.7.2), Chapter 4 (4.1-4.4)**	09

4	**TRENDS IN AI** AI and Ethical Concerns, AI as a Service (AIaaS), Recent trends in AI. **Industrial Applications of AI**: Application of AI in Healthcare, Application of AI in Finance, Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education, Application of AI in Transportation. **Textbook 1: Chapter 8 (8.1, 8.2, 8.4)** **Textbook 2: Chapter 3**	08
5	**INTRODUCTION TO PROMPT ENGINEERING** Introduction to Prompt Engineering Techniques, Instructions Prompt Technique, Zero, One, and Few Shot Prompting, Self-Consistency Prompt. **Prompt Engineering Techniques for ChatGPT** **Prompts for Creative Thinking:** Introduction, Unlocking Imagination and Innovation. **Prompts for Effective Writing**: Introduction, Igniting the Writing Process with Prompts. **Textbook 3: Chapters 1, 3, 4 & 5**	09

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Artificial Intelligence: Beyond Classical AI	Reema Thareja	1st	Pearson Education	2023
2	AI for Everyone – A Beginner's Handbook for Artificial Intelligence	Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti	1st	Pearson	2024
3	Prompt Engineering: Empowering Communication	Ajantha Devi Vairamani and Anand Nayyar	1st	CRC Press, Taylor & Francis Group	2024

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Artificial Intelligence: A Modern Approach	Stuart Russell & Peter Norvig	4th Edition	Pearson	2020
2	Introduction to Artificial Intelligence	Wolfgang Ertel	2nd Edition	Springer	2018
3	Prompt Engineering for Generative AI: ChatGPT, LLMs, and Beyond,	Tom Taulli	Springer Nature	Apress	2023

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	NPTEL – Artificial Intelligence	https://nptel.ac.in/courses/106/102/106102220/
2	Coursera – AI for Everyone	https://www.coursera.org/learn/ai-for-everyone
3	Platform: Google AI Education	https://ai.google/education/
4	Coursera – Machine Learning by Andrew Ng (Stanford University)	https://www.coursera.org/learn/machine-learning
5	OpenAI Prompt Engineering Guide (for ChatGPT)	https://platform.openai.com/docs/guides/gpt-best-practices

Note: To conduct the activity students can use any of the AI tools such as ChatGPT.	
Sl.No	**Activity on Creating Effective Prompts**
1	**Basic Prompt writing:** Create two different prompts to ask an AI about the topic "Electricity." The first prompt should be vague, and the second prompt should be clear and specific. Compare the responses you get and describe which prompt gave a better answer and why.
2	**Zero-Shot Prompting:** Create a prompt that asks an AI to explain Ohm's Law without giving any example or background. Evaluate how well the AI explains the concept based on your prompt alone.
3	**One-Shot and Few-Shot Prompting:** Provide the AI with a single example of how to calculate the resistance in a simple circuit. Then write your own prompt asking the AI to solve a similar resistance calculation. After that, add two more examples to your prompt and observe any changes in the AI's response quality.
4	**Chain-of-Thought Prompting:** Develop a prompt that guides the AI step-by-step through calculating current flow in a circuit using Ohm's Law with resistors in series. Then, ask a final question for the AI to solve. Analyze how breaking down the reasoning steps impacts the accuracy of the answer.
5	**Prompt Refinement:** Start with an ambiguous prompt related to the "Water Cycle." Test the AI's response, note the confusion or errors, and then refine your prompt to make it clearer and more specific. Repeat this process twice and record how the AI's responses improve with each refinement. **Role-Based Prompting:** Create three prompts asking the AI to explain "Newton's Laws of Motion," each with a different role instruction: (a) as an expert engineer, (b) as a high school teacher, (c) as a beginner. Compare the tone, detail, and style of the responses.
6	**Creative Engineering Problem Prompts:** Craft a prompt that asks the AI to brainstorm ideas for designing a low-cost water purification system suitable for rural areas. Encourage creativity by adding phrases like **"limited resources"** and **"sustainability".**
7	**Ethical Prompt Design Discussion:** Identify a biased prompt related to job descriptions (e.g. language with respect to a gender). Rewrite the prompt to remove bias and create a neutral, inclusive version. Explain why this revision is more ethical.
8	**Simulated Customer Support Chatbot:** Develop a prompt that instructs the AI to play the role of a technical support agent helping a customer troubleshoot a failure in an electronic circuit. Include instructions to keep the tone friendly and professional and to ask diagnostic questions.

9	**Multi-Language Prompting:** Develop a prompt that asks the AI to translate a simple engineering glossary (5 technical terms) from English to your native language. Then modify the prompt to request additional explanations of these terms in the translated language.
10	Review a curated set of different prompt types (e.g., for summarization, information extraction, paraphrasing, question answering) from a "Prompt Gallery." For each prompt type, match it with a real world task (e.g., summarizing a lecture note, extracting names from a project report). Test at least three prompt templates on an AI tool or by role-play (students simulate being the AI), with varied wording. Record the outcomes and discuss which prompt (or template) was most effective for each task, and explain why you think it worked best. Reflect on how changing small parts of a prompt can alter model response quality, completeness, or accuracy.
11	Choose a real engineering challenge or societal problem relevant to your field (e.g., "Reducing plastic waste in campus cafeterias" or "Optimizing solar panel placement on campus rooftops"). Draft an initial prompt that asks an AI to propose practical solutions. Share the AI's (or peer's) answer in small groups and identify aspects that are missing, vague, or not actionable. Refine your prompt based on feedback (e.g., specify constraints, ask for step-by-step solutions, or require a list of pros and cons). Repeat the process one more time, refining again for further clarity or specificity. Document the entire prompt-refinement process and share the best solution generated, along with a brief analysis of how prompt improvements led to better responses.

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Understand the fundamental concepts, techniques, and applications of Artificial Intelligence and related fields.
CO2	Apply AI algorithms, models, and problem-solving techniques to practical scenarios
CO3	Analyze AI systems to identify their components, working principles, and suitability for specific tasks.
CO4	Evaluate the performance, limitations, and ethical implications of AI-based solutions.
CO5	Create innovative AI-driven solutions using modern tools, techniques, and prompt engineering strategies.

CO-PO-MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	-	-	1	1	-	2
CO2	3	3	3	-	-	-	-	2	2	-	2
CO3	3	3	2	-	-	-	-	2	2	-	2
CO4	3	3	2	-	-	-	-	1	2	-	3
CO5	3	2	3	-	-	-	-	3	3	-	3
AVG	3	2.6	2.2	-	-	-	-	1.8	2	-	2.4

PRINCIPLES OF ELECTRONICS

Course Code	B25ESC14B/ B25ESC24B	Total Contact Hours / Week	03	CIE Marks	50
Course Category	ESC	Total SAAE Hours/ Semester	48	SEE Marks	50
L:T:P:S	3:0:0:0	Total National Learning Hours	90	Total Marks	100
Total Credits	3			Exam Duration	3

COURSE LEARNING OBJECTIVES
The students are able to learn 1. Operation of a Semiconductor diode and its applications. 2. Transistor Biasing circuits and Amplifiers. 3. Op-Amps and its applications. 4. Number systems and basic Logic circuits. 5. Oscillators and basics of Communication system.

PREREQUISITES
NIL

MODULE No.	TOPICS	Hours
1	**SEMICONDUCTOR DIODE AND APPLICATIONS** Introduction, V.I Characteristics of PN Junction diode, Forward Characteristic, Reverse characteristic, Diode current equation, Effect of temperature on diode characteristic, ideal diodes, Practical /Real diode, Diode applications. **Rectifiers and Filters:** Introduction, working of Half wave rectifier, Full wave rectifier, Center tapped Full Wave Rectifier Operation, Advantages and Disadvantages, Full Wave Bridge Rectifier Operation, advantages and disadvantages, Comparison of rectifiers. Filters, Capacitor filter. (Textbook 1: 5.1 to 5.7, 5.9, 5.10, 8.1, 8.2, 8.6, 8.7, 8.12, 8.13, 8.17, 8.26, 8.27 & 8.29)	08
2	**BJT BIASING** Introduction, DC operating point and Load Line, Simpler way of Drawing a DC load line, Q-Point and Maximum Undistorted output, Factors Affecting Stability of Q-Point, Methods of Transistor Biasing. Fixed/Base Bias, Voltage Divider Bias and Numericals (Textbook 1: 12.1 to 12.4, 12.5, 12.10, 12.11, 12.17). **Single Stage BJT amplifier**: Introduction, Classification of amplifier and Transistor as an Amplifier, RC Coupled amplifier, and Frequency response of RC coupled amplifier, Advantages and disadvantages of RC coupled amplifier	10

	Transformer Coupled amplifier, Frequency response of Transformer coupled amplifier, Advantages and disadvantages of Transformer coupled amplifier and Direct Coupled amplifier. (Textbook 1: 16.1 to 16.3, 18.4, 18.6, 18.7, 18.10, 18.12, 18.13 & 18.15).	
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, Differentiator and Numericals. (Textbook 1: 29.1 to 29.13, 30.3 & 30.5)	08
4	**BINARY SYSTEMS** Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, 1's & 2's Complements and Numericals. (Textbook 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. (Textbook 2: 2.1 to 2.7, 4.3.1 & 4.3.2)	08
5	**SINUSOIDAL OSCILLATORS** Introduction, Classification of Oscillators, Nature of Sinusoidal oscillations, Oscillatory circuit, Barkhausen criterion, Tuned Circuit oscillators –BJT based Hartley, Colpitts and Crystal oscillator and Numericals. (Textbook 1: 25.1, 25.3, 25.5, 25.6, 25.9, 25.10, 25.14 & 25.15, 25.18 to 25.23). **Communication Systems:** Introduction, Radio frequency Spectrum, Modulation, Need for modulation, Modulation, Methods of Modulation/schemes, Amplitude Modulation– Percentage Modulation, Upper and Lower frequencies and side bands, Mathematical analysis of a Modulated Carrier Wave, Power relations in an AM Wave and Numericals. (Textbook 1: 32.1, 32.3, 32.5, 32.7, 32.8, 32.9, 32.10, 32.11, 32.12, 32.13 & 32.14)	08

PRESCRIBED TEXT BOOK:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	A text book of Electronic Circuits	Dr. R.S. Sedha	3rd Revised edition	S Chand and Company Pvt Ltd	2025
2	Digital Logic and Computer Design	Morris Mano	2nd Impression	Prentice Hall India Publication	2017

REFERENCE BOOKS:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Electronic Devices and Circuit Theory	Robert L. Boylestad	11th edition	Prentice Hall of India Pvt Ltd	2020
2	Electronic Devices and Circuits	David A Bell	5th Edition	Oxford University Press	2008

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl.No	Type of e-Resource	URL
1	MOOCs	• https://onlinecourses.nptel.ac.in/noc21_ee55/preview • https://www.nptelprep.in/courses/117103063/materials

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Apply the knowledge of diodes as rectifiers.
CO2	Analyze the biasing circuit for transistor as an amplifier
CO3	Illustrate 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.

CO-PO- MAPPING:

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

TEACHING LEARNING PROCESS PEDAGOGY (GENERAL INSTRUCTIONS):

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

1. Lecture method (L) does not mean only traditional lecture method, but different type of teaching methods may be adopted to develop the outcomes.
2. Show Video/animation films to explain evolution of communication technologies.
3. Encourage collaborative (Group) Learning in the class
4. Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
7. Discuss how every concept can be applied to the real world. and when that's possible, it helps to improve the students' understanding.

INTRODUCTION TO PYTHON PROGRAMMING

Course Code	**B25PLC15B/ B25PLC25B**	**Total Contact Hours / Week**	**04**	**CIE Marks**	**50**
Course Category	**PLC**	**Total SAAE Hours / Semester**	**48**	**SEE Marks**	**50**
L:T:P:S	**3:0:0:0**	**Total Notional Learning Hours**	**90**	**Total Marks**	**100**
Total Credits	**03**			**Exam Duration**	**3 Hrs**

COURSE LEARNING OBJECTIVES
1. Understand the fundamental concepts of programming, including variables, expressions, conditional statements, loops, and functions, using Python as a platform. 2. Develop programs to solve computational problems through structured logic, iterative constructs. 3. Manipulate and process textual data, files, and collections such as lists, dictionaries, and tuples for solving real-world data processing tasks. 4. Apply object-oriented programming concepts including classes, objects, methods, and operator overloading to design reusable and scalable solutions. 5. Enhance problem-solving skills through debugging, exception handling, and effective use of Python's built-in libraries and tools.

PREREQUISITES
Basics of computer, Hardware , Software Input and Output devices

MODULE No	**TOPICS**	**Hours**
1	**WHY SHOULD YOU LEARN TO WRITE PROGRAMS?** Conversing with Python, Terminology: Interpreter and compiler, What is a program?, The building blocks of programs, What could possibly go wrong?, Debugging. **Variables, Expressions, and Statements** Values and types, Variables, Variable names, Statements, Operators and operands, Expressions, Order of operations, Modulus operator, String operations, Asking the user for input, Comments, Choosing mnemonic variable names, Debugging **Conditional Execution** Boolean expressions, Logical operators, Conditional execution, Alternative execution, chained conditionals, Nested conditionals, catching exceptions using try and except, Short-circuit evaluation of logical expressions, Debugging Text Book1 Chapter 1.1,1.5,1.6,1.8,1.9,1.10,1.11, Chapter2,Chapter	10

2	**FUNCTIONS** Function calls, Built-in functions, Type conversion functions, Math functions, Random numbers, Adding new functions, Definitions and uses, Flow of execution, Parameters and arguments, Fruitful functions and void functions, Why functions?, Debugging **ITERATION** Updating variables, The while statement, Infinite loops, Finishing iterations with continue, Definite loops using for, Loop patterns, Counting and summing loops, Maximum and minimum loops, Debugging, Text Book1 Chapter4, Chapter5	08
3	**STRINGS** A string is a sequence, Getting the length of a string using len, Traversal through a string with a loop, String slices, Strings are immutable, Looping and counting, The in operator, String comparison, String methods, Parsing strings, Formatted String Literals, Debugging, **FILES** Persistence, Opening files, Text files and lines, Reading files, Searching through a file, Letting the user choose the file name, Using try, except, and open, Writing files, Debugging, Text Book1 Chapter 6, Chapter7	08
4	**LISTS** A list is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Deleting elements, Lists and functions, Lists and strings, Parsing lines, Objects and values, Aliasing, List arguments, Debugging, **DICTIONARIES** Dictionary as a set of counters, Dictionaries and files, Looping and dictionaries, Advanced text parsing, Debugging, **TUPLES** Tuples are immutable, Comparing tuples, Tuple assignment, Dictionaries and tuples, Multiple assignment with dictionaries, The most common words, Using tuples as keys in dictionaries, Sequences: strings, lists, and tuples - Oh My!, List comprehension, Debugging, Text Book1 Chapter 8 Chapter 9 , Chapter 10	08

5	**CLASSES AND OBJECTS** Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, **Classes and functions:** Time, Pure functions, Modifiers, Prototyping versus planning, **CLASSES AND METHODS** Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The str____method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation, **Textbook 2: Chapters 15 – 17**	08

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	"Python for Everybody- Exploring Data Using Python"	Dr. Charles R. Severance	1stEdition	Create Space Independent Publishing Platform	2016
2	"Think Python: How to Think Like a Computer Scientist"	Allen B. Downey	2nd Edition	O'Reilly Media, Inc.	2015

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Python for Everybody: Exploring Data in Python 3	Charles R. Severance	1st Edition	Create Space Independent Publishing Platform	2016
2	Head First Python	Paul Barry	2nd Edition	O'Reilly Media	2016

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. No	Type of e-Resource	URL
1	Video Lectures	https://www.learnbyexample.org/python/
2	Video Lectures	https://www.learnpython.org/
3	Video Lectures	https://pythontutor.com/visualize.html#mode=edit

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Understand and apply fundamental programming constructs, including variables, data types, expressions, and control structures, to solve basic computational problems using Python.
CO2	Develop modular programs using user-defined functions. Apply iterative constructs to perform repetitive computations efficiently.
CO3	Manipulate textual data using Python string operations. Handle text files using Python's built-in file I/O capabilities.
CO4	Apply Python's data structures such as lists, dictionaries, and tuples to solve real-world problems involving data collection and processing.
CO5	Implement object-oriented solutions using classes, objects, attributes, and methods. Demonstrate the use of OOP principles such as encapsulation, polymorphism, and operator overloading.

CO-PO-MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	1	-	-	-	-	-	2
CO2	3	3	2	2	1	-	-	-	-	-	2
CO3	3	2	2	2	1	-	-	-	-	-	2
CO4	3	3	3	2	1	-	-	-	-	-	2
CO5	3	3	3	2	1	-	-	-	-	-	2
AVG	3	2.6	2.4	2	1	-	-	-	-	-	2

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions): Teaching Methods

A. Lecture with Demonstration

- Use a live coding approach during lectures to illustrate syntax, logic flow, and debugging.
- Integrate Jupyter Notebook / Python IDLE for step-by-step code execution.
- Highlight real-time output observation for immediate feedback.

B. Interactive Learning

- Pose short problems during class (e.g., "Write a function to reverse a string in 3 minutes").
- Encourage Think–Pair–Share for collaborative problem solving.
- Use Polling/Quizzes via tools like Kahoot, Google Forms, or LMS quizzes.

C. Practical & Hands-On Sessions

- Provide incremental exercises from basic syntax to applied projects.
- Introduce debugging challenges to develop error-handling skills

ENGINEERING CHEMISTRY LAB

Course Code	B25CHEL16/ B25CHEL26	Total Contact Hours / Week	02	CIE Marks	50
Course Category	ASCL	Total SAAE Hours / Semester	NIL	SEE Marks	50
L:T:P:S	0:0:2:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	3 Hrs

COURSE LEARNING OBJECTIVES
1. To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods. 2. Introduce practical applications of chemistry concepts to engineering problems. 3. Know the laboratory practices implemented in research and industrial setting.

PREREQUISITES
Basic understanding of acids, bases, and pH scale.
Understanding of water hardness (temporary & permanent) and Use of indicators.
Basic programming skills and Data input/output in programming.
Safety precautions when handling burners and glassware.

Sl No.	TOPICS	CO'S	Hours
1	**Section A**		02
	A1: Determination of Iron in Rust by Redox Sensors.	CO1	
	A2: Determination of the pKa of Vinegar using a pH Sensor.	CO1	
	A3: Estimation of total hardness of water using the EDTA method.	CO2	
	A4: Determination of Copper content in e-waste by optical sensors.	CO1	
	A5: Synthesis of Iron-oxide Nano particles.(Demo Experiment)	CO3	
	A6: Design and Chemical Etching of Single-Layer PCBs Using Ferric Chloride Solution.(Open ended Experiment)	CO4	
2	**Section B**		02
	B1: Conductometric estimation of an acid mixture.	CO1	
	B2: Determination of viscosity coefficient of lubricant using Ostwald's viscometer.	CO3	
	B3: Estimation of iron in TMT bar by external indicator method.	CO3	
	B4: Write a programme to find fuel efficiency in engines prone to emission test using Octane Number.	CO4	
	B5: Chemical Structure drawing Using software: Chem Draw or ACD / Chem Sketch. (Demo Experiment)	CO4	
	B6: Determination of the pKa of a weak acid and its interpretation using Origin software.(Open ended Experiment)	CO5	

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	A text book of quantitative analysis	GH Jeffery	35th	A John Wiley & Sons	2012
2	A text book of Instrumental analysis	Willard, Merit, Dean and Settle	6th	Wiley	2012

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Vogel's Text Book of Quantitative Chemical Analysis	G.H.Jeffery & J.Bassett,	35th	Wiley	2012
2	Theory and Practice in Applied Chemistry	O.P.Vermani & Narula	6th	New Age International	2019
3	Analytical chemistry	Gary D. Christian	6th	Wiley	2019
4	Engineering Chemistry Lab Manual		1st	--	2025

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Handling different types of instruments for analysis of Samples for quick and accurate results.
CO2	Analysis the quality of water for assessing the public health
CO3	Ability to perform experiments, illustrating the principle of chemistry relevant to the study of science and engineering.
CO4	Enhance the thinking capabilities in the modern trends in engineering and technology.
CO5	Demonstrate an ability to work effectively in a team for finding good results.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	1	1	-	2	2	2	-	-	2
CO2	1	-	2	-	-	2	2	2	-	-	2
CO3	2	1	-	2	-	2	2	2	-	-	2
CO4	2	2	2	2	2	2	2	2	-	-	2
CO5	2	-	-	2	-	-	2	2	2	-	2
AVG	1.8	1.66	1.66	1.75	2	2	2	2	2	-	2

LAB EVALUATION PROCESS

1. Continuous Internal Evaluation – 50 marks
2. Semester End Examination - 50 marks

Continuous Internal Evaluation Marks Split up		
Sl. No	**Activity**	**Marks**
1	Average of Weekly Entries	30
2	CIE Test 100 Reduced to 20	20
TOTAL		**50**

Continuous Internal Evaluation Test				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
PART A	8	35	7	50
PART B	7	35	8	50
TOTAL				**100**
NOTE: This 100 will be scaled down to 20				

Semester End Examination (SEE)				
Questions	**Write up**	**Conduction**	**Viva Voce**	**Marks**
PART A	8	35	7	50
PART B	7	35	8	50
TOTAL				**100**
NOTE: This 100 will be scaled down to 50				

PYTHON PROGRAMING LAB

Course Code	B25PLCL17B/ B25PLCL27B	Total Contact Hours / Week	02	CIE Marks	50
Course Category	PLCL	Total SAAE Hours / Semester	-	SEE Marks	50
L:T:P:S	0:0:2:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	1			Exam Duration	3

COURSE LEARNING OBJECTIVES
To enable students to understand the fundamentals of Python programming and develop problem-solving skills by implementing algorithms, data structures, and real-world applications use Python.

PREREQUISITES
1. Basic computer literacy – Familiarity with operating systems, file handling, and keyboard usage. 2. Fundamentals of programming concepts – Variables, data types, operators, and control flow (from C or any language). 3. Problem-solving and logical thinking skills – Ability to break problems into steps. 4. Basic knowledge of algorithms and flowcharts – Understanding of sequential, conditional, and iterative logic.

MODULE #	TOPICS
1	Write a Python program to accept the number of days a book is returned late and calculate the library fine as per the following rules: Up to 5 days late → ₹2 per day 6 to 10 days late → ₹3 per day for the days beyond the first 5 days Display the total fine. Use a) if, elif b) use logical operators
2	a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console. i)for loop ii) while loop b. Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R). i)using functions ii) without functions
3	Given a string, str = 'X-DSPAM-Confidence: 0.8475' Use find and string slicing to extract the portion of the string after the colon character and then use the float function to convert the extracted string into a floating point number.
4	Write a program to read through a file and print the contents of the file all in upper case .Use the following methods a) read b)readline c)readlines.

5	Write a program which repeatedly reads integers until the user enters "done". Once "done" is entered, print out the total, count, max, min and average of the integers. If the user enters anything other than a integers, detect their mistake using try and except and print an error message and skip to the next integers.
6	Write a program to read through a mail log, build a histogram using a dictionary to count how many messages have come from each email address, and print the dictionary.
7	Write a Python program to manage student records using a dictionary. The program should: Create a dictionary where keys are student roll numbers (strings) and values are their names. Add multiple entries using update() and direct assignment. Display all student roll numbers using keys(). Display all student names using values(). Display all items (roll number → name pairs) using items(). Get the name of a student for a given roll number using get(). Remove a student record using pop(). Remove the last inserted student record using popitem(). Check if a roll number exists in the dictionary using the in operator. Clear all student records using clear() Copy the dictionary using copy() and show that changes in the copy don't affect the original
8	Write a Python program to manage a fruit inventory stored in a **tuple**. The program should: a. Display the complete inventory. b. Accept a fruit name from the user and: • Count the number of times it appears in the inventory using a tuple method. • Display the index of its first occurrence using a tuple method. • If the fruit does not exist, display an appropriate message. c. Display the list of **unique fruits** present in the inventory (convert tuple to set and back). d. Display the inventory sorted in **alphabetical order** as a new tuple.

9	Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the addition of N complex numbers.
10	Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use __init__() method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.]

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	Python for Everybody-Exploring Data Using Python.	Dr. Charles R. Severance	1	CreateSpace Independent Publishing Platform	2016
2	Think Python: How to Think Like a Computer Scientist.	Allen B. Downey	2	O'Reilly Media, Inc.	2015

REFERENCE BOOKS:

Reference Book No	Book Title	Authors	Edition	Publisher	Year
1	Python for Everybody: Exploring Data in Python 3	Charles R. Severance	1	CreateSpace Independent Publishing Platform	2016
2	Head First Python	Paul Barry	2	O'Reilly Media	2016
3	Python Crash Course	Eric Matthes	2	No Starch Press	2019

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. No	Type of e-Resource	URL
1	Video Lectures	https://www.learnbyexample.org/python/
2	Video Lectures	https://www.learnpython.org/
3	Video Lectures	https://pythontutor.com/visualize.html#mode=edit

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO's	Course Outcome Statement
CO1	Apply basic Python syntax, control structures, and expressions to develop simple interactive programs
CO2	Implement programs using lists, tuples, and dictionaries to solve data storage and manipulation problems.
CO3	Write and execute programs involving string operations and file handling for text processing applications.
CO4	Develop Python programs using functions and modular design to improve code reusability and readability.
CO5	Apply object-oriented programming concepts such as classes, objects, and methods to implement real-world problem solutions in Python.

CO-PO-MAPPING:

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

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.

Python IDE like Jupyter Notebook, IDLE etc

Pedagogy (General Instructions):

1. Hands-on Learning – The lab sessions should be conducted in a computer laboratory where each student has access to a system with Python installed.
2. Incremental Approach – Begin with simple syntax and basic programs before progressing to complex problem-solving and real-world applications.
3. Problem-Solving Emphasis – Encourage students to focus on writing clear algorithms/flowcharts before coding.
4. Code Documentation – Insist on writing readable code with proper indentation, comments, and meaningful variable/function names.
5. Evaluation – Assess students based on lab performance, assignments, viva, and quality of the final project work.
6. Encouraging Best Practices – Promote version control usage (Git basics), modular programming, and use of virtual environments for Python projects.

INTERDISCIPLINARY PROJECT BASED LEARNING

COMMUNICATION SKILLS

Course Code	B25ENGL19/ B25ENGL29	Total Contact Hours / Week	01	CIE Marks	50
Course Category	AEC	Total SAAE Hours / Semester	16	SEE Marks	50
L:T:P:S	1:0:0:0	Total Notional Learning Hours	30	Total Marks	100
Total Credits	01			Exam Duration	2 Hrs

COURSE LEARNING OBJECTIVES

1. Understand and Apply the basics of verbal, non-verbal communication for clear and effective expressions.
2. Practice Communication Strategies for group discussion, presentations, teamwork, and professional interactions
3. Able to Draft formal letters and professional email with proper etiquette and structure
4. Demonstrate proficiency in online communication while maintaining Professionalism and etiquette
5. Use digital platforms for collaboration, assignments, and communications.

PREREQUISITES

1. Basic knowledge of English grammar and sentence.
2. Fundamental speaking and listening ability
3. Familiarity with digital tools.
4. Fundamental English writing skills

MODULE #	TOPICS	Hours
1	**COMMUNICATION SKILLS** Glimpses of Essential English for Engineers (General Overview). Communication Skills: Process, Verbal and Non-Verbal, Proxemics, Chronemics and Barriers. Writing: Word Classification – Parts of Speech, Sentence structures. Speaking & Listening: Listening to English Pronunciation – English Phonemes – Intelligible Accent – Speech Organs- Syllable Structures, Intonation, and Practice.	02
2	**INTERPERSONAL SKILLS** Speaking: Role Play Exercises Based on Workplace Contexts, Introducing Oneself - PEP Talks- Personal Empowerment, participating in Group Discussion and Debates, Giving Technical Presentation. Reading: Reading the Interview of an Achiever (Skimming and Scanning) (Case Studies). Writing: Writing a Short Biography of an Achiever Based on given reflections, Grammar: Sentence patterns. Vocabulary Development: Idioms and Phrases.	03
3	**ENGLISH FOR EMPLOYABILTY** Writing: Formal Letter writing (Enquiry, Order, and Complaint). Tenses – Reported Speech Voice - Email Etiquettes, Structure, Writing and	03

	Responding to Emails. Paragraph Writing (Descriptive, Argumentative, Expository, Short Story, and Narrative), Blog Writing. Reading Proof Reading (Spelling, Punctuation, Grammar). Error Identification Exercises. Speaking: Questions & Requests (non-Wh questions and Question tags).	
4	**ENGLISH IN DIGITAL WORLD** Writing: Framing of search terms / keywords in search engines/ Commands for search on open AIs - Tools to support synchronous communication such as webinar platforms, and asynchronous communication such as forums and social media - Online communication - Types – pros and cons of online communication. Acceptable online roles and behaviours – Netiquettes - Etiquettes of social media. Problems and opportunities in handling digital resources -Tools to check grammar. Writing: Citing information accurately from source material - Plagiarism – Infringement, Importance of academic integrity.	03
5	**APPLYING FOR JOBS** Listening: TED Talks. Speaking: Mock Interview, Telephone Interviews. Reading: Reading a Job Interview- language used in formal professional settings, formal vs. informal tone, non verbal communication cues, Statement of Purpose, Company Profile and Completing Page 3 of 11 Comprehension Exercises Writing: Job Applications and Resumes Grammar: Conditional Clauses, Modal verbs Vocabulary Development: Technical Vocabulary, Purpose Statement.	03

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	English for engineers and technologists	Kumar A. R.	-	Orient BlackSwan	2008
2	Technical communication: Principles and practice	Raman, M., & Sharma, S.	3 rd	Oxford University Press	2015

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	Technical communication: Principles and practice	Raman, M., & Sharma, S.	3rd	Oxford University Press	2015
2	Business and professional communication	Floyd, K., & Cardon,	2nd	Mc Graw Hill	2024
3	Effective Technical Communication	Ashraf M. Rizvi, Priyadarshi Patnaik	3rd	Mc Graw Hill Education	2024
4	A course in English pronunciation	Yadav, D. P	3rd	Notion Publications	2022

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Google Docs + Voice Typing	https://docs.google.com
2	Learn English	https://learnenglish.britishcouncil.org/
3	Take IELTS	https://www.britishcouncil.in/exam/ielts
4	Digital tools	https://www.oxfordlearnersdictionaries.com/
5	Digital tools	https://www.youtube.com/watch?v=QxQUapA-2w4&t=51s.

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
CO1	Build essential verbal, non-verbal, and phonetic communication skills for clarity and effectiveness
CO2	Use interpersonal skills in group discussions, presentations, and professional interactions.
CO3	Apply formal writing, email etiquette, and creative content development for employability.
CO4	Communicate effectively in digital platforms, following netiquette and academic integrity.
CO5	Prepare job applications, resumes, and perform confidently in interviews.

CO-PO MAPPING:

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

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

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 and software's to meet the present requirements of the Global employment market. (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, (vii) Following the method of expeditionary learning Tools and techniques, (viii) Use of audio visual methods through language Labs in teaching of LSRW skills. 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 in teaching of communicative skills in general.

INDIAN CONSTITUTION AND ENGINEERING ETHICS

Course Code	B25IC010/ B25IC020	Total Contact Hours / Week	01	CIE Marks	50
Course Category	NCMC	Total SAAE hours / semester	16	SEE Marks	--
L:T:P:S	1:0:0:0	Total Notional Learning Hours	--	Total Marks	50
Total Credits	--			Exam Duration	--

COURSE LEARNING OBJECTIVES
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.

PREREQUISITES
1. Basic idea of law and order 2. Understanding of government structure 3. General political Awareness 4. Familiarity with Indian History

MODULE #	TOPICS	Hours
1	**INTRODUCTION TO INDIAN CONSTITUTION** The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly. The Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of India Constitution	02
2	**FR'S, FD'S AND DPSP'S** Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.	03
3	**UNION EXECUTIVE** Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.	03

4	**STATE EXECUTIVE & ELECTIONS, AMENDMENTS AND EMERGENCY PROVISIONS** State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	03
5	**PROFESSIONAL ETHICS** Ethics & Values. Types of Ethics. Scope & Aims of Professional & Engineering Ethics. Positive and Negative Faces of Engineering Ethics. Clash of Ethics, Conflicts of Interest. The impediments to Responsibility. Trust & Reliability in Engineering, IPRs (Intellectual Property Rights), Risks, Safety and liability in Engineering	03

PRESCRIBED TEXT BOOKS:

Text Book #	Book Title	Authors	Edition	Publisher	Year
1	"Constitution of India"	-	-	Naidhruva Edutech Learning Solutions, Bengaluru.	2022
2	"Introduction to the Constitution of India"	Merunandan	2nd edition	Durga Das Basu (DD Basu): Prentice – Hall	2008

REFERENCE BOOKS:

Reference Book #	Book Title	Authors	Edition	Publisher	Year
1	"Constitution of India, Professional Ethics and Human Rights	Shubham Singles, Charles E. Haries, and et al	Second Edition	Cengage Learning India	2019
2	The Constitution of India	Merunandan K B	Second Edition	Merugu Publication,	
3	"Samvidhana Odu"	Justice HN Nagamohan Dhas, Sahayana, kerekon.	Second Edition	KSLU	2016
4	Introduction to the Constitution of India	Durga Das Basu	22nd edition	LexisNexis/ Prentice Hall	2008

e-RESOURCES: e-BOOKS / ONLINE COURSE MATERIALS / ONLINE COURSES / VIDEO LECTURES:

Sl. #	Type of e-Resource	URL
1	Official constitution of India	http://legislative.gov.in/constitution-of-india
2	Parliament of India website	http://parliamentofindia .nic.in/
3	Supreme court of India Judgments &References	http://main.sci.gov.in/

4	Indian Constitution	indian-polity-by-dd-bashu-edd349fb.pdf
5	Ethics of Indian Constitution	https://archive.org/details/in.ernet.dli.2015.103074

COURSE OUTCOMES:

At the end of the Course, student will be able to:

CO #	Course Outcome Statement
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.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	3
CO3	-	-	-	-	-	3	-	-	-	2	3
CO4	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-		3
AVG	-	-	-	-	-	3	3	-	-	2	3

TEACHING-LEARNING PROCESS:

Pedagogy (General Instructions):

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.