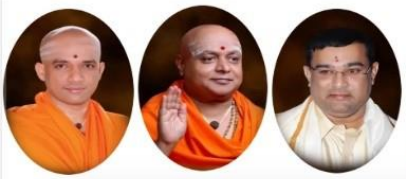

|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)

# SJB Institute of Technology

An AUTONOMOUS INSTITUTION UNDER VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Approved by AICTE, 2(f) and 12(B) recognized by UGC, New Delhi
Accredited by NAAC, Accredited by NBA, Certified by ISO 9001 - 2015

## B.E.

## Autonomous Scheme & Syllabus

## First Year - Mechanical Engineering (ME Stream)

## Academic Year 2023-2024

I and II Semesters

2023-2027 Batch

# SERVICE TO MANKIND IS SERVICE TO GOD

**His Divine Soul Padmabhushana**

**Sri Sri Sri Dr. Balagangadharanath MahaSwamiji**

*Founder President, Sri Adichunchanagiri Shikshana Trust®*

**Belief in God is not ignorance or illusion. It is a belief that there is an unseen, ineffable Power that transcends all our powers of muscles, mind and lives.**

**His Holiness Parama Pujya**

**Sri Sri Sri Dr. Nirmalanandanatha MahaSwamiji**

*President, Sri Adichunchanagiri Shikshana Trust ®*

**True richness is the generosity of heart. Cultivate it and work to help the less fortunate ones in life.**

**Revered Sri Sri Dr. Prakashanatha Swamiji**

**Managing Director, BGS & SJB Group of Institutions & Hospitals**

**People and prosperity follow the path which the leaders take. So the elders and leaders should make sure that they give the right lead and take the right path.**

# Syllabus Book for ME Stream

## Syllabus for 1st and 2nd Semester

The syllabus, scheme and guidelines are provided in detail.
The syllabus, scheme and guidelines are subjected to changes if any needed.
The updates will be done and intimated timely.

| | |
|---|---|
| The Syllabus book is available on | www.sjbit.edu.in |
| **For any queries, please write to** | academicdean@sjbit.edu.in |

**UPDATES**

| Release / Revision | Date | Remarks |
|---|---|---|
| Release | 09/09/2023 | Pending syllabus of 2nd SEM AEC course 23CSAE21/23EEAE21/ 23CVAE21/23MEAE21 |
| Revision 01 | 02/11/2023 | Updated with pending course syllabus |
| Revision 02 | 06/11/2023 | More clarity in CIE & SEE guidelines of CAED course (typographical mistakes are removed) Formatting for better appearance. |
| Revision 03 | 18/11/2023 | Retitling of Course titles of Mathematics, Physics, chemistry, Engg. Core courses from all departments |
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|| Jai Sri Gurudev ||
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# SJB Institute of Technology

BGS Health and Education City, Dr. Vishnuvardhana Road, Kengeri, Bengaluru-560060
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## AUTONOMOUS SCHEME (Tentative) UG - BE First Year ME

**SCHEME:** 2023 **Aca. Year.: 2023-24** **Date:** 18/11/2023

**SEM:** I

| SL No | Course Type | Course type Series | Course Code | Course Title | Teaching Dept. | QP setting dept | Credits | Teaching Hrs/Week | | | | Examinations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | L | T | P | S | | SEE | | | |
| | | | | | | | | Lecture | Tutorial | Practical | PBL/ABL / SL/othrs. | CIE Marks | Dur. | Th. Mrks | Lab. Mrks | Tot. Marks |
| **PHYSICS CYCLE** | | | | | | | | | | | | | | | | |
| 1 | BSC | 1 | 23MAT11D | Advanced Calculus | Maths | Maths | 4 | 3 | 2 | 0 | | 50 | 03 | 50 | - | 100 |
| 2 | IBSC | 1 | 23PHI12D | Physics of Materials | PHY | PHY | 4 | 2 | 2 | 2 | | 50 | 03 | 50 | - | 100 |
| 3 | ESC | 1 | 23EET13D | Elements of Electrical Engineering | EEE | EEE | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 4 | ESC | 2 | 23MET14D | Principles of Mechanical Engineering | ME | ME | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 5 | IESC | 1 | 23CPI15D | Concepts of C Programming | CSE^ | CSE^ | 4 | 3 | 0 | 2 | | 50 | 03 | 50 | - | 100 |
| 6 | HSMC | 1 | 23ENGH01 | Professional Skills in English | HSS | HSS | PP/NP | 0 | 1 | 1 | | 50 | - | 0 | - | 50 |
| 7 | HSMC | 2 | 23ENVH02 | Environmental studies | HSS | HSS | 1 | 1 | 0 | 0 | @ | 50 | 02 | 50 | - | 100 |
| 8 | NCMC | 1 | 23PDSN01 | Personality Development-1 (HRD Training) | I.E. | I.E. | PP/NP | 0 | 0 | 0 | 2 | 50 | - | 0 | - | 50 |
| 9 | AEC | 1 | 23MEAE11 | Skill Development Course - 1 (EWDP) | I.E. | I.E. | 1 | 1 | 0 | 0 | 2 | 50 | 02 | 50 | - | 100 |
| | | | | | | **SEM-I Total** | 20 | 16 | 5 | 7 | 4 | 450 | | 350 | 0 | 800 |
| **CHEMISTRY CYCLE** | | | | | | | | | | | | | | | | |
| 1 | BSC | 2 | 23MAT11D | Advanced Calculus | Maths | Maths | 4 | 3 | 2 | 0 | | 50 | 03 | 50 | - | 100 |
| 2 | IBSC | 2 | 23CHI12D | Applied Chemistry of Engineering materials | CHE | CHE | 4 | 2 | 2 | 2 | | 50 | 03 | 50 | - | 100 |
| 3 | ESC | 3 | 23ECT13D | Fundamentals of Electronics | ECE | ECE | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 4 | ESC | 4 | 23CVT14D | Elements of Civil Engineering | CV | CV | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 5 | IESC | 2 | 23CDI15D | Engineering Visulaization & Digital Drawing | CV/ME | CV/ME | 4 | 3 | 0 | 2 | | 50 | 03 | 0 | 50 | 100 |
| 6 | HSMC | 3 | 23SKAH03 23BKAH04 | Samskrutika Kannada / Balake Kannada | HSS | HSS | PP/NP | 1 | 0 | 0 | | 50 | - | 0 | - | 50 |
| 7 | HSMC | 4 | 23CIPH05 | Constitution of India & Professional Ethics | HSS | HSS | 1 | 1 | 0 | 0 | @ | 50 | 02 | 50 | - | 100 |
| 8 | NCMC | 1 | 23PDSN01 | Personality Development-1 (HRD Training) | I.E. | I.E. | PP/NP | 0 | 0 | 0 | 2 | 50 | - | 0 | - | 50 |
| 9 | AEC | 1 | 23MEAE11 | Skill Development Course - 1 (EWDP) | I.E. | I.E. | 1 | 1 | 0 | 0 | 2 | 50 | 02 | 50 | - | 100 |
| | | | | | | **SEM-I Total** | 20 | 17 | 4 | 6 | 4 | 450 | | 300 | 50 | 800 |

BSC - Basic Science Course; IBSC - Integrated Basic Science Course; ESC - Engineering Science Course; IESC - Integrated Engineering Science Course; HSMC - Humanities, Social Sciences & Management Course; AEC - Ability Enhancement Course. {CSE^ --> CSE Stream} {@ - Compulsory one activity during the semester} I.E - Industry Expert

18/11/23
Dr. BABU. N.V
Prof. & Academic Dean
SJB Institute of Technology
BGS Health & Education City
Kengeri. Bengaluru-560060

18.11.2023
Principal
SJB Institute of Technology
# 67, BGS Health & Education City,

|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)

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## AUTONOMOUS SCHEME (Tentative) UG - BE First Year ME

**SCHEME:** 2023 **Aca. Year.: 2023-24** **Date:** 18/11/2023

**SEM:** II

| SL No | Course Type | Course type Series | Course Code | Course Title | Teaching Dept. | QP setting dept | Credits | Teaching Hrs/Week | | | | Examinations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | L | T | P | S | CIE Marks | SEE | | | Tot. Marks |
| | | | | | | | | Lecture | Tutorial | Practical | PBL/ABL/ SL/othrs. | | Dur. | Th. Mrks | Lab. Mrks. | |
| **CHEMISTRY CYCLE** | | | | | | | | | | | | | | | | |
| 1 | BSC | 2 | 23MAT21D | Differential Equations and Numerical Methods | Maths | Maths | 4 | 3 | 2 | 0 | | 50 | 03 | 50 | - | 100 |
| 2 | IBSC | 2 | 23CHI22D | Applied Chemistry of Engineering materials | CHE | CHE | 4 | 2 | 2 | 2 | | 50 | 03 | 50 | - | 100 |
| 3 | ESC | 3 | 23ECT23D | Fundamentals of Electronics | ECE | ECE | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 4 | ESC | 4 | 23CVT24D | Elements of Civil Engineering | CV | CV | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 5 | IESC | 2 | 23CDI25D | Engineering Visulaization & Digital Drawing | CV/ME | CV/ME | 4 | 3 | 0 | 2 | | 50 | 03 | 0 | 50 | 100 |
| 6 | HSMC | 3 | 23SKAH03 23BKAH04 | Samskrutika Kannada / Balake Kannada | HSS | HSS | PP/NP | 1 | 0 | 0 | | 50 | - | 0 | - | 50 |
| 7 | HSMC | 4 | 23CIPH05 | Constitution of India & Professional Ethics | HSS | HSS | 1 | 1 | 0 | 0 | @ | 50 | 02 | 50 | - | 100 |
| 8 | NCMC | 2 | 23PDSN02 | Personality Development-2 (HRD Training) | I.E. | I.E. | PP/NP | 0 | 0 | 0 | 2 | 50 | - | 0 | - | 50 |
| 9 | AEC | 2 | 23MEAE21 | Skill Development Course - 2 (EWDP) | I.E. | I.E. | 1 | 1 | 0 | 0 | 2 | 50 | 02 | 50 | - | 100 |
| | | | | | | **SEM-II Total** | 20 | 17 | 4 | 6 | 4 | 450 | | 300 | 50 | 800 |
| **PHYSICS CYCLE** | | | | | | | | | | | | | | | | |
| 1 | BSC | 1 | 23MAT21D | Differential Equations and Numerical Methods | Maths | Maths | 4 | 3 | 2 | 0 | | 50 | 03 | 50 | - | 100 |
| 2 | IBSC | 1 | 23PHI22D | Physics of Materials | PHY | PHY | 4 | 2 | 2 | 2 | | 50 | 03 | 50 | - | 100 |
| 3 | ESC | 1 | 23EET23D | Elements of Electrical Engineering | EEE | EEE | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 4 | ESC | 2 | 23MET24D | Principles of Mechanical Engineering | ME | ME | 3 | 3 | 0 | 0 | | 50 | 03 | 50 | - | 100 |
| 5 | IESC | 1 | 23CPI25D | Concepts of C Programming | CSE^ | CSE^ | 4 | 3 | 0 | 2 | | 50 | 03 | 50 | - | 100 |
| 6 | HSMC | 1 | 23ENGH01 | Professional Skills in English | HSS | HSS | PP/NP | 0 | 1 | 1 | | 50 | - | 0 | - | 50 |
| 7 | HSMC | 2 | 23ENVH02 | Environmental studies | HSS | HSS | 1 | 1 | 0 | 0 | @ | 50 | 02 | 50 | - | 100 |
| 8 | NCMC | 2 | 23PDSN02 | Personality Development-2 (HRD Training) | I.E. | I.E. | PP/NP | 0 | 0 | 0 | 2 | 50 | - | 0 | - | 50 |
| 9 | AEC | 2 | 23MEAE21 | Skill Development Course - 2 (EWDP) | I.E. | I.E. | 1 | 1 | 0 | 0 | 2 | 50 | 02 | 50 | - | 100 |
| | | | | | | **SEM-II Total** | 20 | 16 | 5 | 7 | 4 | 450 | | 350 | 0 | 800 |

BSC - Basic Science Course; IBSC - Integrated Basic Science Course; ESC - Engineering Science Course; IESC - Integrated Engineering Science Course; HSMC - Humanities, Social sciences & Management Course; AEC - Ability Enhancement Course. {CSE^ --> CSE Stream} {@ - Compulsory one activity during the semester} I.E - Industry Expert

18/11/23

Dr. BABU. N.V
Prof. & Academic Dean
SJB Institute of Technology
BGS Health & Education City

19.11.23

Principal
SJB Institute of Technology
# 67, BGS Health & Education City

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**Table of Contents**


| Sl. No | Subject code | Subject | PgNo |
|---|---|---|---|
| 1 | 23MAT11C | Advanced Calculus | 1 to 3 |
| 2 | 23MAT21D | Differential Equations and Numerical Methods | 4 to 6 |
| 3 | 23EET13D/23EET23D | Elements of Electrical Engineering | 7 to 9 |
| 4 | 23ECT13/23D | Fundamentals of Electronics | 10 to 12 |
| 5 | 23MET14D/24D | Principles of Mechanical Engineering | 13 to 15 |
| 6 | 23CVT14D/24D | Elements of Civil Engineering | 16 to 18 |
| 7 | 23CPI15D/25D | Concepts of C Programming | 19 to 21 |
| 8 | 23CDI15D/25D | Engineering Visulaization & Digital Drawing | 22 to 24 |
| 9 | 23PHI12D/22D | Physics of Materials | 25 to 28 |
| 10 | 23CHI12D/22D | Applied Chemistry of Engineering materials | 29 to 32 |
| 11 | 23BKAH04 | Balake Kannada (Kannada for Usage) | 33 to 35 |
| 12 | 23SKAH03 | Samskrutika Kannada | 36 to 37 |
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| 15 | 23ENVH02 | Environmental Studies | 44 to 46 |
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| 18 | 23MEAE11 | Skill Development Course – 1: WEB 2.0 (HTML, CSS & JAVASCRIPT) | 52 to 54 |
| 19 | 23MEAE21 | Skill Development Course – 2: Python | 55 to 57 |
| 20 | ——— | Annexure-CIE & SEE Guidelines | 58 to 69 |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I | **Course Type:** | BSC | | |
| **Course Title:** Advanced Calculus | | | | | |
| **Course Code:** | 23MAT11D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:2:0:0 | **Total Hours:** | 50 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

1. To facilitate the students with a concrete foundation of differential calculus.
2. To develop the knowledge of matrices and linear algebra in comprehensive manner.

**II. Teaching-Learning Process (General Instructions):**

1. In addition to the traditional lecture method, innovative teaching methods shall be adopted.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Grading assignments and quizzes and documenting students' progress.
4. Encourage the students for group learning to improve their creative and analytical skills.

**Pre-requisites**

1. Trigonometric formulae.
2. Differentiation, Integration and properties.
3. Basic knowledge of Matrix operations.

**III. COURSE CONTENT**

| **Module-1:Single variable calculus** | 10 hours |
|---|---|

Polar curves – Angle between the radius vector and tangent, angle between two curves, pedal equation. Curvature and radius of curvature – Cartesian and pedal forms. Evaluation of Indeterminate forms: evaluation of limits of the form $1^{\infty}, 0^{0}, \infty^{0}$.

**Textbook: Chapter: sections:** Discussion and coverage of contents as suggested in articles 4.7(1, 2), 4.8, 4.10, 4.11(1, 5), 4.5(III) of Textbook 1.

**Self Study:** Radius of curvature in parametric and polar form.

**RBT Levels:** L1, L2 and L3.

| **Module-2: Series expansion and Multivariable calculus** | 10 hours |
|---|---|

Taylor's and Maclaurin's series expansions for one variable (statement only)-Problems. Partial differentiation; Definition and simple problems, Total derivatives – differentiation of composite functions. Jacobians-definition, properties and problems. Maxima and minima for a function of two variables.

**Textbook: Chapter: sections:** Discussion and coverage of contents as suggested in articles 5.2, 5.5(1, 2), 5.7 (1), 5.11 of Textbook 1.

**Self Study:** Method of Lagrange's undetermined multipliers with a single constraint.

**RBT Levels:**L1, L2 and L3.

| **Module-3:Integral Calculus** | 10 hours |
|---|---|

| |
|---|
| **Multiple Integrals:** Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area, Problems.<br>**Beta and Gamma functions:** Definitions, properties, relation between Beta and Gamma functions. Problems. |
| **Textbook: Chapter: Sections:** Discussion and coverage of contents as suggested in articles.7.1 to 7.5, 7.14, 7.15 & 7.16 of Textbook 1. |
| **Self Study:** Application to find Volume. |
| **RBT Levels:** L1, L2 and L3. |

| **Module-4: Ordinary Differential Equations (ODEs) of First Order** | 10 hours |
|---|---|

| |
|---|
| Linear and Bernoulli's differential equations. Exact differential equations. Orthogonal trajectories (Cartesian form only). Applications: Newton's law of cooling.<br>Nonlinear differential equations: Introduction to general and singular solutions; Solvable for *p* only ; Clairaut's equation. |
| **Textbook: Chapter: Sections:** Discussion and coverage of contents as suggested in articles 11.9 (only for introduction), 11.10, 11.11, 12.3 (1, 2), 12.611.13(1) and 11.14 of Textbook 1. |
| **Self Study:** Reducible to exact differential equations. Orthogonal trajectories – polar form. |
| **RBT Levels:** L1, L2 and L3. |

| **Module-5:Linear Algebra** | 10 hours |
|---|---|

| |
|---|
| Rank of a matrix by echelon and normal form. Consistency and Solution of system of linear equations. Gauss-elimination method. Approximate solution byGauss-Seidel method. Determination of largest Eigen values and the corresponding Eigen vector by Rayleigh's power method. |
| **Textbook: Chapter: Sections:** Discussion and coverage of contents as suggested in articles 2.7(1, 2,7), 2.10(1), 28.6(1) 28.7(2) and 28.9 Textbook 1. |
| **Self Study:** LU decomposition method and Gauss-Jordan method. |
| **RBT Levels:** L1, L2 and L3. |

## IV. COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Apply the knowledge of single variable calculus to solve the problems on polar curves and evaluation of indeterminate forms. |
| **CO2** | Apply the knowledge of multivariable calculus to solve the problems on partial differentiation, composite functions and Jacobian. |
| **CO3** | Apply the concept of change of order of integration and change of variables to evaluate multiple integrals to find area and volume. |
| **CO4** | Analyze the solution of linear and non-linear ordinary differential equations. |
| **CO5** | Make use of matrix theory for solving the system of linear equations and compute eigen values and eigen vectors. |

## V. CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | | | | | | | | | | 1 | | | | |
| CO2 | 3 | 2 | | | | | | | | | | 1 | | | | |
| CO3 | 3 | 2 | | | | | | | | | | 1 | | | | |
| CO4 | 3 | 2 | | | | | | | | | | 1 | | | | |
| CO5 | 3 | 2 | | | | | | | | | | 1 | | | | |

| VI. Assessment Details (CIE & SEE) | | | | |
|---|---|---|---|---|
| **General Rules:** Refer Annexure section 1 | | | | |
| **Continuous Internal Evaluation (CIE):** Refer Annexure section 1 | | | | |
| **Semester End Examination (SEE):** Refer Annexure section 1 | | | | |
| **VII. Learning Resources** | | | | |
| **VII(a): Textbooks:** | | | | |
| **Sl. No.** | **Title of the Book** | **Name of the author** | **Name of the publisher** | **Edition and Year** |
| **1** | Higher Engineering Mathematics | B.S. Grewal | Khanna Publishers | 44th Ed., 2018. |
| **VII(b): Reference Books:** | | | | |
| **1** | Advanced Engineering Mathematics | E. Kreyszig | John Wiley & Sons | 10th Ed., 2016 |
| **2** | A Textbook of Engineering Mathematics | N.P Bali and Manish Goyal | Laxmi Publications | 10th Ed., 2022 |
| **3** | Higher Engineering Mathematics | B.V.Ramana | Tata Mc Graw-Hill | 11th Ed., 2017 |
| **4** | Linear Algebra and its Applications | Gilbert Strang | Cengage Publications | 4th Ed., 2022. |
| **5** | "Linear Algebra and its Applications" | David C Lay | Pearson Publishers | 4th Ed., 2018. |
| **VII(c): Web links and Video Lectures (e-Resources):** | | | | |
| 1. http://nptel.ac.in/courses.php?disciplineID=111<br>2. http://www.class-central-central.com/subject/math(MOOCs)<br>3. http://academiccarth.org/<br>4. VTU EDUSAT programme-20 | | | | |
| **VIII: Activity Based Learning** | | | | |
| Assignments, quiz, Presentation. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | II | **Course Type:** | BSC | | |
| **Course Title:** Differential Equations and Numerical Methods | | | | | |
| **Course Code:** | 23MAT21D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:2:0:0 | **Total Hours:** | 50 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

1. Familiarize the importance of ordinary and partial differential equations.
2. Apply the knowledge vector calculus to solve engineering problems.
3. Develop the knowledge of numerical methods and apply them to solve transcendental and differential equations.

**II. Teaching-Learning Process (General Instructions):**

1. In addition to the traditional lecture method, innovative teaching methods shall be adopted.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. Grading assignments and quizzes and documenting students' progress.
5. Encourage the students for group learning to improve their creative and analytical skills.

**Pre-requisites:**

1. Trigonometric formulae.
2. Differentiation, Integration and properties
3. Basic knowledge of Scalars and Vectors

**III. COURSE CONTENT**

| **Module-1: Differential equations of higher order** | 10 Hours |
|---|---|

Second order linear ODE's with constant coefficients – Inverse differential operators, evaluation of homogeneous equations, Non homogeneous equations ($e^{ax}$, $\sin ax$ or $\cos ax$, $polynomial$), method of variation of parameters, Cauchy's and Legendre linear equations. Applications: Simple pendulum.

**Textbook: Chapter: sections** Discussion and coverage of contents as suggested in articles 13.1 to 13.6, 13.8, 13.9, 14.3(1) of Textbook 1.

**Self study:** LCR circuits and oscillation of a spring.

**RBT Levels:** L1, L2 and L3.

| **Module-2: Partial Differential equations(PDE's):** | 10 Hours |
|---|---|

| | |
|---|---|
| Formation of Partial differential equations by elimination of arbitrary constants and functions, Solution of Lagrange's linear PDE. Derivation of one dimensional heat and wave equations and solutions by the method of separation of variables. | |
| **Textbook:Chapter:sections:** Discussion and coverage of contents as suggested in articles 17.2, 17.5, 18.4(1, 2) and 18.5(1, 2)of Textbook 1. | |
| **Self study:** Solution of non-homogeneous Partial differential equations by direct integration, Homogeneous Partial differential equations involving derivative with respect to one independent variable. | |
| **RBT Levels:** L1, L2 and L3. | |
| **Module-3:Vector calculus** | 10 Hours |
| **Vector Differentiation**: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, Solenoidal and Irrotational vector fields, Problems. Vector identities.<br>**Vector Integration**: Line integrals, Surface integrals. Applications to work done by a force and flux. Green's theorem (statement only), problems. | |
| **Textbook: Chapter: sections:**<br>Discussion and coverage of contents as suggested in articles 8.1, 8.4, 8.5, 8.6, 8.7, 8.8, 8.11, 8.12, 8.13, and 8.18(1, 2) of Textbook 1. | |
| **RBT Levels:** L1, L2 and L3. | |
| **Module-4: Numerical Methods** | 10 Hours |
| Solution of algebraic and transcendental equations: Newton-Raphson method.<br>**Finite Differences and Interpolation**: Forward, Backward differences, Interpolation, Newton-Gregory Forward and Backward Interpolation formulae, Interpolation with unequal Intervals: Newton divided difference interpolation formula and Lagrange interpolation formula (no proof), problems.<br>**Numerical Integration**: Simpson 1/3rd rule and Simpson 3/8th rule. | |
| **Textbook: Chapter: sections:** Discussion and coverage of contents as suggested in articles 28.2(3), 29.1(1,2), 29.6, 29.9, 29.10, 29.11, 29.12, 30.4, 30.7, 30.8 of Textbook 1. | |
| **Self study:** Regula-falsi method and Trapezoidal rule. | |
| **RBT Levels:** L1, L2 and L3. | |
| **Module-5: Numerical Solution of Ordinary Differential Equations (ODEs)**: | 10 Hours |
| 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 formula (No derivations),problems. Numerical solution of ordinary differential equations of second order and first degree: Milne'smethod. | |
| **Textbook: Chapter: sections:** Discussion and coverage of contents as suggested in articles 32.3, 32.5, 32.7, 32.9, 32.12 of Textbook 1. | |
| **Self Study:**Numerical solution of ordinary differential equations of second order and first degree Runge-Kutta method of fourth order. | |
| **RBT Levels:** L1, L2 and L3. | |

## IV. COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Solve higher order linear ordinary differential equations analytically using standard methods. |
| **CO2** | Demonstrate partial differential equations and their solutions for physical interpretations. |

| | |
|---|---|
| **CO3** | Understand the applications of vector calculus refer to Solenoidal, Irrotational vectors, line integral and surface integral. |
| **CO4** | Use relevant numerical techniques for interpolation. Estimate the missing terms through interpolation methods. |
| **CO5** | Acquire basic knowledge in solving ordinary differential equation of first and second order by Numerical methods. |

**V. CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | | | | | | | | | | 1 | | | | |
| **CO2** | 3 | 2 | | | | | | | | | | 1 | | | | |
| **CO3** | 3 | 2 | | | | | | | | | | 1 | | | | |
| **CO4** | 3 | 2 | | | | | | | | | | 1 | | | | |
| **CO5** | 3 | 2 | | | | | | | | | | 1 | | | | |

**VI. Assessment Details (CIE & SEE)**

**General Rules:** Refer Annexure section 1

**Semester End Examination (SEE):** Refer Annexure section 1

**Continuous Internal Evaluation (CIE):** Refer Annexure section 1

**VII. Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Name of the publisher | Edition and Year |
|---|---|---|---|---|
| 1 | Higher Engineering Mathematics | B.S. Grewal | Khanna Publishers | 44th Ed., 2018. |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | Advanced Engineering Mathematics | E. Kreyszig | John Wiley & Sons | 10th Ed., 2016 |
| 2 | Introductory Methods of Numerical Analysis | S.S.Sastry | Tata McGraw-Hill | 11th Edition . |
| 3 | Higher Engineering Mathematics | B.V.Ramana | Tata Mc Graw-Hill | 11th Ed., 2017 |
| 4 | Calculus | James Stewart | Cengage publications | 7thedition, 2019. |
| 5 | A Textbook of Engineering Mathematics | N.P Bali and Manish Goyal | Laxmi Publications | 10th Ed., 2022 |

**VII(c): Web links and Video Lectures (e-Resources):**

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central-central.com/subject/math(MOOCs)
3. http://academiccarth.org/
4. VTU EDUSAT programme-20

**VIII: Activity Based Learning**

Assignments, quiz, presentation.

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | ESC | | |
| **Course Title:** Elements of Electrical Engineering | | | | | |
| **Course Code:** | 23EET13D/23EET23D | | | **Credits:** | 3 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:0:0 | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

## I. Course Objectives:

This course will enable students:

- To understand evolution of electricity and electricity invention experiments
- To have an insight of energy resources and general structure of power system.
- To study fundamentals of AC and analyse DC circuits
- To study the electrical machines construction, working principle and applications.
- To explore fundamentals of solar PV system. Batteries and its applications.
- To study the domestic wiring, tariff and electrical safety practices.

## II. Teaching-Learning Process (General Instructions):

- Chalk and talk method
- Power point presentation / keynotes
- Videos
- Animations

## III. COURSE CONTENT

**Module-1: History of electricity and sources of electrical energy** — 8 Hours

**History of electricity (Review only):** Evolution of electricity & electrical inventions (Benjamin franklin kite experiment, thomas alva edison bulb invention)

**Introduction:** Conventional and non-conventional energy resources; general structure of electrical power systems using single line diagram approach.

**Sources of electrical Energy**- Brief introduction to the electrical generation using thermal, solar, hydro, wind (Block diagram approach).

**Textbook: Chapter: sections:**

1. A Course in power systems, J B Gupta : Part-1, Chapter-1, section-1.3,1.4,1.5, Chapter-7, section 7.7,7.8
2. Power system engineering, Chakrabarty Part-1, chapter-2, section 2.2, Chapter-3, section-
3. 6, Part-2 Chapter-1,section-1

**Pre-requisites (Self Learning):** Basics of electricity.

**RBT Levels: L1, L2**

**Module-2: DC circuits and AC fundamentals** — 8 Hours

**DC circuits**: Introduction to DC circuits, ohms law, kirchhoff's laws, concept of power and energy. analysis of series parallel circuits and numerical.

**AC fundamentals**: Generation of sinusoidal voltage, concept of phasors, time period, frequency, instantaneous values, peak, average, RMS value, peak factor, and form factor, Numerical.

**Textbook: Chapter: sections:** Basic electrical engineering, D C Kulshreshtha : Chapter 2, Section-2.1,2.2, Chapter-3, Section-3.6, 3.7,3.8,3.9, Chapter-9, Section- 9.1,9.2,9.3

**Pre-requisites (Self Learning):** Faraday's laws of electromagnetic induction

**RBT Levels: L1, L2, L3**

**Module-3: Three phase induction motors** — 8 Hours

**Three phase induction motors:** Construction of 3-phase induction motor, concept of rotating magnetic field. Working principle, types, slip and its significance, applications, necessity of starter, star-delta starter, Illustrative examples on slip calculation.

**Single phase induction motor:** Construction, working, types and its application.

**Textbook: Chapter: sections:** Basic electrical engineering, D C Kulshreshtha : Chapter 15, Section- 15.1 to 15.8

**Pre-requisites (Self Learning):** Mutual induction principle, Fleming's right-hand rule.

**RBT Levels: L1, L2, L3**

| **Module-4: DC motor & fundamentals of solar PV systems and battery** | 8 Hrs |
|---|---|

**DC Motor**: Principle of operation, back emf and its significance. Torque equation, types of motors, characteristics of DC motors (series & shunt only). Applications of DC motors. Numerical.

**Fundamentals of solar PV systems and battery**: Overview of solar energy conversion devices and applications, basics of batteries and parameters, applications of batteries.

**Textbook: Chapter: sections: :**

1. Basic electrical engineering, D C Kulshreshtha, Chapter-16 : Section-16.2, 16.11 to 16.13.
2. Non conventional energy sources, G D Rai, Chapter-3, section-3.1 to 3.3, Chapter - 5, Section-5.2,5.6,5.11, Chapter-10, Section-10.3

**Pre-requisites (Self Learning):** Fleming's right-hand rule.

**RBT Levels: L1, L2, L3**

| **Module-5: Domestic wiring and safety measures** | 8 Hours |
|---|---|

**Domestic Wiring:** Introduction, service mains, meter board and distribution board. Types of domestic wiring. 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 and safety precautions, earthing and its types (plate and pipe),

**Textbook: Chapter: sections:** Basic electrical engineering, D C Kulshreshtha : Chapter 19 : Section 19.2 to 19.10.

**Pre-requisites (Self Learning):** Fundamentals of single-phase AC supply.

**RBT Levels: L1, L2, L3**

## IV.**COURSE OUTCOMES**

At the end of the course, students will be able to

| | |
|---|---|
| **CO1** | Understand the evolution of electricity, sources of electrical energy and structure of power system. |
| **CO2** | Study of basic DC circuits and AC fundamentals |
| **CO3** | Explain the construction, types and working of electrical machines. |
| **CO4** | Enumerate the applications of battery and solar PV systems. |
| **CO5** | Describe the concepts of domestic wiring and safety measures. |

## V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| **PO/PSO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **S1** | **S2** | **S3** | **S4** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 | - | - | - | 1 | 1 | 1 | - | - | - | 2 | 2 | - | - | - |
| CO2 | 3 | 2 | - | - | - | 1 | 1 | 1 | - | - | - | 2 | 2 | - | - | - |
| CO3 | 3 | 2 | - | - | - | 1 | 1 | 1 | - | - | - | 2 | 2 | 2 | - | - |
| CO4 | 3 | 2 | - | - | - | 2 | 2 | 1 | - | - | - | 2 | 2 | - | - | - |
| CO5 | 3 | 2 | - | - | - | 1 | 1 | 1 | - | - | - | 2 | 2 | - | - | - |

## VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer appendix section 1

**Continuous Internal Evaluation (CIE):** Refer appendix section 1

**Semester End Examination (SEE):** Refer appendix section 1

## VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Basic electrical Engineering | D C Kulshreshtha | 2nd edition, 2019 | Tata McGraw Hill. |
| 2 | A Course in power Systems | J B Gupta | 11th edition, reprint 2021 | S.K. Kataria & Sons |
| 3 | Power system engineering | A Chakrabarti , M L Soni | 1st edition reprint, 2007 | Dhanpat rai & Co |
| 4 | Non-conventional sources of energy | G D Rai | 6th edition, 2017 | Khanna Publishers |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | A textbook of electrical technology | B.L.Theraja | Reprint edition 2014. | S Chand and Company |
| 2 | Basic electrical engineering | D.P. Kothari | 4th edition,2019. | McGraw-Hill Education |

**VII(c): Web links and Video Lectures (e-Resources):**

Mention the links of the online resources, video materials, etc.
https://www.youtube.com/@eeedepartment4878
https://www.youtube.com/watch?v=6p5WXzrYYiI
https://www.youtube.com/watch?v=0wkjlSZt0ko

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Activities like seminar, assignments, quiz, case studies, mini projects, industry visit, self-study activities, group discussions, etc

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | ESC | | |
| **Course Title:** Fundamentals of Electronics | | | | | |
| **Course Code:** | 23ECT13D / 23D | | | **Credits:** | 3 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:0:0 | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

1. To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
2. To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
3. Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.

**II. Teaching-Learning Process (General Instructions):**

- Chalk and talk method
- Power point presentation / Keynotes
- Videos
- Virtual Labs

**III. COURSE CONTENT**

**III(a).Theory PART**

| **Module-1:Semiconductor Diodes and Applications** | **8 Hours** |
|---|---|

P-N junction diode, Characteristics and Parameters, Zener Diode, Half wave Rectification, Full wave Rectification, Half Wave rectifier power supply (Capacitor Filter Circuit), Zener diode voltage regulators.
Text 1

**RBT Levels:** L1, L2

| **Module-2:BJT, Feedback Amplifiers and Oscillators** | **8 Hours** |
|---|---|

BJT operation, Common Base Characteristics, Common Emitter Characteristics, Common Collector Characteristics, Series Voltage Negative Feedback (Negative feedback concept, Voltage Gain), Phase Shift Oscillator (OPAMP Phase Shift Oscillator), Wein Bridge oscillator.

Text 1

**RBT Levels:** L1, L2

| **Module-3: Digital Electronics Fundamentals** | **8 Hours** |
|---|---|

Analog versus digital, Introduction to number system, Decimal Number system, Binary Number system, Octal Number system, Hexadecimal Number system, Decimal to Binary Conversion, Decimal to Octal Conversion, Decimal to hexadecimal Conversion, Binary to Octal and Octal to Binary Conversion, Hex-Binary and Binary to Hex Conversion, Hex- Octal and Octal to Hex Conversion, Logic Gates, Universal Gates, Introduction to Boolean algebra, Postulates of Boolean Algebra, Theorems of Boolean Algebra, Arithmetic Circuits (Half adder, Full Adder).

Text 2

**RBT Levels:** L1, L2

| **Module-4:Operational Amplifiers and Applications** | **8 Hours** |
|---|---|

Integrated circuit Operational Amplifier, Voltage Follower Circuit, Non-Inverting, Inverting (Direct Coupled only), Summing, Difference Amplifier.

Text 1

**RBT Levels:** L1, L2, L3

| **Module-5:Basics of Instrumentations & Measurements** | **8 Hours** |
|---|---|

What is measurement, Classification of Methods of measurements, Fundamental methods of measurements, Input-Output Configurations of Instruments, Static & Dynamic Characteristics, Mass Sensing Element, Thermal Detector, Sensors of Motion, Piezoelectric Principle, Strain Gauges (Mechanical, optical, Electrical).

Text 3

**RBT Levels:** L1, L2

## IV. COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Explain the basic construction, operation, characteristics and applications of semiconductor devices. |
| **CO2** | Apply the acquired knowledge to construct small scale circuits consisting of semiconductor devices like BJT, Feedback amplifiers &Oscillators. |
| **CO3** | Develop digital circuits by using logic gates and its functions. |
| **CO4** | Analyse working of OPAMP in various circuits. |
| **CO5** | Describe the Instrumentations & Measuring Devices. |

## V. CO-PO-PSO MAPPING(mark H=3; M=2; L=1)

| **PO/PSO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **1** | **2** | **3** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | | | | | | | | | | | 2 | | |
| **CO2** | 3 | 2 | | | | | | | | | | | 2 | | |
| **CO3** | 3 | 2 | | | | | | | | | | | 2 | | |
| **CO4** | 3 | 2 | | | | | | | | | | | 2 | | |
| **CO5** | 3 | 2 | | | | | | | | | | | 2 | | |

## VI. Assessment Details (CIE & SEE)

**General Rules:** Refer Appendix Section 1

**Continuous Internal Evaluation (CIE):** Refer Appendix Section 1

**Semester End Examination (SEE):** Refer Appendix Section 1

## VII. Learning Resources

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 01 | Electronic Devices and Circuits | David A Bell | 5th Edition | Oxford |
| 02 | Digital Electronics Principles and Integrated Circuits | Anil. K Maini | 2020 ISBN: 978-81-265-0863-1 | Wiley |
| 03 | Mechanical & Industrial Instruments | Er. R K Jain | 3rd Edition, 2015 | K Publishers |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 01 | Electronic Devices and Circuit Theory | Robert L Boylestad | 9th Edition | Prentice Hall of India |
| 02 | Electronic Circuits Fundamentals & Applications | Mike Tooley | 4thEdition, 2015 | Elsevier |
| 03 | Basic Electronics | D.P.Kothari, I.J.Nagarath | 1st Edition 2014 | McGraw Hill |

**VII(c): Web links and Video Lectures (e-Resources):**

- https://onlinecourses.swayam2.ac.in/nou23_ec05
- https://onlinecourses.swayam2.ac.in/nou23_ec06
- https://onlinecourses.swayam2.ac.in/cec23_cs11

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | ESC | | |
| **Course Title:** Principles of Mechanical Engineering | | | | | |
| **Course Code:** | 23MET14D/24D | | | **Credits:** | 3 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:0:0 | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

This course will enable students:

- Acquire basic knowledge of mechanical engineering and fundamentals of non-conventional energy sources.
- Attain knowledge about traditional and advanced manufacturing processes.
- Procure basic concepts of IC engines, and Electric vehicles.
- Obtain the knowledge of mechatronics and robotics.
- Gain the fundamental concepts of composite materials and joining processes.

II .**Teaching-Learning Process (General Instructions):**

- Adopt different types of teaching methods to develop the outcomes through Power point presentations and Video demonstrations or Simulations.
- Arrange visits to show the working models & processes.
- Adopt collaborative (Group Learning) Learning in the class.
- Adopt Problem Based Learning (PBL), which foster students' Analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information.

III.**COURSE CONTENT**

| **Module-1:** | 8 Hours |
|---|---|

**Introduction to Mechanical Engineering:** Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

**Energy Sources and Power Plants:** Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

**Pre-requisites (Self Learning):** Basic knowledge of power generation

**RBT Levels: L1, L2**

| **Module-2:** | 8 Hours |
|---|---|

**Machine Tool Operations: Lathe**: Principle of working of a centre lathe, lathe operations: Turning, facing, knurling, thread cutting, taper turning by swivelling the compound rest,

**Drilling Machine**: Working of simple drilling machine, drilling operations: drilling, boring, reaming, tapping, counter sinking, counter boring,

**Milling Machine**: Principle, Working and types of milling machine, milling operations: plane milling, end milling and slot milling.

**(No sketches of machine tools, sketches to be used only for explaining the operations).**

**Introduction to Advanced Manufacturing Systems**: Introduction, components of NC, CNC & DNC, advantages and applications of CNC & DNC

**Pre-requisites (Self Learning):** Basics knowledge of machine tools

**RBT Levels: L1, L2**

| **Module-3:** | 8 Hours |
|---|---|

**Introduction to IC Engines**: Components and working principles of 2 & 4-Stroke Petrol engine and 4-Stroke Diesel engines, performance of IC engines (Simple numerical).
**Insight into future mobility technology**; Introduction to Electric and Hybrid Vehicles, Working Principle, Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles. Emission standards

**Pre-requisites (Self Learning):** Basic knowledge of automobiles

**RBT Levels: L1, L2, L3**

| **Module-4:** | 8 Hours |
|---|---|

**Mechanical Power Transmission: Belt Drives**: Introduction, Types of belt drives (Open and Cross Belt Drive), length of the belt and tensions. **Gear Drives**: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)
**Introduction to Robotics:** Open-loop and closed-loop control systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing, assembly and inspection.

**Pre-requisites (Self Learning):** Basic knowledge of power transmissions & control system

**RBT Levels: L1, L2, L3**

| **Module-5:** | 8 Hours |
|---|---|

**Introduction to Advanced Engineering Materials:Composites**: Fibre reinforced composites, metal matrix composites, **Smart materials**- peizo electric materials, Shape memory alloys, Semiconductors and super - insulators
**Joining Processes**: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding and MIG welding.

**Pre-requisites (Self Learning):** Basic knowledge of materials and welding

**RBT Levels: L1, L2**

IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Understand the basic concepts of mechanical engineering in the field of energy & its utilization |
| **CO2** | Determining conventional and advanced machining processes in manufacturing of components. |
| **CO3** | Interpret the fundamental concepts of engines & future mobility technology. |
| **CO4** | Apply the basic concept of transmission system and robotics application |
| **CO5** | Enumerate the application of engineering materials & joining process in manufacturing. |

V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | | | | | | | | | | | |
| CO2 | 3 | 2 | | | | | | | | | | | 2 | | | |
| CO3 | 3 | 2 | | | | | 1 | | | | | | | | | |
| CO4 | 3 | 2 | | | | | | | | | | | | | | |
| CO5 | 3 | | | | | | | | | | | | | | | |

VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer Annexure Section 1

**Continuous Internal Evaluation (CIE):** Refer Annexure Section 1

**Semester End Examination (SEE):** Refer Annexure Section 1

VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Elements of Mechanical Engineering, | K R Gopala Krishna, | 2019 | Subhash Publications |
| 2 | Elements of Workshop Technology (Vol. 1 and 2) | Hazra Choudhry and Nirzar Roy | 2010 | MediaPromoters and Publishers Pvt. |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | An Introduction to Mechanical Engineering | Jonathan Wickert and Kemper Lewis | Third Edition | S Chand and Company |
| 2 | Manufacturing Technology- Foundry, Forming and Welding, | P.N.Rao | Vol 1, 2019 | Tata McGraw Hill |
| 3 | Robotics | Appu Kuttan KK | volume 1 | K. International Pvt Ltd, |
| 4 | Automation, production system and CIM | Mikell P Grover | 4th edition, 2018 | Pearson |

**VII(c): Web links and Video Lectures (e-Resources):**

- https://youtu.be/cT9UN1XENNk?si=EtVUDGO8cHU5xWfY
- https://youtu.be/fw8Jfoif1BM?si=IbGrPZSPpcyW2BZq
- https://www.youtube.com/watch?v=mNOYS-duUJYEV Electrical Systems BASICS!
- https://rakhoh.com/en/applications-and-advantages-of-steam-in-manufacturing-and- process-industry/
  Videos | Makino (For Machine Tool Operation)

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

1. Visit to any manufacturing/aero/auto industry or any power plant
2. Demonstration of lathe/milling/drilling/CNC operations
3. Demonstration of working of IC engine
4. Demonstration of metal joining process
5. Video demonstration of latest trends in mobility/robotics

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | ESC | | |
| **Course Title:** Elements of Civil Engineering | | | | | |
| **Course Code:** | 23CVT14D/24D | | | **Credits:** | 3 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:0:0 | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

- To make students learn the scope of various fields of civil engineering.
- To develop student's ability to analyse the problems involving forces, moments withtheir applications.
- To develop the student's ability to find out the center of gravity and moment of inertiaand their applications.

**II. Teaching-Learning Process (General Instructions):**

Chalk and talk, videos, Power Point presentation, animations.

**COURSE CONTENT**

**Module-1: Introduction to Civil Engineering** — 8 Hours

**INTRODUCTION TO CIVIL ENGINEERING:** Scope of different fields of Civil Engineering-Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering. Effect of the infrastructural facilities on socio-economic development of a country.

**BUILDING MATERIALS AND CONSTRUCTION:** Properties and uses of building material used in construction, Types of foundations, walls, doors, windows and staircases.

**Textbook**: H. J Sawant**: Chapter-1: sections-1**

**Self-Learning:** Smart materials used in construction

**RBT Levels: L1 L2**

**Module-2: Force System** — 8 Hours

**ANALYSIS OF FORCE SYSTEMS:** Concept of idealization, force, a system of forces, superposition, transmissibility, Resolution, and composition of forces, Law of Parallelogram of forces, polygonal law, Resultant of concurrent coplanar force system, coplanar non-concurrent force system, a moment of forces, couple, Varignon's theorem, resultant of coplanar non-concurrent force system – Numerical problems.

**Textbook**: H. J Sawant**: Chapter 3 &4: Sections 3 & 4**

**Self-Learning:** Free body diagram for complex figures(3D)

**RBT Levels: L1 L2 L3**

**Module-3: Equilibrium of Bodies** — 8 Hours

**ANALYSIS OF BODIES IN EQULIBRIUM:** Free body diagrams, Lami's theorem, Equations of Equilibrium, Equilibrium of coplanar concurrent and non-concurrent force systems – Numerical problems.

**ANALYSIS OF BEAMS:** Types of Loads and Supports, statically determinate and indeterminate beams, Support Reaction in beams, Numerical problems on support reactions for statically determinate beams (Point load, UDL & uniformly varying loads and Moments).

**Textbook**: H. J Sawant**: Chapter 6&8: Sections 6 & 8**

**Self-Learning:** Finding support reactions for a complex loaded beam.

**RBT Levels: L1 L2 L3**

| **Module-4: Friction and Dynamics** | 8 Hours |
|---|---|

**FRICTION:** Introduction, Frictional force, Types of Friction- Static friction and Dynamic friction, Limiting friction, ladder friction, Laws of Friction-Laws of Static friction and Laws of Dynamic friction, Angle of friction, Angle of Repose and Cone of friction. Problems on Static Friction-Horizontal plane, Inclined plane, Interconnected bodies and ladder friction.
**DYNAMICS:** Circular motion of bodies, Super elevation and design speed – Numericals.
Basic concepts of vibration, D'Alembert's principle of inertial forces and dynamic equilibrium.
**Textbook**: H. J Sawant**: Chapter 7&12: Sections 7 & 12**
**Self-Learning:** Pulley problems with friction
**RBT Levels: L1 L2 L3**

| **Module-5: Centroid and Moment of Inertia** | 8 Hours |
|---|---|

**CENTROID:** Introduction, methods of determining the centroid, locating the centroid of simple figures from first principle, Centroid of composite and built-up sections – Numerical problems.
**MOMENT OF INERTIA:** Introduction, method of determining the second moment of area of plane sections from first principles, parallel axis theorem and perpendicular axis theorem section modulus, the radius of gyration, moment of inertia of composite area and built-up sections – Numerical problems. Concept of product of inertia (No problem).
**Textbook**: H. J Sawant**: Chapter 10&11: Sections 10 & 11**
**Self-Learning:** Centroid & MOI for complex figures
**RBT Levels: L1 L2 L3**

## IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Summarize the various fields of civil engineering and importance of building materials. |
| **CO2** | Apply the knowledge of science to study the effect of force systems on the rigid bodies. |
| **CO3** | Analyse the action of force systems on the rigid bodies. |
| **CO4** | Determine the centroid and moment of inertia of regular and built-up sections. |

## V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | | | | | 2 | 1 | | | | 1 | | 1 | | |
| CO2 | 3 | 2 | | | | | | | | | | 1 | | 1 | | |
| CO3 | 3 | 2 | | | | | | | | | | 1 | | 1 | | |
| CO4 | 3 | 2 | | | | | | | | | | 1 | | 1 | | |

## VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer Appendix Section 1
**Continuous Internal Evaluation (CIE):** Refer Appendix Section 1
**Semester End Examination (SEE):** Refer Appendix Section 1

## VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| **1** | Basic Civil Engineering and Engineering Mechanics | Bansal R. K. | 2015 | Laxmi Publications |
| **2** | Elements of Civil Engineering and Engineering Mechanics | Kolhapure B K | 2014 | EBPB |
| **3** | Elements of Civil Engineering and Mechanics | H. J Sawant | 2014 | Technical Publications |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| **1** | Mechanics for Engineers, Statics and Dynamics | Beer F.P. and Johnston E. R | 1987 | McGraw Hill |
| **2** | Engineering Mechanics | Bhavikatti S S | 2019 | New Age International |
| **3** | Engineering Mechanics | Reddy Vijaykumar K | 2011 | BS publication |
| **4** | Engineering Mechanics | Timoshenko S | 5th Edition, 2017 | Pearson Press |

**VII(c): Web links and Video Lectures (e-Resources):**

https://www.youtube.com/watch?v=nGfVTNfNwnk
https://www.youtube.com/watch?v=nkg7VNW9UCc
https://www.youtube.com/watch?v=aiT5mcuXf5Y&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=7
https://www.youtube.com/watch?v=VQRcChR9IkU
https://www.youtube.com/watch?v=3YBXteL-qY4
https://www.youtube.com/watch?v=3YBXteL-qY4
https://www.youtube.com/watch?v=lheoBL2QaqU
https://www.youtube.com/watch?v=atoP5_DeTPE
https://www.youtube.com/watch?v=ksmsp9OzAsI
https://www.youtube.com/watch?v=x1ef048b3CE
https://www.youtube.com/watch?v=l_Nck-X49qc
https://play.google.com/store/apps/details?id=appinventor.ai_jgarc322.Resultant_Force
https://www.youtube.com/watch?v=RIBeeW1DSZg
https://www.youtube.com/watch?v=R8wKV0UQtlo
https://www.youtube.com/watch?v=0RZHHgL8m_A
https://www.youtube.com/watch?v=Bls5KnQOWkY
https://www.youtube.com/watch?v=nFBvLIfFFqI

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

https://www.youtube.com/watch?v=Zrc_gB1YYS0
https://play.google.com/store/apps/details?id=vn.edu.best4u.com.bieudonoiluc
https://www.youtube.com/watch?v=Hn_iozUo9m4
https://play.google.com/store/apps/details?id=com.teobou
https://www.youtube.com/watch?v=WOHRp3V-QA0

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | IESC | | |
| **Course Title:** Concepts of C Programming | | | | | |
| **Course Code:** | 23CPI15D/25D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:2:0 | **Total Hours:** | 40 + Lab slots |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

## I .Course Objectives:

This course will enable students to:

- Familiarize with writing of algorithms, flowchart and fundamentals of C.
- Use of different Branching statements and loops
- Use and implement data structures like arrays and structures.
- Implement different programs using functions.
- Define and use of pointers with simple applications.

## II .Teaching-Learning Process (General Instructions):

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

1. Lecturer 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. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking. 5. Adopt Problem Based Learning (PBL),which fosters student's Analyticalskills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world and when that's possible, it helps to improve the student's understanding.
9. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize the operations of C Programs

## III.COURSE CONTENT

### III(a). Theory PART

| **Module-1: Introduction.** | 8 Hours |
|---|---|

Definition, Characteristics of Computers, Stored Program Concept, History of Computers, Classification of Computers, Application of Computers, Basic Organization of Computers, Computer Hardware and Software, Storage device concepts, Operating Systems, and Networking.

**Textbook1: Chapter1, Textbook2: 1.9, 1.10, 1.11, chapter2.**

**RBT Levels: 1**

| **Module-2: Basics of C.** | 8 Hours |
|---|---|

**C-tokens and Data types:** Introduction, Character set, C Tokens, Declaration of variables, Storage class, Assigning values to variables, Symbolic constants.
**Managing I/O operations and operators:** Managing I/O operations, Operators and Expressions.
**Textbook 2: Chapter 4: 4.1-4.7, Chapter 5, Chapter 6.**

| **RBT Levels: 2** | |
|---|---|
| **Module-3: Control Statement and loops.** | 8 Hours |

**Control statements:** Conditional and Un conditional branching statements with programming examples. Looping statements, break and continue statements.
**Textbook 2: Chapter 8, Chapter 9.**

| **RBT Levels:2,3,4** | |
|---|---|
| **Module-4: Arrays and Strings.** | 8 Hours |

**Arrays:** One-Dimensional Array, Two-Dimensional Arrays (Declaration and Compile Time and Run Time Initialization), reading and displaying arrays, Searching and Sorting.
**Strings:** Introduction, Character Arrays, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen. Various String Handling Functions with programming examples.
**Textbook 2: Chapter 10 and 11.**

| **RBT Levels:2,3,4** | |
|---|---|
| **Module-5: User Defined Functions.** | 8 Hours |

**User Defined Functions:**
Need for Functions, Types of functions, function definition, declaration and its scope, Category of functions Storage classes (Automatic, Static, Extern, and Register).
**Recursion:** Introduction recursion, types in recursive function, programming examples on recursive functions.
**Textbook 2: Chapter 7.**

**RBT Levels:2,3,4**

**III(b). PRACTICAL PART**

| **Sl. No.** | **Experiments / Programs / Problems** |
|---|---|
| **1** | Write a C Program to find area of a rectangular plot of land |
| **2** | Write a C Program to calculate IHP, BHP, CR for a four stroke gas engine. |
| **3** | Simulation of a Simple Calculator. |
| **4** | Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages. |
| **5** | An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paisa per unit: for the next 100 units 90 paisa per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs.100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges. |
| **6** | Write a C Program to generate prime numbers up to a given range. |
| **7** | Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences. |
| **8** | Sort the given set of N numbers using Bubble sort. |
| **9** | Implement Binary Search on Integers. |
| **10** | Implement Matrix multiplication and validate the rules of multiplication. |
| **11** | Write functions to implement string operations such as copy and concatenate using user defined functions. |
| **12** | Write functions to implement string operations such as compare, and find string length. Use the parameter passing techniques. |

IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Illustrate the basic constructs of C language. |
| **CO2** | Understand and apply suitable syntax for various problems. |
| **CO3** | Construct programming solutions for various basic problems. |
| **CO4** | Implement programs using problem solving skills. |

V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | 1 | | | | | | | | | | | | | |
| CO2 | 2 | | 1 | | | | | | | | | | | | | |
| CO3 | 2 | | 2 | | | | | | | | | | | | | |
| CO4 | 2 | | 2 | | | | | | | | | | | | | |

VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer Appendix section 2

**Assessment Details (both CIE and SEE):** Refer Appendix section 2

**Semester End Examination (SEE):** Refer Appendix section 2

VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Computer fundamentals and programming in C | Reema Thareja | 3rd Edition, 2023 | Oxford Unversity Press, New Delhi |
| 2 | Programming in ANSI C | E. Balaguruswamy | 7" Edition | Tata McGraw- Hill |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | The 'C' Programming Language | Brian W. Kernighan and Dennis M. Ritchie | - | Prentice Hall of India |
| 2 | Computer Fundamentals & C Programming | Sumitabha Das | | Mc Graw Hill Education |

**VII(c): Web links and Video Lectures (e-Resources):**

1. elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html
2. https://nptel.ac.in/courses/106/105/106105171/ MOOC courses can be adopted for more clarity in understanding the topics and verities of problem solving method
3. https://tinyurl.com/4xmrexre

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

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

- Quizzes
- Assignments
- Seminar

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | IESC | | |
| **Course Title:** Engineering Visulaization & Digital Drawing | | | | | |
| **Course Code:** | 23CDI15D/25D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 3:0:2:0 | **Total Hours:** | 40 + Lab slots |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

## I .Course Objectives:

This course will enable students to:

- Attain the basic principles and conventions of engineering drawing
- Understand the use of drawing as a communication mode
- Visualize 2D and 3D pictorial views using CAD software
- Enumerate the concepts of development of lateral surfaces
- Acquire multi-disciplinary concept of applications

## II .Teaching-Learning Process (General Instructions):

- Adopt different types of teaching methods to develop the outcomes through Power point presentations and Video demonstrations.
- Adopt teaching methods by using working models
- Adopt collaborative (Group Learning) Learning in the class.
- Adopt Problem Based Learning (PBL), which foster students Analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information with the use of modern tools.

## III.COURSE CONTENT

**Module-1:** 8 Hours

**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 systems

**Orthographic Projections of Points, Lines and Planes:**

Introduction to Orthographic projections, Orthographic projections of points in all the quadrants. Orthographic projections of lines. (Placed in First quadrant only)

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon and circular lamina. (Placed in First quadrant only- Change of position method).

**Pre-requisites (Self Learning):** Basics of Geometry

**RBT Levels: L1, L2, L3**

**Module-2:** 8 Hours

**Orthographic Projection of Solids:**

Orthographic projection of right regular solids (Solids Resting on HP only);

Prisms & Pyramids (triangle, square, rectangle, pentagon, hexagon), Cylinders, Cones,Cubes & Tetrahedron .

**Pre-requisites (Self Learning):** Basics of Geometry

**RBT Levels: L1, L2, L3**

**Module-3:** 8 Hours

**Isometric Projections:**
Isometric scale, Isometric projection of right regular prisms, pyramids, cylinders, cones and spheres. (Isometric projection of combination of two simple solids.) Frustumof cone & square pyramid only.

**Pre-requisites (Self Learning):** Basics of Geometry and 3D Drawing

**RBT Levels: L1, L2, L3**

| **Module-4:** | 8 Hours |
|---|---|

**Development of Lateral Surfaces of Solids:**
Development of lateral surfaces of right regular prisms, cylinders, pyramids and conesresting with base on HP only.Development of their frustums and truncations.

**Pre-requisites (Self Learning):** Basics of Geometry

**RBT Levels: L1, L2, L3**

| **Module-5: Multidisciplinary Applications & Practice*:*** | 8 Hours |
|---|---|

**Drawing Simple Mechanism:** Bicycles, Tricycles, Gear trains, Ratchets, two wheelercart & Four wheeler carts to dimensions.(2D View)

**Pre-requisites (Self Learning):** Basics of Drawing

**RBT Levels: L1, L2, L3**

## IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Understand and visualize the objects with definite shape and dimensions |
| **CO2** | Analyse the shape and size of objects through different views |
| **CO3** | Create a 3D view using CAD software. |
| **CO4** | Develop the lateral surfaces of the object |
| **CO5** | Identify the interdisciplinary engineering components and systems through its graphical representation. |

## V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | | | 2 | | | | | 2 | | 1 | | | | |
| CO2 | 3 | 2 | | | 2 | | | | | 2 | | 1 | | | | |
| CO3 | 3 | 2 | | | 2 | | | | | 2 | | 1 | | | | |
| CO4 | 3 | 2 | | | 2 | | | | | 2 | | 1 | | | | |
| CO5 | 3 | 2 | | | 2 | | | | | 2 | | 1 | | | | |

## VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer appendix section 3

**Continuous Internal Evaluation (CIE):** Refer appendix section 3

**Semester End Examination (SEE):** Refer appendix section 3

## VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Engineering Drawing: Plane and Solid Geometry | N.D. Bhatt. | 53rd edition, | Charotar Publishing House Pvt. Limited, 2019. |
| 2 | Textbook Of Computer Aided Engineering Drawing, | K. R. Gopalakrishna, & Sudhir Gopalakrishna: | 39th Edition, | Subash Stores, Bangalore, 2017 |
| 3 | Engineering Visualisation, | S.N. Lal, & T Madhusudhan | 1st Edition, | Cengage, Publication |

**VII(b): Reference books:**

| | | | | |
|---|---|---|---|---|
| 1 | Engineering Drawing, | Parthasarathy N. S., Vela Murali, | 2015 | Oxford University Press |

| | | | | |
|---|---|---|---|---|
| 2 | Fundamentals of Engineering Drawing**,** | *Luzadder Warren J.*,**,** | 2005 | Prentice-Hall of India Pvt. Ltd., New Delhi, Eastern Economy Edition, 2005 |
| **VII(c): Web links and Video Lectures (e-Resources):** | | | | |
| **NPTEL Videos:** https://youtube.com/playlist?list=PLp6ek2hDcoNCjoRLQ4rjpCozisCACBxKA | | | | |
| **VIII: Activity Based Learning / Practical Based Learning/Experiential learning:** | | | | |
| Activities like Model Preparation & Presentation, self-study activities. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | IBSC | | |
| **Course Title:** Physics of Materials | | | | | |
| **Course Code:** | 23PHI12D/22D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 2:2:2:0 | **Total Hours:** | 40+ Lab slots |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 3 |

**I. Course Objectives:**

- To understand the types of oscillation, shock waves &their generation, and applications.
- To study the elastic properties of materials and basic concepts of nano materials
- To study the electrical properties of materials.
- To Understand the concepts in low temperature phenomena and generation of low temperature
- To understand the operations of different instruments and to analyze experimental results.

**II. Teaching-Learning Process (General Instructions):**

Some of the adapted methods in teaching learning methods are

1. Chalk and Talk
2. Blended Mode of Learning
3. Simulations, Interactive Simulations and Animations
4. Smart Classroom
5. Lab Experiment Videos

III.**COURSE CONTENT**

**III(a).Theory Part**

| **Module-1:Oscillations and Waves** | 8 Hours |
|---|---|

**Oscillations:** Basics of SHM, derivation of equation for SHM, Mechanical simple harmonic oscillators (spring constant by series and parallel combination), Equation of motion for free oscillations, Natural frequency of oscillations.

Damped Oscillations: Theory of damped oscillations (derivation), over damping, critical & under damping (graphical representation)

**Shock waves:** Introduction to shock waves, Mach number, Properties of Shock waves, Construction and working of Reddy shock tube, applications of shock waves, Numerical problems.

**Engineering Physics by S P Basavaraju: Chapter:1- Oscillations and waves**

**Waves and oscillations by R N Chaudhri: Chapter: 3-Damped Hormonic oscillations Chapter:4-Forced Vibrations and resonance**

**Pre-requisites:** Basics of Oscillations

**RBT Levels:** L1 – Remembering, L2 – Understanding, L3 – Applying.

| **Module-2:Elastic properties of materials** | 8 Hours |
|---|---|

**Elasticity:** Concept of elasticity, plasticity, stress, strain, tensile stress, shear stress, compressive stress strain hardening and strain softening, failure (fracture/fatigue), Hooke's law, different elastic moduli: Poisson's ratio, Expression for Young's modulus (Y), Bulk modulus (K) and Rigidity modulus (n) in terms of α and β. Relation between Y, n and K, Limits of Poisson's ratio.

**Bending of beams:** Neutral surface and neutral plane, Derivation of expression for bending moment of a beam with circular and rectangular cross section. Single cantilever, derivation of expression for young's modulus.

**Engineering Physics by S P Basavaraju: Chapter-2: Elastic properties of Materials Engineering Physics by R K Guptha and R K Gaur: Chapter: 7-Elasticity**

| | |
|---|---|
| **Pre-requisites (Self Learning):** Elastic Modulli and its Types | |
| **RBT Levels:** : L1 – Remembering, L2 – Understanding, L3 – Applying, | |
| **Module-3:Electrical Properties of Materials** | 8 Hours |
| **Electrical Properties:** Review of classical free electron theory, limitations of classical free electron theory. Postulates of quantum free electron theory, Density of states (qualitative), Fermi energy, Fermi velocity, Fermi temperature, Fermi factor and its dependence on energy and temperature. Electrical conductivity (qualitative expression using effective mass and Fermi velocity). Merits of quantum free electron theory.<br>**Semiconductor physics**: Introduction to semiconductor physics, conductivity in an intrinsic semiconductor, Expression for the concentration of electrons in the conduction band and Holes concentration in valance band (only mention the expression), Fermi level in intrinsic and extrinsic semiconductors , Hall effect, Expression for Hall coefficient (derivation).Applications of Hall effect-Hall thrusters, Numerical problems<br>**Modern Engineering Physics S.L. Guptha and Sanjeev Guptha: 19-Free electron theory and Chapter: 21-Semiconductor physics**<br>**Engineering Physics by R K Guptha and R K Gaur: Chapter: 60-Classifications of solids** | |
| **Pre-requisites (Self Learning):** Concepts of electric current | |
| **RBT Levels:**: L1 – Remembering, L2 – Understanding, L3 – Applying, | |
| **Module-4:Cryogenics** | 8 Hours |
| **Production of low temperature -** Joule Thomson effect (Derivation with 3 cases), Porous plug experiment with theory, Thermodynamical analysis of Joule Thomson effect, Liquefaction of Oxygen by cascade process, Lindy's air liquefier, Liquefaction of Helium and its properties, Platinum Resistance Thermometer, Applications of Cryogenics, in Aerospace, Tribology and Food processing(qualitative), Numerical Problems<br>**College Physics by N. Sundararajan, George Thomas, Syed Azeez Chapter: 8- Low temperature Physics**<br>**Fundamentals of Cryogenic engineering by Mamata Mukhopadhya,Chapter:1-Introduction to Cryogenics, Chapter:3-Liquefaction process** | |
| **Pre-requisites (Self Learning):** Basic Laws of Thermodynamics | |
| **RBT Levels:** : L1 – Remembering, L2 – Understanding, L3 – Applying. | |
| **Module-5:Modern Engineering Materials** | 8 Hours |
| **Nano Materials:** Introduction to Nano materials, Surface to volume ratio, Quantum confinement – Quantum well, Quantum wire, Quantum dot. Carbon Nano tubes, types, properties, Synthesis of carbon nano tubes - Arc discharge method, Applications. Transmission Electron Microscopy (TEM), Scanning Electron Microscope (SEM), Numerical problems.<br>**Composite Materials:** Introduction to composite materials, Classification of composites based on reinforcement materials and matrix. Advantages and disadvantages of composite materials, Engineering Applications – Smart materials and smart structures, Micro Electromechanical Structures (MEMS).<br>**Textbook: Chapter: sections: Engineering physics by G. Aruldhas: Chaptar 16: Nano technology**<br>**Nanotechnology Fundamentals and Applications By Manasi Karkare: Chapter:3-Nanomaterials Chapter:8-Nanocomposite** | |
| **Pre-requisites (Self Learning):** Properties of materials | |
| **RBT Levels:**L1 – Remembering, L2 – Understanding, L3 – Applying. | |

**III(b). PRACTICAL PART**

| Sl. No. | Experiments |
|---|---|
| 1 | Determination of Young's Modulus of a material by Uniform Bending |
| 2 | Determination of n by Tensional Pendulum |
| 3 | Study of frequency response of Series and Parallel LCR Circuits |
| 4 | Determination of Fermi Energy of a conductor |
| 5 | Determination of resistivity of a material using Four Probe Method |
| 6 | Determination of stiffness factor of a given springs |
| 7 | Determination of Young's Modulus of a material by Single Cantilever |
| 8 | Particle size determination using LASER source |

| | |
|---|---|
| **9** | Measurement of Wavelength of LASER using Diffraction Grating |
| **10** | Determination of Numerical Aperture using optical fiber |
| **11** | Measurement of Magnetic Field at any point along the axis of a circular coil |
| **12** | PHET Interactive Simulations |
| **13** | Verification of Stefan's law |
| **14** | Measurement of dielectric constant by Charging and Discharging method of a Capacitor |

**Instructions for conduction of practical part:**

Any Ten Experiments must be completed from the list of experiments.

Each experiment to be evaluated for conduction with observation sheet and record writeup. Rubrics for the evaluation of the write-up for experiments designed by the faculty who is handling the laboratory session and is made known to students at the beginning of the practical session.

- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 50 marks.
- Average marks scored by the students from all the experiments are considered.
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct 01 test for 50 marks, test shall be conducted after the completion of prescribed experiments.
- In each test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 80% and the rest 20% for viva-voce.

## IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Elucidate the concepts in oscillations, waves, elasticity, and material failures. |
| **CO2** | Elucidate the concepts of conductors and semiconductors |
| **CO3** | Summarize the low-temperature phenomena and generation of low temperature. |
| **CO4** | Understand basic concepts of nano science and material characterization Technique |
| **CO5** | Practice working in groups to conduct experiments in physics and perform precise and honest measurements. |

## V.**CO-PO-PSO MAPPING**(mark H=3; M=2; L=1)

P

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | | | 2 | | | | | | | 2 | | | | |
| CO2 | 3 | 2 | | | | | | | | | | 2 | | | | |
| CO3 | 3 | 2 | | | | | | | | | | 2 | | | | |
| CO4 | 3 | 2 | | | | | | | | | | 2 | | | | |
| CO5 | 3 | 2 | 1 | | 2 | | | 3 | 3 | | | 2 | | | | |

## VI.**Assessment Details (CIE & SEE)**

**General Rules:** Refer Appendix section 2

**Continuous Internal Evaluation (CIE):** Refer Appendix section 2

**Semester End Examination (SEE):** Refer Appendix section 2

## VII.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | A Textbook of Engineering Physics | M.N. Avadhanulu and P.G. Kshirsagar | 10th revised Ed, | S. Chand. & Company Ltd, New Delhi |
| 2 | Engineering physics | G. Aruldhas | First Ed-2010 | Eastern Economy Edition |
| 3 | Engineering Physics | Gaur and Gupta | 8th revised Ed, 2001. | Dhanpat Rai Publications |
| 4 | Engineering Physics | S.P Basavraju | 2018-CBCS Edition | Subhas Stores, Bangalore |
| 5 | Solid State Physics | S O Pillai | 2018-8th Edition | New Age International Publishers |

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| **1** | Engineering Lab | WBUT | 1 December 2008, 1st | New Age International |

| | | | | |
|---|---|---|---|---|
| | Manual | | Edition | Publishers. |
| 2 | Applied Physics Lab Manual | Anoop Sing Yadav | First Edition - 1 January 2018. | Vayu Education of India |
| 3 | Engineering Physics | R K Guptha and R K Gaur | 8th Revised-2001 | Dhanpat Rai Publications |
| 4 | Applied Physics for engineers | P K Diwan | 2014 | Wiley Publications |
| 5 | Fundamentals of Cryogenic engineering | Mamata Mukhopadhya | Kindle edition | PHI LearningPrivate limited |

**VII(c): Web links and Video Lectures (e-Resources):**

Mention the links of the online resources, video materials, etc.

Mention the links of the online resources, video materials, etc.

**https://vlab.amrita.edu/?sub=1&brch=282&sim=1512&cnt=1**
**https://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1**
**https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1**
**https://bop-iitk.vlabs.ac.in/basics-of-physics/List%20of%20experiments.html**
**https://virtuallabs.merlot.org/vl_physics.html**
**https://phet.colorado.edu**
**https://www.myphysicslab.com**

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Mention suggested Activities like seminar, assignments, quiz, case studies, mini projects, industry visit, self-study activities, group discussions, etc

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | IBSC | | |
| **Course Title:** Applied Chemistry of Engineering materials | | | | | |
| **Course Code:** | 23CHI12D/22D | | | **Credits:** | 4 |
| **Teaching Hours/Week (L:T:P:O)** | | | 2:2:2:0 | **TotalHours:** | 40+Lab slots |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **TotalMarks:** | 100 |
| **SEE Type:** | Theory | | | **ExamHours:** | 3 |

## I. Course Objectives:

1) To enable students to acquire knowledge on principles of chemistry for engineering applications.
2) To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
3) To provide students with a solid foundation in analytical reasoning required to solve societal problems.

## II .Teaching-Learning Process (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

- Tutorial &remedial classes for needy students
- Conducting Makeup classes/Bridge courses for needy students
- Demonstration of concepts either by building models or by industry visit
- Experiments in laboratories shall be executed in blended mode(conventional or non-Conventional methods)
- Use of ICT–Online videos, online courses
- Use of online platforms for assignments/Notes/Quizzes(Ex. Google classroom)

## III.COURSE CONTENT

### III(a). THEORY PART

**Module-1:Green Chemistry** — **8 Hours**

**Green Chemistry**: Basic principles of green chemistry -brief discussion on 12 principles of green chemistry. Various green chemical approaches – Microwave synthesis, Bio catalysed reaction (only explanation with examples), Synthesis of typical organic compounds by conventional and green route; Adipic acid – Conventional synthesis from Benzene, Green synthesis from glucose.

**Green fuel**: Hydrogen-production by electrolysis of water (Alkaline water electrolysis, Proton Exchange Membrane Electrolysis,Solid oxide electrolysis)and applications in hydrogen fuel cells. Biodiesel- Preparation and Applications. Construction, working and applications of Methanol-Oxygen fuel cell ($H_2SO_4$ as electrolyte).

**Textbook:Chapter:sections-An Introductory Text on Green Chemistry by Indu Tucker Sidhwani:**
**Chapter 1,2,4,6:Section 1.1,2.1-2.13,4.5.2-4.5.3,6.2,6.3**

**Pre-requisites (Self Learning)**
Atom economy-synthesis of ethylene oxide and methyl methacrylate, construction and working of $H_2$-$O_2$ fuelcell

**RBT Levels: L1,L2,L3**

**Module-2: Corrosion and Metal Finishing** — **8 Hours**

**Corrosion:** Introduction, Electrochemical theory of corrosion. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of corrosion product, nature of medium – pH, conductivity and temperature. Types of corrosion - Differential metal and differential aeration (pitting and water line). Corrosion Penetration Rate (CPR), numerical problems on CPR.Corrosion control- : Metallic coatings – Galvanization. Inorganic coatings: Anodizing.Cathodic protection - sacrificial anode .

**Metal Finishing**: Introduction, technological importance. Electroplating: Introduction, Electroplating of chromium (hard and decorative).Electro less plating: Introduction, Electro less plating of Nickel and copper (PCB).

**Textbook:Chapter:sections: Engineering Chemistry by R V Gadag: Chapter6:Section:6.3,6.4,6.5,6.6,6.7. Chapter 5:Section:5.1,5.11,5.12.**

**Pre-requisites (Self Learning)**

Organic coatings: Paint, components of paints and their functions. Varnish, definition, differences between paints varnishes

**RBT Levels: L1,L2,L3**

## Module-3:Energy; Source, Conversion and storage — 8 Hours

**Fuels-**Introduction, definitions of CV, LCV, and HCV determination of calorific value of solid/liquid fuel using bomb calorimeter, numerical problems. Petroleum – Cracking by fluidized catalytic cracking process, Octane and Cetanenumbers, Knocking of petrol engine -Definition, mechanism, ill effects and prevention. Power alcohol, unleaded petrol.

**Energy devices**: Introduction, construction, working, and applications of(i)Li-ion battery ii) Na-ion battery

**Photovoltaic cells-**Introduction, production of solar grade Si using union carbide process, Construction, workingand applications of photovoltaic cell, advantages and disadvantages of PV cell

**Textbook:Chapter:sections Engineering Chemistry by R V Gadag: Chapter 1:Section:1.1,1.4,1.5,1.6,1.7,1.9,1.10,1.12, Chapter 4:Section:4.1,4.6, Chapter 2:Section:2.1,2.3,2.4.**

**Pre-requisites (Self Learning)**

Physical and Chemical properties of Si ,Doping of silicon**,** construction and working of Pd-acid battery

**RBT Levels: L1,L2,L3**

## Module-4:Advanced Polymers — 8 Hours

**Polymers**: Introduction, types of polymerizations, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC), Chloro polyvinylchloride (CPVC).

**Fibers**: Introduction, synthesis, properties and applications of Kevlar fibre and Polyester.

**Plastics:** Introduction, synthesis, properties and industrial applications of PMMA and Teflon.

**Polymer Composites:** Introduction, properties and industrial applications of carbon-based reinforced composites(graphene/carbon nano-tubes as fillers)

**Lubricants**: Introduction, classification, properties and applications of lubricants.

**Textbook:Chapter:sections: Engineering Chemistry by R V Gadag: Chapter 7: Section: 7.4,7.5,7.6,7.15,7.16, Chapter 10: Section: 10.1,10.2,10.3,10.4**

**Pre-requisites (Self Learning)**

Biodegradable polymer: Introduction, synthesis, properties and applications of PLA,synthesis and application ofnylon 66

**RBT Levels: L1,L2,L3**

## Module-5:Analytical Techniques and Nanomaterials — 8 Hours

**Analytical techniques**: Introduction, principle, instrumentation of potentiometric sensors; its application in the estimation of iron. Optical sensors (colorimetry); its application in the estimation of the copper, pH-sensor (Glasselectrode); its application in the determination of pH of beverages. Conductometry (Strong acid with a strong base, weak acid with a strong base, mixture of strong acid and a weak acid with a strong base)

**Nanomaterials**: Introduction, size-dependent properties of nanomaterial (surface area, catalytical and thermal), synthesis of nanoparticles by sol-gel, and co-precipitation method, properties and engineering applications of carbon nanotubes and graphene.

**Textbook:Chapter:sections :Engineering Chemistry by R V Gadag: Chapter 8: Section: 8.1,8.2,8.4, Chapter 10:10.1, 10.3,10.5, 10.6,**

**Pre-requisites (Self Learning)**

Determination of viscosity of biofuel and its correlation with temperature.

**RBT Levels: L1,L2,L3**

## III(b). PRACTICAL PART

| Sl. No. | Experiments / Programs / Problems |
|---|---|
| 1 | Conductometric estimation of acid mixture |
| 2 | Potentiometric estimation of FAS using $K_2Cr_2O_7$ |
| 3 | Determination of pKa of vinegar using pH sensor (Glass electrode) |
| 4 | Estimation of Copper present in electroplating effluent by optical sensor (colorimetry) |
| 5 | Determination of Viscosity coefficient of lubricant (Ostwald's viscometer) |
| 6 | Estimation of total hardness of water by EDTA method |
| 7 | Estimation of iron in TMT bar by diphenyl amine/external indicator method |
| 8 | Determination of Chemical Oxygen Demand (COD) of industrial waste water sample |
| 9 | Determination of acid value of biofuel |
| 10 | Synthesis of iron oxide nanoparticles |

**Instructions for conduction of practical part: Instructions for conduction of practical part:**

- Strict discipline should be maintained inside thel aboratory.
- Lab batches will be allotted at the beginning of the semester.
- Student should enter into the lab by wearing Apron and having the Lab Manual along with a calculator and observation notebook.
- The student should conduct one experiments in the specified time of 2hrs duration in regular lab sessions
- All entries of the observation should be done by using black pen only. Avoid writing by pencil and overwriting
- **The short procedure for the experiment must be prepared for writing in data sheet by the student before coming to the laboratory** All calculations pertaining to the experiments should be completed in the laboratory. The results must be got corrected by the batch teacher only Then entry should be made in the record and also enter the marks in index book before leaving the laboratory.
- Please remember that practical records are evaluated during regular class hours. Therefore it is imperative that each student takes care to see that experiments are well conducted and recorded.

## IV.COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Illustrate the principles of Green chemistry in engineering & technology |
| **CO2** | Understand Engineering problems and solution in Corrosion of Metals |
| **CO3** | Apply the knowledge for production and consumption of energy available in different form |
| **CO4** | Evaluate the knowledge of Chemistry in Engineering materials |
| **CO5** | Analyse engineering materials to achieve practical solutions |

## V.CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | **3** | **1** | **1** | | | | **1** | **1** | | | | **1** | | | | |
| CO2 | **3** | **1** | **1** | | | | **1** | **1** | | | | **1** | | | | |
| CO3 | **3** | **1** | **1** | | | | **1** | **1** | | | | **1** | | | | |
| CO4 | **3** | **1** | **1** | | | | **1** | **1** | | | | **1** | | | | |
| CO5 | **3** | **1** | **1** | | | | **1** | **1** | | | | **1** | | | | |

## VI.Assessment Details (CIE & SEE)

**General Rules:**Refer Annexure section 2

**Continuous Internal Evaluation (CIE):**Refer Annexure section 2

**Semester End Examination (SEE):**Refer Annexure section 2

## VII.Learning Resources

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Green Chemistry: Theory and Practice | Paul T. Anastas, John Charles Warner | 01-Jan-2000 | Oxford University Press |
| 2 | Green Chemistry: Environmentally Benign Reactions | V.K. Ahluwalia | 02-Jul-2021 | Springer Nature |
| 3 | Nanotechnology A Chemical Approach to Nanomaterials | G.A. Ozin& A.C. Arsenault | 2005 | RSC Publishing |
| 4 | Linden's Handbook of Batteries | Kirby W.Beard | Fifth Edition, 2019. | McGraw Hill, |
| 5 | Corrosion Engineering | M.G.Fontana, N.D.Greene | 3rd Edition, 1996 | McGrawHill Publications, NewYork |
| 6 | Wiley Engineering Chemistry | Wiley | 2nd Edition-2013 | Wiley India Pvt.Ltd. NewDelhi |
| 7 | Engineering Chemistry | R V Gadag | 3rd Edition-2006 | I K International house,Pvt.Ltd |
| **VII(b): Reference Books:** | | | | |
| 1 | Engineering Chemistry | O.G.Palanna | Fourth Reprint 2017 | Tata McGraw Hill Education Pvt. Ltd. New Delhi |
| 2 | Engineering Chemistry | Shubha Ramesh et.al. | 1st Edition, 2011 | Wiley India |
| 3 | Fundamentals of Analytical chemistry | Douglas A. Skooget.al. | Eighth edition-2004 | Thomson Asia pte Ltd |
| 4 | OLED Display Fundamentals and Applications | TakatoshiTsujimura | 2012 | Wiley–Blackwell |
| 5 | Super capacitors: Materials, Systems, and Applications | Max Lu, Francois Beguin,ElzbietaFrackowiak | 1st edition, 2013 | Wiley-VCH |

**VII(c): Web links and Video Lectures (e-Resources):**

http://libgen.rs/
https://nptel.ac.in/downloads/122101001/
https://nptel.ac.in/courses/104/103/104103019/
https://ndl.iitkgp.ac.in/
https://www.youtube.com/watch?v=faESCxAWR9k
https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X9IbHrDMjHWWh
https://www.youtube.com/watch?v=j5Hml6KN4TI
https://www.youtube.com/watch?v=X9GHBdyYcyo
https://www.youtube.com/watch?v=1xWBPZnEJk8

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Seminar, Assignments, Quiz, Industry visit, self-study activities, group discussions, etc

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | HSMC | | |
| **Course Title:** Balake Kannada (Kannada for Usage) | | | | | |
| **Course Code:** | 23BKAH04 | | | **Credits:** | PP/NP |
| **Teaching Hours/Week (L:T:P:O)** | | | **1:0:0:0** | **Total Hours:** | 15 |
| **CIE Marks:** | 50 | **SEE Marks:** | - | **Total Marks:** | 50 |
| **SEE Type:** | | - | | **Exam Hours:** | - |

**.Course Objective : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು :**

- To create the awareness regarding the necessity of learning local language for comfortable and healthy life .
- To enable learners to Listen and understand the Kannada Language Properly.
- To Speak , Read and Write Kannada Language as per requirement.
- To train the learners for correct and polite conversation.
- To know about Karnataka State and its Language , Literature and General Information about this State.

## II.COURSE CONTENT

**Module-1** — **3 Hours**

1. Introduction, Necessity of learning a local language .Methods to learn the Kannada Language
2. Easy Learning of Kannada Language : A few Tips, Hints for Correct and Polite Conversation , Listening and Speaking activities , Key to Transcription
3. ವೈಯಕ್ತಿಕ , ಸ್ವಾಮ್ಯಸೂಚಕ / ಸಂಭಂದಿತ ಸರ್ವನಾಮಗಳ ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು- Personal Pronouns, Possessive Forms, Interrogative Words

**Textbook: Chapter: sections:**

**Pre-requisites (Self Learning)**

**RBT Levels:L1, L2**

**Module-2** — **3 Hours**

1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು ,ಸಂದೇಹಾಸ್ಪದ ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು -Possessive forms of Nouns , Dubitive Question and Relative Nouns.
2. ಗುಣ ಪರಿಣಾಮ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು , ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative , Quantitative and Colour Adjectives , Numerals
3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು - ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ , ಅದು , ಅವು , ಅಲ್ಲಿ )- Predictive Forms, Locative Case

**Textbook: Chapter: sections:**

**Pre-requisites (Self Learning)**

**RBT Levels:L1, L2**

**Module-3:** — **3 Hours**

1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases and Numerals
2. ಸಂಖ್ಯಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - Ordinal

Numerals and Plural Markers.

3. ನ್ಯೂನ / ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳುDefective / Negative Verbs and Colour Adjectives

**Textbook : Chapter: sections:**

**Pre-requisites (Self Learning)**

**RBT Levels:** L1, L2

| **Module-4** | **3 Hours** |
|---|---|

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ , ನಿರ್ದೇಶನ , ಪ್ರೋತ್ಸಹ 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 ) , ಸಂಬಧ ಸೂಚಕ , ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ - Comparative , Relationship , Identification and Negation Verbs

**Pre-requisites (Self Learning)**

**RBT Levels:** L1, L2

| **Module-5** | **3 Hours** |
|---|---|

1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು Different types of Tense, Time and Verbs
2. ದ್ , ತ್ , ತು , ಇತು , ಆಗಿ , ಅಲ್ಲ , ಗ್ , ಕ್ , ಇದೆ , ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ , ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ Formation of Past, Future and Present Tense Sentences with Verb Forms
3. Kannada vocabulary list : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು - Kannada Words in Conversation

**RBT Levels:** L1, L2

## III.**COURSE OUTCOMES**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಂಶಗಳು : At the end of the course student will ne able to:

| | |
|---|---|
| **CO1** | To create the awareness regarding the necessity of learning local language for comfortable and healthy life . |
| **CO2** | To enable learners to Listen and understand the Kannada Language Properly. |
| **CO3** | To Speak , Read and Write Kannada Language as per requirement. |
| **CO4** | To train the learners for correct and polite conversation. |
| **CO5** | To know about Karnataka State and its Language , Literature and General Information about this State. |

## IV.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | | | | | | | | | | | | | | | |
| CO2 | | | | | | | | | | | | | | | | |
| CO3 | | | | | | | | | | | | | | | | |
| CO4 | | | | | | | | | | | | | | | | |
| CO5 | | | | | | | | | | | | | | | | |

## V.**Assessment Details (CIE & SEE)**

**General Rules:** Refer Annexure section 7

**Continuous Internal Evaluation (CIE):** Refer Annexure section 7

**Semester End Examination (SEE):** Refer Annexure section 7

VI.**Learning Resources**

**VII(a): Textbooks:**

| Sl. No. | Title of the Book | Name of the author | Name of the publisher | Edition and Year |
|---|---|---|---|---|
| 1 | Balake Kannada | Dr. Timmesha | Prasaranga, VTU, Belagavi | 2018 |

**VII(c): Web links and Video Lectures (e-Resources):**

1. **VTU Website**

**VIII: Activity Based Learning**

Contents related activities (Activity-based discussions)
For active participation of students instruct the students to prepare Flow Charts and Handouts
Organising group wise discussions connecting to placement activities
Quizzes and Discussions
Seminars and Assignments

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | HSMC | | |
| **Course Title:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸ್ಡ ಪಠ್ಯಕ್ರಮ | | | | | |
| **Course Code:** | 23SKAH03 | | | **Credits:** | PP/NP |
| **Teaching Hours/Week (L:T:P:O)** | | | 1:0:0:0 | **Total Hours:** | 15 |
| **CIE Marks:** | 50 | **SEE Marks:** | | **Total Marks:** | 50 |
| **SEE Type:** | - | | | **Exam Hours:** | - |

**Course Objective:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು :

- ವೃತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ , ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು .
- ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸುವುದು.
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
- ತಾ0ತ್ರಿಕಾ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
- ಸಾಂಸ್ಕೃತಿಕ , ಜಾನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಸುವುದು .

## I.COURSE CONTENT

| | |
|---|---|
| **ಘಟಕ- 01 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು** | 3 Hours |

01. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪೆ ನಾಗರಾಜಯ್ಯ
02. ಕರ್ನಾಟಕ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ ವೆಂಕಟಸುಬ್ಬಯ್ಯ
03. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ್ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ

**Textbook: Chapter: sections:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ : ವಿಟಿಯು ನಿಗದಿಪಡಿಸಿಲಾದ ಪುಸ್ತಕ
ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ.

**Pre-requisites (Self Learning)**

**RBT Levels:** L1, L2

| | |
|---|---|
| **ಘಟಕ -02 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ** | 3 Hours |

01.ವಚನಗಳು:ಬಸವಣ್ಣ,ಅಕ್ಕಮಹಾದೇವಿ,ಅಲ್ಲಮಪ್ರಭು,ಆಯ್ದಕ್ಕಿಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ , ಆಯ್ದಕ್ಕಿ ಲಕಮ್ಮ
02. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ - ಪುರಂದರದಾಸರು
03. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುತ್ತು - ಶಿಶುನಾಳ ಶರೀಫ

**Textbook: Chapter: sections:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ : ವಿಟಿಯು ನಿಗದಿಪಡಿಸಿಲಾದ ಪುಸ್ತಕ
ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ.

**Pre-requisites (Self Learning)**

**RBT Levels:** L1, L2

| | |
|---|---|
| **ಘಟಕ - 03 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ** | 3 Hours |

01. ಡಿ.ವಿ.ಜಿ. ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು
02. ಕುರುಡುಕಾಂಚಾಣ : ದಾ. ರಾ ಬೇಂದ್ರೆ
03. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

**Textbook : Chapter: sections:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ : ವಿಟಿಯು ನಿಗದಿಪಡಿಸಿಲಾದ ಪುಸ್ತಕ
ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ.

| | |
|---|---|
| **Pre-requisites (Self Learning)** | |
| **RBT Levels:** L1, L2 | |
| **ಘಟಕ -04 ತಾ0ತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ** | 3 Hours |
| 01. ಡಾ . ಸರ್ . ಎಂ . ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ. ಎನ್ . ಮೂರ್ತಿರಾವ್<br>02. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ ಘಟಕ | |
| **Textbook: Chapter: sections: :** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ : ವಿಟಿಯು ನಿಗದಿಪಡಿಸಿಲಾದ ಪುಸ್ತಕ<br>ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ | |
| **Pre-requisites (Self Learning)** | |
| **RBT Levels:** L1, L2 | |
| **ಘಟಕ - 05 ಸಾಂಸ್ಕೃತಿಕ , ಜಾನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ** | 3 Hours |
| 01. ಯುಗಾದಿ : ವಸುದೇಂದ್ರ<br>02.ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ . ಚಿ . ಬೋರಲಿಂಗಯ್ಯ | |
| **Textbook: Chapter: Sections:** ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ : ವಿಟಿಯು ನಿಗದಿಪಡಿಸಿಲಾದ ಪುಸ್ತಕ<br>ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ | |
| **Pre-requisites (Self Learning)** | |
| **RBT Levels:** L1, L2 | |

## II.COURSE OUTCOMES

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (23SKAH03) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :**

| | |
|---|---|
| **CO1** | ಕನ್ನಡ ಭಾಷೆ , ಸಾಹಿತ್ಯ , ಮತ್ತು ಕನ್ನಡ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡುವುದು. |
| **CO2** | ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ,ಮತ್ತು ಜ್ಞಾನಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ. |
| **CO3** | ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ |
| **CO4** | ತಾ0ತ್ರಿಕಾ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲ್ಲು ಕೌತುಕಥೆ ಹೆಚ್ಚಾಗುತ್ತದೆ |
| **CO5** | ಸಾಂಸ್ಕೃತಿಕ , ಜಾನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು. |

## III.CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | | | | | 1 | | | | 1 | | | | | | |
| CO2 | | | | | | 1 | | | | 1 | | | | | | |
| CO3 | | | | | | 1 | | | | 1 | | | | | | |
| CO4 | | | | | | 1 | | | | 1 | | | | | | |
| CO5 | | | | | | 1 | | | | 1 | | | | | | |

## IV.Assessment Details (CIE & SEE)

**General Rules:** Refer Annexure section 7

**Continuous Internal Evaluation (CIE):** Refer Annexure section 7

**Semester End Examination (SEE):** Refer Annexure section

## V.Learning Resources

**VII(a): Textbooks:**:

| Sl. No. | Title of the Book | Name of the author | Name of the publisher | Edition and Year |
|---|---|---|---|---|
| 1 | ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ | ಡಾ . ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ . ಎಲ್ . ತಿಮ್ಮೇಶ | ವಿಟಿಯು ಪ್ರಸಾರಾಂಗ | 2018 |

**VII(c): Web links and Video Lectures (e-Resources):**

**VIII: Activity Based Learning**

Assignments, quiz.

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | HSMC | | |
| **Course Title:** Professional Skills and English | | | | | |
| **Course Code:** | 23ENGH01 | | | **Credits:** | PP/NP |
| **Teaching Hours/Week (L:T:P:O)** | | | 0:1:1:0 | **Total Hours:** | 30 |
| **CIE Marks:** | 50 | **SEE Marks:** | -- | **Total Marks:** | 50 |
| **SEE Type:** | - | | | **Exam Hours:** | -- |

## I.Course Objective

- This course aims at achieving fluency and confidence in spoken and written English.
- Acquiring wide range of vocabulary and linguistic competence that is required for functional performance.
- Building elementary foundations for the knowledge related to conventions and use of language in society, particularly in speaking and listening skills
- Developing the basic skills for creative reading and writing with precision

## II.COURSE CONTENT

**Module-1: Introduction to Communicative English** — Hrs: T/4 L/1

Fundamentals of Communicative English- Barriers to Effective Communication, Different styles in Technical Communication. Interpersonal Communication Skills, Types of communication Interpersonal Communication Skills, Non-Verbal Communication Skills (Body Language), Barrier in communication, how to improve it. **Grammar Focus**: Basic English Grammar, Parts of speech.
**Activity**: Peer- Based Exercises to Ignite conversation. Allow students to interact witheach other; talk about their Special Skill, Hobbies and Passion.

**Textbook: Chapter: sections:** Discussion and coverage of contents as suggested inPART-01: .1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.11, 1.13 of textbook 1.

**Pre-requisites (Self Learning):** Basics Of Grammar learnt in PUC- Parts of Speech.

**RBT Levels:**L1, L2 and L3

**Module-2: Listening Skills** — Hrs: T/4 L/1

**Introduction to Phonetics**: Sounds and Symbols of vowels, Consonants, Diphthongs, Syllables Silent and Non-Silent letters. Pronunciation of 'The', Homophones and Homonyms.
**Importance Of Listening**: Difference between Hearing and Listening, Active Listening, Types of Listening, Barriers in Listening, Note taking, Active response, Empathy and Perspective- taking, Building Listening Habits.
**Activity:** Scenario – Based Activity

**Textbook: Chapter: sections:** Discussion and coverage of contents in **Part -02**: 7.1, 7.2, 7.6, 8.7. **Part-03**: 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, 9.12 of textbook 01.

**Pre-requisites (Self Learning):** Audio Track listening such as Podcasts, Audio Books, Language Learning to improve Pronunciation , Comprehension and over all Language Skills.

**RBT Levels:**L1, L2 and L3

| **Module-3: Introduction to Speaking Skills** | Hrs: T/4 L/1 |
|---|---|
| Developing Vocabulary, Paraphrasing conversations, Paraphrasing content, Common Errors in Pronunciation. Importance of Non verbal communication [Body Language, Para linguistic features] Presentations on a various themes by organizing a larger unit of discourse and giving information and Expressing opinions, Group Discussions: Significance of GD and Do's & Don'ts. Assertive Communication skills, Answering to the Point following 7C's of communication. Extempore and Public Speaking.<br>Grammar focus: Reported Speech, Voice, One -word Substitution, Prefix and Suffix.<br>**Activity:** GD | |
| **Textbook : Chapter: sections:** Discussion and coverage of contents in<br>**Part- 04:** 10.1, 10.2, 10.3, 11,1, 11.2, 11.3, 12, 13 of textbook 01. | |
| **Pre-requisites (Self Learning)**<br>Basic English Grammar, Pronunciation, Speaking on general topics | |
| **RBT Levels:** L1, L2 and L3 | |
| **Module-4: Introduction to Reading Skills** | Hrs: T/4 L/1 |
| Types of reading [Skimming, and Scanning, Extensive and intensive reading], Oral skills with emphasis on conversational practice. Reading Comprehension. Analytical and Comparative Reading, Usage of Dictionary.<br>Reading Job advertisements, understanding Job specifications, requirements in application form [Job or for higher studies].<br>**Grammar focus:** Subject verb agreement, use of Active verbs, Sequence of Tenses.<br>**Activity:** Book review [Fiction& Non- Fiction], News Paper article reading, Magazine and Journals review. | |
| **Textbook: Chapter: sections: :** Discussion and coverage of contents inPART-05: 17.1, 17.2, 17.3, 17.7, 17,8, 17.9, 17.10, of textbook 01. | |
| **Pre-requisites (Self Learning):** Basic Reading skills. | |
| **RBT Levels:** L1, L2 and L3 | |
| **Module-5: Introduction to Writing Skills** | Hrs: T/4 L/1 |
| Techniques in Paragraph Writing, Organizing Principles of Paragraphs in Documents, Report writing; Long and Short, Punctuations, Emails, Blog writing, Resume and Cover Letter writing.<br>**Grammar focus :** Misplaced Modifiers, Idioms and Phrases<br>**Activity:** Students write a short Article and Report on Recent Technological Innovations. | |
| **Textbook: Chapter: Sections:** Discussion and coverage of contents in<br>Part-06: 20, 20.1, 20.2, 20.3, 20.4, 22.7, 23.5, 23.13, 25.1, 25.2, 25.3, 25.6, of textbook 01. | |
| **Pre-requisites (Self Learning):** Basic English Grammar, Vocabulary. | |
| **RBT Levels:** L1, L2 and L3 | |

## III.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | Develop the ability to speak English language with the right way of pronunciation. |
| **CO2** | Practice listening effectively to communication in English. |
| **CO3** | Express the viewpoints with confidence in English. |
| **CO4** | Implement English vocabulary at command and language proficiency. |
| **CO5** | Perform well in campus recruitment, engineering and all other general competitive examinations. |

## IV.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | | | | | | | | 2 | 2 | | | | | | |
| CO2 | | | | | | | | | 2 | 2 | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO3 | | | | | | | | | 2 | 2 | | | | | | |
| CO4 | | | | | | | | | 2 | 2 | | | | | | |
| CO5 | | | | | | | | | | 2 | | | | | | |

| V.**Assessment Details (CIE & SEE)** | | | | |
|---|---|---|---|---|
| **General Rules:** Refer Annexure Section 7 | | | | |
| **Continuous Internal Evaluation (CIE):** Refer Annexure Section 7 | | | | |
| **Semester End Examination (SEE):** Refer Annexure Section 7 | | | | |
| VI.**Learning Resources** | | | | |
| **VII(a): Textbooks:** | | | | |
| **Sl. No.** | **Title of the Book** | **Name of the author** | **Name of the publisher** | **Edition and Year** |
| **1** | Communication Skills | Sanjay Kumar Puspa Latha | Oxford University Press | 02th Ed., 2015. |
| **VII(b): Reference Books:** (Insert or delete rows as per requirement) | | | | |
| 1 | How to Analyze People: The Ultimate Guide to Speed Reading People Through Proven Psychological Techniques, Body Language Analysis and Personality Types and Patterns | Sebastian | Oxford English Dictionary Croft | 02nd Ed., 2018 |
| 2 | English Grammar | Krishnaswamy, Subashree . | New York: Cambridge University Press. | 04th Ed., 2018 |
| **VII(c): Web links and Video Lectures (e-Resources):** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | HSMC | | |
| **Course Title:** Constitution of India and Professional Ethics | | | | | |
| **Course Code:** | 23CIPH05 | | | **Credits:** | 1 |
| **Teaching Hours/Week (L:T:P)** | | | 1:0:0:0 | **Total Hours:** | 15 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 2 |

## I .Course Objectives:

The course Indian Constitution will enable the students,

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

## II.Teaching-Learning Process (General Instructions):

The pedagogy shall involve the combination of different methodologies which suit modern technological tools. (i) Direct instructional method (ii) Advanced Technological tools (iii) Enquiry and evaluation based learning (iv) Personalized learning

Apart from conventional lecture methods, various types of innovative teaching techniques through videos may be adapted so that the delivered lesson can progress the students.

## III.COURSE CONTENT

| **Module-1: Indian Constitution** | 3 Hours |
|---|---|

**Indian Constitution:** Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. Salient features of India Constitution. The Preamble of Indian Constitution& Key concepts of the Preamble. Salient features of India Constitution.

**Text Book:** "Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu.

**RBT Levels:** L1, L2

| **Module-2: FR's, FD's and DPSP's** | 03 Hours |
|---|---|

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.

**Text Book:** "Constitution of India" by M V Pylee.

**RBT Levels:** L1, L2

| **Module-3: Union Executive** | 3 Hours |
|---|---|

**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.

**Text Book:** "Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu.

**RBT Levels:** L1, L2

| **Module-4: State Executive & Elections** | 3 Hours |
|---|---|

**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.**Text Book:** "Constitution of India" by M V Pylee.

**RBT Levels:** L1, L2

| **Module-5: Professional Ethics** | 3 Hours |
|---|---|

**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

**Text Book:** "Engineering Ethics", M.Govindarajan, S.Natarajan, V.S.Senthilkuma

**RBT Levels:** L1, L2

## IV.COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Analyse the basic structure of Indian Constitution. |
| **CO2** | Outline the Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution. |
| **CO3** | Extend knowledge about Union and State Government, Elections system of India & Amendments. |
| **CO4** | Outline the importance of Engineering Ethics |

## V.CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | 2 | | | | | | 3 | | | | |
| CO2 | 3 | | | | | 2 | | | | | | 3 | | | | |
| CO3 | 3 | | | | | 2 | | | | | | 3 | | | | |
| CO4 | 3 | | | | | 2 | | 3 | | | | 3 | | | | |

## VI.Assessment Details (CIE & SEE)

**General Rules:** Refer Annexure Section 6

**Continuous Internal Evaluation (CIE):** Refer Annexure Section 6

**Semester End Examination (SEE):** Refer Annexure Section 6

## VII.Learning Resources

**VII(a): Textbooks**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1. | "Introduction to the Constitution of India" | Durga Das Basu | Students Edition, 2008 | Prentice –Hall |
| 2. | "Engineering Ethics" | M.Govindarajan, S.Natarajan, V.S.Senthilkumar | 2004 | Prentice –Hall |

**VII(b): Reference Books**

| | | | | |
|---|---|---|---|---|
| 1 | "Constitution of India, Professional Ethics and Human Rights" | Shubham Singles, Charles E. Haries, and et al. | Latest Edition – 2019 | Cengage Learning India |
| 2 | "Constitution of India" | M V Pylee | 16th Edition | Vikas Publication |

**VII(c): Web links and Video Lectures (e-Resources):**

https://www.studyiq.com/articles/important-articles-of-the-indian-constitution/
https://byjus.com/free-ias-prep/constitution-of-india-an-overview/

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

| |
|---|
| Contents related activities (Activity-based discussions)<br>For active participation of students instruct the students to prepare Flowcharts and HandoutsOrganising Group wise discussions Connecting to placement activities<br>Quizzes and Discussions |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I/II | **Course Type:** | HSMC | | |
| **Course Title:** Environmental Studies | | | | | |
| **Course Code:** | 23ENVH02 | | | **Credits:** | 01 |
| **Teaching Hours/Week (L:T:P)** | | | 1:0:0:0 | **Total Hours:** | 15 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory | | | **Exam Hours:** | 2 |

## I. Course Objectives:

- To create environmental awareness among the students.
- To gain knowledge on different types of pollution in the environment.

## II. Teaching-Learning Process (General Instructions):

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

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, and animation films may be adopted so that the delivered lesson can progressthe students in theoretical, applied and practical skills.
2. Environmental awareness program for the in-house campus
3. Encourage collaborative (Group Learning) Learning in the class.
4. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills.

## III. COURSE CONTENT

| **Module-1** | 3 Hours |
|---|---|

**Introduction to Environmental Studies**: Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security.

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.

**Textbook:** Bharucha, E. (2015). Textbook of Environmental Studies

**RBT Levels:** L1, L2

| **Module-2** | 3 Hours |
|---|---|

**Natural Resources:** Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

**Energy** – Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

**Textbook: "**Environmental Studies", by Benny Joseph

**RBT Levels:** L1, L2

| **Module-3** | 3 Hours |
|---|---|

**Environmental Pollution** (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies): Surface and Ground Water Pollution; Noise pollution; Soil Pollution and Air Pollution.

**Waste Management & Public Health Aspects**: Bio-medical Wastes; Solid waste; Hazardous wastes; E-wastes; Industrial and Municipal Sludge.

**Textbook:** Environmental Science- Principles and Practices, by Das R.C

**RBT Levels:** L1, L2

| **Module-4** | 3 Hours |
|---|---|

**Global Environmental Concerns** (Concept, policies and case-studies): Ground water depletion/recharging, Climate Change; Acid Rain; Ozone Depletion; Radon and Fluoride problem in drinking water; Resettlement and rehabilitation of people, Environmental Toxicology.
**Textbook:** "Environmental Studies – From Crisis to Cure" by R Rajagopalan
**RBT Levels:** L1, L2

| **Module-5** | 3 Hours |
|---|---|

**Latest Developments in Environmental Pollution Mitigation Tools** (Concept and Applications): G I S. &Remote Sensing, Environment Impact Assessment, Environmental Management Systems, ISO14001; Environmental Stewardship- NGOs.
**Field work:** Visit to an Environmental Engineering Laboratory or Green Building or Water Treatment Plant or Waste water treatment Plant; ought to be Followed bv understanding of process and its brief documentation
**Textbook:** Environmental and Pollution Science. Pepper I.L., Gerba C.P. & Brusseau M.L.
**RBT Levels:** L1, L2

## IV.COURSE OUTCOMES

| | |
|---|---|
| **CO1** | To identify the major challenges in environmental issues and evaluate possible solutions. |
| **CO2** | Develop analytical skills, critical thinking and demonstrate socio-economic skills for sustainable development. |
| **CO3** | To analyze an overall impact of specific issues and develop environmental management plan. |

## V.CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | 2 | | | | | | 2 | | | | |
| CO2 | 3 | 2 | | | | | 2 | | | | | 2 | | | | |
| CO3 | 3 | 2 | | | | 2 | 2 | | | | | 2 | | | | |

## VI.Assessment Details (CIE & SEE)

**General Rules:** Refer Annexure Section 6

**Continuous Internal Evaluation (CIE):** Refer Annexure Section 6

**Semester End Examination (SEE):** Refer Annexure Section 6

## VII.Learning Resources

**VII(a): Textbooks**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Textbook of Environmental Studies | Bharucha, E. | (2015) | - |
| 2 | Environmental Studies | Benny Joseph | 2nd Edition, 2012 | Tata Mc Graw – Hill. |
| 3 | Environmental Studies – From Crisis to Cure | R Rajagopalan | 2005 | Oxford Publisher |
| 4 | Environmental Science-Principles and Practices | Das, R.C. | 2008 | I Ed., Printice Hall of India,New Delhi. |
| 5 | Environmental and Pollution Science. | Pepper,I.L., Gerba,C.P.& Brusseau, M.L. | 2006 | Elsevier Academic Press. |

**VII(b): Reference Books**

| | | | | |
|---|---|---|---|---|
| 1 | Principals of Environmental Science and Engineering | Raman Sivakumar | 2nd Edition, 2005 | Cengage learning, Singapur. |
| 2 | Fundamentals of Ecology. | Odum, E.P., Odum, H.T. & Andrews, J. | 1971 | - |
| 3 | Environmental Pollution and Control | Vesilind, P.J., Peirce, J.J., & Weiner R.F | 1990. | .Butterworth-Heinemann, USA |
| **VII(c): Web links and Video Lectures (e-Resources):** | | | | |
| https://www.youtube.com/watch?v=or-z0Q03pcY<br>https://www.youtube.com/watch?v=qS8mfAX1tAk | | | | |
| **VIII: Activity Based Learning / Practical Based Learning/Experiential learning:** | | | | |
| | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I | **Course Type:** | NCMC | | |
| **Course Title:** Personality Development-1 | | | | | |
| **Course Code:** | 23PDSN01 | | | **Credits:** | PP/NP |
| **Teaching Hours/Week (L:T:P:O)** | | | 0:0:0:2 | **Total Hours:** | 24 |
| **CIE Marks:** | 50 | **SEE Marks:** | - | **Total Marks:** | 50 |
| **SEE Type:** | - | | | **Exam Hours:** | 00 |

**I. Course Objectives:**

1. Explore techniques to boost self-esteem and overcome self-doubt
2. Learn effective techniques for structuring and delivering presentations
3. Recognizing the Role of Aptitude in Placement
4. Learn to express thoughts and ideas clearly and confidently.
5. Improve overall language proficiency and grammatical accuracy.

**II. Teaching-Learning Process (General Instructions):**

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

1. Lecturer method (L) need not to be only a 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. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, developdesign thinking skills such as the ability to design, evaluate, generalize, and analyze informationrather than simply recall it.
6. Introduce Topics in manifold representations.
7. 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.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

**III.COURSE CONTENT**

**III(a).Theory PART**

| | |
|---|---|
| **Module-1:**Personality Development and Presentation skills | 5 Hours |

| | |
|---|---|
| Self-Introduction Tips, Ways to Improve Self Confidence, Art of Story Telling and presentation Skills, Five beats of story telling, Activity(Story narration by students) and basics of presentation slides making, Body language and postures. | |
| **Pre-requisites (Self Learning)** | |
| **Module-2:**Overview of Aptitude,Problems on Number series and Simplification | 5 Hours |
| Aptitude concept**,** Basic idea on how Aptitude helps in getting placed, What are the benefits in learning Aptitude, Vedic Maths Techniques, Problems on Number series and puzzles, Problems on Simplification. | |
| **Pre-requisites (Self Learning)** | |
| **Module-3:**Public Speaking and Etiquette | 4 Hours |
| Art of improving Communication skills, Public Speaking, Stage Presence, formal dressing, networking, etiquette ,Campus Interview and Portfolio ,Business Etiquettes, Meeting Etiquettes, Social Etiquettes**.** | |
| **Pre-requisites (Self Learning)** | |
| **Module-4:** Grammar and Verbal Aptitude | 6 Hours |
| Articles, Prepositions and Spotting the Errors, Verbal aptitude concept, Problems on seating arrangement, Activity (Team Building). | |
| **Pre-requisites (Self Learning)** | |
| **Module-5:**Reasoning | 4 Hours |
| Data sufficiency and Assessment | |
| **Pre-requisites (Self Learning)** | |

## IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | To improve verbal ability skill and communicative skill of the students |
| **CO2** | To improve verbal ability skill and communicative skill of the students |
| **CO3** | Students will communicate effectively & appropriately in real life situation |
| **CO4** | It will enhance students problem solving skill. |
| **CO5** | Students will be able to prepare for various public and private sector exams & placement drives. |

## V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO2 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO3 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO4 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO5 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |

## VI.**Assessment Details (CIE)**

**General Rules:** Refer appendix section 8

**Continuous Internal Evaluation (CIE):** Refer appendix section

**Semester End Examination (SEE):** Refer appendix section

## VII.**Learning Resources**

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | The power of habit | CHARLES DUHIGG'S BLOG | 2007 | Good readers |

| | | | | |
|---|---|---|---|---|
| 2 | Never Split the Difference: Negotiating as if Your Life Depended on It | Chris Voss | 2015 | Good readers |
| 3 | Thinking, Fast and Slow Hardcover | Daniel Kahneman | 2011 | Good readers |
| **VII(c): Web links and Video Lectures (e-Resources):** | | | | |
| https://swayam.gov.in/explorer<br>https://nptel.ac.in/courses | | | | |
| **VIII: Activity Based Learning / Practical Based Learning/Experiential learning:** | | | | |
| Mention suggested Activities like<br>seminar<br>assignments<br>quiz<br>mini projects | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | II | **Course Type:** | NCMC | | |
| **Course Title:** Personality Development-2 | | | | | |
| **Course Code:** | 23PDSN02 | | | **Credits:** | PP/NP |
| **Teaching Hours/Week (L:T:P:O)** | | | 0:0:0:2 | **Total Hours:** | 24 |
| **CIE Marks:** | 50 | **SEE Marks:** | ---- | **Total Marks:** | 50 |
| **SEE Type:** | - | | | **Exam Hours:** | - |

**I. Course Objectives:**

- Demonstrate the ability to write clear, concise, and grammatically correct messages.
- Craft a comprehensive curriculum vitae (CV) suitable for academic and professional pursuits.
- Apply problem-solving strategies to real-world situations.
- Collaborate effectively with peers in group activities and projects.
- Develop a systematic approach to creative problem solving

**II. Teaching-Learning Process (General Instructions):**

Mention the planned/proposed sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

III.**COURSE CONTENT**

**III(a). Theory PART**

| | |
|---|---|
| **Module-1:** Quantitative Aptitude | 6 Hours |
| Problems on HCF and LCM, Speed time and distance, clocks and calendars | |
| **Pre-requisites (Self Learning)** | |
| **Module-2:** Verbal communication and Handwriting skills | 4 Hours |
| Written and oral communication, Resume and CV building, Handwriting skills, technical writing skills. | |
| **Pre-requisites (Self Learning)** | |
| **Module-3:** Logical reasoning and Puzzles | 6 Hours |
| Vocabulary reasoning, Logical deduction, Cross word puzzles, Activity (Bridge Building Challenge/Code Debugging Challenge) | |
| **Pre-requisites (Self Learning)** | |
| **Modsssssssssule-4:** Team Building, Teamwork | 4 Hours |
| Essentials of team building, Responsibility, Collaboration, Coordination, Activity (Marshmallow Challenge) | |
| **Pre-requisites (Self Learning)** | |
| **Module-5:**Brain storming and Assessment | 4 Hours |
| Individual Brainstorming, Group, Brainstorming, Stepladder Technique, Crawford Slip writing approach, Reverse brainstorming, Star bursting, Round robin brainstorming and Final Assessment | |
| **Pre-requisites (Self Learning)** | |

IV.**COURSE OUTCOMES**

| | |
|---|---|
| **CO1** | To improve verbal ability skill and communicative skill of the students |

| | |
|---|---|
| **CO2** | To improve verbal ability skill and communicative skill of the students |
| **CO3** | Students will communicate effectively & appropriately in real life situation |
| **CO4** | It will enhance students problem solving skill. |
| **CO5** | Students will be able to prepare for various public and private sector exams & placement drives. |

V.**CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO2 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO3 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO4 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |
| CO5 | 2 | | | | | | | 2 | | 2 | | 1 | | | | |

VI.**Assessment Details of CIE**

**General Rules:** Refer appendix section 8

**Continuous Internal Evaluation (CIE):** Refer appendix section 8

**Semester End Examination (SEE):** Refer appendix section 8

VII.**Learning Resources**

**VII(b): Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1 | The power of habit | CHARLES DUHIGG'S BLOG | 2007 | Good readers |
| 2 | Never Split the Difference: Negotiating as if Your Life Depended on It | Chris Voss | 2015 | Good readers |
| 3 | Thinking, Fast and Slow Hardcover | Daniel Kahneman | 2011 | Good readers |

**VII(c): Web links and Video Lectures (e-Resources):**

https://swayam.gov.in/explorer
https://nptel.ac.in/courses

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Mention suggested Activities like
seminar
assignments
quiz
mini projects

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | I | **Course Type:** | AEC | | |
| **Course Title:** WEB 2.0 (HTML, CSS & JAVASCRIPT) {Skill Development Course-1 (EWDP)} | | | | | |
| **Course Code:** | 23MEAE11 | | | **Credits:** | 1 |
| **Teaching Hours/Week (L:T:P:O)** | | 0:1:1:1 | | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory/practical/other assessment(practical) | | | **Exam Hours:** | 02 |

**I. Course Objectives:**

- Learn Web tool box and history of web browsers
- Learn HTML, XHTML tags with utilizations.
- Know CSS with dynamic document utilizations.
- Learn JavaScript with Element access in JavaScript
- Logically plan and develop web pages..

**II. Teaching-Learning Process (General Instructions):**

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

1. Lecturer method (L) need not to be only a 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. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analysed information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. 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.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

**III. COURSE CONTENT**

| **Module-1** | 8 Hours |
|---|---|

**Introduction to Web Programming**: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox.

Textbook 1: Chapter 1 (1.1 to 1.9 )

**Pre-requisites (Self Learning)**

| | |
|---|---|
| **RBT Levels: L1 and L2** | |
| **Module-2:** | 8 Hours |
| **HTML and XHTML :** Origins of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables , Frames , HTML Color ,HTML Attributes ,. Forms, Frames in HTML and XHTML, Syntactic differences between HTML and XHTML.<br><br>Textbook 1 : Chapter 2 (2.1 to 2.10 ) | |
| **Pre-requisites (Self Learning) : HTML** | |
| **RBT Levels:L1 , L2** | |
| **Module-3:** | 8 Hours |
| **CSS**: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, Background images, tags.<br><br>Textbook 1 : Chapter 3 (3.6 to 3.12) | |
| **Pre-requisites (Self Learning) ; HTML** | |
| **RBT Levels: L2 , L3** | |
| **Module-4:** | 8 Hours |
| **Java Script – I:** Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input.<br><br>Reference Book : Chapter 4(4.1 to 4.5) | |
| **Pre-requisites (Self Learning) : HTML and CSS** | |
| **RBT Levels: L2 , L3** | |
| **Module-5:** | 8 Hours |
| **Java Script – II:** Control statements, Object creation and Modification; variables , data types Arrays; Functions; Constructor; Pattern matching using expressions; Errors, Element access in JavaScript DOM and BOM Objects .<br><br>Text Book 1 : Chapter 4(4.6 to 4.14) | |
| **Pre-requisites (Self Learning) :** | |
| **RBT Levels: L3** | |

## IV. COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Describe the fundamentals of web and concept of HTML. |
| **CO2** | Use the Concepts of HTML , XHTML to construct the web pages . |
| **CO3** | Interpret CSS for Dynamic Documents. |
| **CO4** | Evaluate different concepts of JS and Construct Dynamic Documents |
| **CO5** | Design a small project using HTML ,CSS and JavaScript |

## V. CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | PS1 | PS2 | PS3 | PS4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO2** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO3** | 2 | | 2 | | 2 | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO4** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO5** | 2 | | 2 | | 2 | | | | | | | | | | | |

**VI. Assessment Details (CIE & SEE)**

**General Rules:** Refer appendix section 5

**Continuous Internal Evaluation (CIE):** Refer appendix section 5

**Semester End Examination (SEE):** Refer appendix section 5

**VII. Learning Resources**

**VII(a): Text Books**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | **Programming the World Wide Web** | **Robert W Sebesta** | **6th Edition, 2008** | **Pearson Education** |

**VII(b): Reference Books**

| Sl. No. | Title of the Book | Name of the author | Edition and Year | Name of the publisher |
|---|---|---|---|---|
| 1 | Castro | Elizabeth and Hyslop | Eight Edition And 2013 | Peach pit Press |
| 2 | Basics of Web Design | Felke-Morris | Fifth Edition And 2019 | Pearson Education |
| 3 | Beginning HTML5 Media | Silvia, and Green Tom | First Edition And 2015 | Apress |

**VII(c): Web links and Video Lectures (e-Resources):**

Introduction to web Development :
https://www.youtube.com/watch?v=l1EssrLxt7E&list=PLfqMhTWNBTe3H6c9OGXb5_6wcc1Mca52n
Introduction to HTML , CSS , Java Script :
https://www.youtube.com/watch?v=6mbwJ2xhgzM&list=PLu0W_9lII9agiCUZYRsvtGTXdxkzPyItg
Tutorial Link:
1. http://www.tutorialspoint.com
2. http://www.w3schools.com

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Demonstration of Simple Projects

|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)
SJB Institute of Technology
BGS Health and Education City, Dr. Vishnuvardhana Road, Kengeri, Bengaluru-560060
Approved by AICTE, New Delhi.
Autonomous Institute affiliated to Visvesvaraya Technological University, Belagavi
Accredited by NAAC with 'A+'grade, Certified by ISO 9001 - 2015
Recognized by UGC, New Delhi with 2(f) & 12 (B)

| | | | | | |
|---|---|---|---|---|---|
| **Semester:** | II | **Course Type:** | AEC | | |
| **Course Title:** INTRODUCTION TO PYTHON PROGRAMMING {Skill Development Course-2 (EWDP)} | | | | | |
| **Course Code:** | 23MEAE21 | | | **Credits:** | 1 |
| **Teaching Hours/Week (L:T:P:O)** | | | 0:1:1:1 | **Total Hours:** | 40 |
| **CIE Marks:** | 50 | **SEE Marks:** | 50 | **Total Marks:** | 100 |
| **SEE Type:** | Theory/practical/other assessment(practical) | | | **Exam Hours:** | 02 |

**I. Course Objectives:**

- Learn the syntax and semantics of the Python programming language.
- Illustrate the process of structuring the data using lists, tuples.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object-Oriented Programming concepts in Python.

**II. Teaching-Learning Process (General Instructions):**

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

1. Lecturer method (L) need not to be only a 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. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analysed information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. 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.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

**III. COURSE CONTENT**

| **Module-1** | 8 Hours |
|---|---|

**Python Basics**: Difference between basic programming Language and Python, Python History, Python Operators and Operator Precedence, Keywords & Identifier, Statements & Comments, Python Data types.

**Lists:** The List Data Type, Working with Lists, Augmented Assignment Operators, Methods,

Example.

**Dictionaries and Structuring Data:** The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things.

Textbook 1: Chapter 1-3

**Pre-requisites (Self Learning)**

**RBT Levels: L1 and L2**

| **Module-2:** | 8 Hours |
|---|---|

**Flow control:** Python if...else, Python for and while Loop, break, Continue and Pass Statement.

**Functions:** def Statements with Parameters, Return Values and return Statements,The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling.

Textbook 1 : Chapter 2 (2.1 to 2.1

**Pre-requisites (Self Learning) : HTML**

**RBT Levels:L1 , L2**

| **Module-3:** | 8 Hours |
|---|---|

**Manipulating Strings:** Working with Strings, Useful String Methods.

**Exception Handling:** Common Exceptions, User-defined Exception Declaring multiple Exception, Raising Exception, Python Directory.

Textbook 1 : Chapter 6, 8

**Pre-requisites (Self Learning) ; HTML**

**RBT Levels: L2 , L3**

| **Module-4:** | 8 Hours |
|---|---|

**File handling:** Reading from a file, writing to a file, Reading and writing CSV file Reading and writing Excel file, Python Classes, Python Objects, Operator Overloading.

**Python Modules:** Create Module and Standard module.
Textbook 1: Chapter 9-10

**Pre-requisites (Self Learning) : HTML and CSS**

**RBT Levels: L2 , L3**

| **Module-5:** | 8 Hours |
|---|---|

**Classes and objects:** Inheritance, Multiple Inheritance, Python Namespace, Programmer-defined types.

**Classes and methods:** Object-oriented features, Printing objects, Another example, A more complicated example,Theinit method, The__str__ method, Operator overloading, Type-based dispatch.

Text Book 2 : Chapter 15-17

**Pre-requisites (Self Learning) :**

**RBT Levels: L3**

## IV. COURSE OUTCOMES

| | |
|---|---|
| **CO1** | Demonstrate proficiency in handling loops and creation of functions. |
| **CO2** | Identify the methods to create and manipulate lists, tuples and dictionaries. |
| **CO3** | Develop programs for string processing and file organization |
| **CO4** | Interpret the concepts of Object-Oriented Programming as used in Python. |
| **CO5** | Design a small project using HTML ,CSS and JavaScript |

**V. CO-PO-PSO MAPPING** (mark H=3; M=2; L=1)

| PO/PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | PS1 | PS2 | PS3 | PS4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO2** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO3** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO4** | 2 | | 2 | | 2 | | | | | | | | | | | |
| **CO5** | 2 | | 2 | | 2 | | | | | | | | | | | |

**VI Learning Resources**

1. Al Sweigart,**"Automate the Boring Stuff with Python",** 1st Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)
(Chapters 1 to 18, except 12) for lambda functions use this link: https://www.learnbyexample.org/python-lambda-function/
2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist",** 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf
(Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

**VII(c): Web links and Video Lectures (e-Resources):**

- Introduction to web Development :
- https://www.learnbyexample.org/python/
- https://www.learnpython.org/
  https://pythontutor.com/visualize.html#mode=edit

**VIII: Activity Based Learning / Practical Based Learning/Experiential learning:**

Demonstration of Simple Projects Quizzes for list, tuple, string dictionary slicing operations using below link https://github.com/sushantkhara/Data-Structures-And-Algorithms-with-Python/raw/main/Python%203%20_%20400%20exercises%20and%20solutions%20for%20beginners.pdf

# CIE & SEE Evaluation strategy for Autonomous Scheme 2023 (Tentative)

| Sl. No. | Course Type /Credits | Continuous Internal Evaluation (CIE) | | | | | | | | | | | | | | | | | Semester End Examination (SEE) | | | | | | | | Total Marks (CIE+SEE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total CIE marks | Min. Eligty. | I. Theory Component | | | | | | | II. Practical Component | | | | | | | | Total CIE marks | Dur. In hrs. | Theory | | | Practical | | | Total SEE marks | |
| | | | | Marks | Min. Eligty. | A. Unit test | | B. Formative Assessments | | Tot. Theory marks (I) | Marks | Min. Eligty. | C. Weekly Evaluation | | D. Internal Test | | | Tot. marks (II) | | | Max. cond. marks | Max. considered marks | min. pass % | Max. cond. marks | Max. considered marks | min. pass % | | |
| | | | | | | Nos. | Marks / Each | Nos. | Marks/ Each | | | | Each week | Tot. marks | Nos. | Marks/ Each | Total marks | | | | | | | | | | | |
| 1 | **BSC/ESC/PCC/ETC/ PEC/OEC (3 or 4 Credit courses)** | 50 | 50% | 50 | 50% | 3 | 50 | 2 | 50 | 50 (avg. of 5) | -- | -- | -- | -- | -- | -- | -- | -- | 50 (I) | 03 | 100 | 50 | 40% | -- | -- | -- | 50 | 100 |
| 2 | **IBSC/IESC/IPCC (4 Credit courses)** | 50 | 50% | 50 | 50% | 3 | 50 | -- | -- | 50 (avg. of 3) | 50 | 50% | 50 | 50 (Avg. of all) | 1 | 50 | 50 | 50 (Avg. of C & D) | 50 (Avg. of I & II) | 03 | 100 | 50 | 40% | -- | -- | -- | 50 | 100 |
| 3 | **IESC - CAED (4 credit course)** | 50 | 50% | -- | -- | -- | -- | -- | -- | -- | 50 | 50% | 50 | 50 (Avg. of all) | 1 | 50 | 50 | 50 (Avg. of C & D) | 50 | 03 | -- | -- | -- | 100 | 50 | 40% | 50 | 100 |
| 4 | **PCCL (1 Credit courses)** | 50 | 50% | -- | -- | -- | -- | -- | -- | -- | 50 | 50% | 50 | 50 (Avg. of all) | 1 | 50 | 50 | 50 (Avg. of C & D) | 50 (II) | 03 | -- | -- | -- | 100 | 50 | 40% | 50 | 100 |
| 5 | **AEC**- IDT, Skill Development courses **(1 credit course)** | 50 | 50% | 50 | 50% | 2 | 50 | 1 | 50 | 50 (Avg. of 3) | -- | -- | -- | -- | -- | -- | -- | -- | 50 (I) | 02 | 50 | 50 | 40% | -- | -- | -- | 50 | 100 |
| 6 | **HSMC**- CIP, Env studies, SFH, UHV **(1 credit course)** | 50 | 50% | 50 | 50% | 2 | 50 | 1 | 50 | 50 (Avg. of 3) | -- | -- | -- | -- | -- | -- | -- | -- | 50 (I) | 02 | 50 | 50 | 40% | -- | -- | -- | 50 | 100 |
| 7 | **HSMC -** English, Kannada **(No credits)** | 50 | 50% | 50 | 50% | 2 | 50 | 1 | 50 | 50 (Avg. of 3) | -- | -- | -- | -- | -- | -- | -- | -- | 50 (I) | -- | -- | -- | -- | -- | -- | -- | -- | 50 |
| 8 | **NCMC -** Personality Development courses, PE, Yoga, NCC, NSS, IKS **(No credits)** | 50 | 50% | 50 | 50% | -- | -- | 1 | 50 | 50 | -- | -- | -- | -- | -- | -- | -- | -- | 50 (I) | -- | -- | -- | -- | -- | -- | -- | -- | 50 |

**Formative (Successive) Assessments:** Assignments/quiz/ seminars/field survey and report presentation/course project/etc. based on the faculty & dept. planning

**Practical Conduction:** The conduction of each experiment/program per week should evaluate for 50 Marks and average of all shall be taken.

In case of Integrated course, minimum eligibility shall be attained as prescribed in both the theory and practical components.

**Self Learning Courses (SLC) Courses, Internship, Mini project & Major Project: Rubrics & Methodology shall be defined seperately**

## CIE and SEE guidelines based on course Type for Autonomous Scheme 2023

**Note:**

- **The CIE conduction coordination will be done by the office of Controller of Examination (COE).**
- **The SEE will be conducted by the office of Controller of Examination (COE).**

| Continuous Internal Evaluation (CIE) | Semester End Examination (SEE) | Final Passing requirement |
|---|---|---|
| **1. BSC/ESC/PCC/ ETC/PEC/OEC – Theory Course (03 & 04 Credit courses)** | | |
| The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. | | |
| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br><br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and it will have only 01 component:<br>**I. Theory component.**<br>Theory Component will consist of<br>A. Internal Assessment Test<br>B. Formative assessments<br><br>**A. Internal Assessment Test:**<br>• There are 03 tests each of 50 marks conducted during 6th week, 10th week & 15th week, respectively. | The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).<br><br>**Semester-End Examination:**<br>Duration of 03 hours and total marks of 100.<br><br>• The question paper will have ten questions. Each question is set for 20 marks.<br>• There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. | The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together. |

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| • The question paper will have four questions (max of 3 sub questions) from the notified syllabus. Each question is set for 25 marks.<br>• The student have to answer 2 full questions (one from 1st & 2nd questions and another from 3rd & 4th question).<br>• Internal Assessment Test question paper shall be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.<br><br>**B. Formative assessments:**<br>• 02 formative assessments each of 50 marks shall be conducted by the course coordinator based on the dept. planning during random times.<br>• One formative assessment shall be completed before 5th week and second shall be completed before 12th week.<br>• The syllabus content for the formative assessment shall be defined by the course coordinator.<br>• The formative assessments include Assignments/ Quiz/ seminars/case study/field survey/ report presentation/ course project/etc.<br>• The assignment QP or Quiz QP shall indicate marks of each question and the relevant COs & RBT levels.<br>• The rubrics required for the other formal assessments shall be defined by the departments along with mapping of relevant COs & POs.<br><br>**The final CIE marks will be 50:**<br>Average of all 05 events of Internal Assessment test and formative assessments.<br><br>**The documents of all the assessments shall be maintained meticulously.** | • The students have to answer 5 full questions, selecting one full question from each module.<br>• Marks scored shall be proportionally reduced to 50 marks. | |

## 2. IBSC/IESC/IPCC – Integrated with Theory & Practical (04 credit courses)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

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| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br>Minimum eligibility of 50% marks shall be attained separately in both the theory component and practical component.<br><br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and it will have 02 component:<br>I. Theory Component.<br>II. Practical Component.<br><br>I. Theory Component will consist of<br>A. Internal Assessment Test<br>B. Formative assessments (Not required for Integrated courses)<br><br>**A. Internal Assessment Test:**<br>• There are 03 tests each of 50 marks conducted during 6th week, 10th week & 15th week, respectively.<br>• The question paper will have four questions (max of 3 sub questions) from the notified syllabus. Each question is set for 25 marks.<br>• It is suggested to include questions on laboratory content in the Internal Assessment test Question papers.<br>• The student have to answer 2 full questions (one from 1st & 2nd questions and another from 3rd & 4th question).<br>• Internal Assessment Test question paper shall be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.<br><br>**B. Formative assessments:**<br>• Not required for Integrated courses. | The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).<br><br>**Semester-End Examination:**<br>Only theory SEE for duration of 03 hours and total marks of 100.<br><br>• The question paper will have ten questions. Each question is set for 20 marks.<br>• There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.<br>• The laboratory content must be included in framing the theory question papers.<br>• The students have to answer 5 full questions, selecting one full question from each module.<br>• Marks scored shall be proportionally reduced to 50 marks.<br><br>**No Practical SEE for Integrated Course.**<br><br>Note: CAED Course shall not be considered here, it shall be considered as in sl. No. 3 in the next row | The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together. |

**II. Practical Component:**

**C.** Conduction of each experiment/program should be evaluated for 50 marks and average of all the experiments/programs shall be taken. (rubrics will be published by the lab conduction committee)

**D.** One laboratory Internal Assessment test will be conducted during the 14th week for 50 marks. (rubrics will be published by the lab conduction committee)

**The final CIE marks will be 50 =**
Avg. {**I** [ Avg. of 03 Internal assessment tests] + **II** [Avg. of (C & D)]}
**The documents of all the assessments shall be maintained meticulously.**

Note: CAED Course shall not be considered here, it shall be considered as in sl. No. 3 in the next row

## 3. IESC: CAED Course (4 credits)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).

- CIE shall be conducted for max. marks of 100 and shall be scaled down to 50 marks
- CIE component should comprise of both Manual and computer drafting i.e. 50% manual and 50% computer drafting out of total 100 marks
- CIE component should comprise of Continuous evaluation of drawing work of students as and when the modules are covered based on below detailed weightage.

| Module | Module Max. Marks | Evaluation Weightage in marks | |
|---|---|---|---|
| | | Computer display and print out | Manual Sketching |
| Module 1 | 20 | 10 | 10 |
| Module 2 | 20 | 10 | 10 |
| Module 3 | 20 | 10 | 10 |
| Module 4 | 20 | 10 | 10 |
| Module 5 | 20 | 10 | 10 |
| **TOTAL** | **100** | **50** | **50** |

The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).

**Semester-End Examination:**
SEE for duration of 03 hours and total marks of 100.

- SEE shall be conducted and evaluated for maximum marks of 100 and shall be scaled down to 50 marks.
- Question paper shall be made available for each batch as per schedule.
- Evaluation shall be carried jointly by both the internal & external examiners.
- Scheme of Evaluation: To be defined by both the examiners jointly.
- Maximum 3 questions shall be set as per the following pattern.

The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together.

- At least one Test covering all the modules is to be conducted for 100 marks during 14th week and the same is to be scaled down to **25 Marks.**
- Assignments = **10 Marks from each module. (50 marks scaled down to 25 Marks)**
- The final CIE 50 marks = Test (25 marks) + Assignment (25 marks).

| From Module | Marks Allotted |
|---|---|
| Module 01 (Choice between Lines or Planes) | 30 |
| Module 02 (Compulsory question) | 40 |
| Module 03 or Module 04 or Module 05 | 30 |
| **TOTAL** | **100** |

| Q. No. | Manual Sketching | Computer display and print out | TOTAL MARKS |
|---|---|---|---|
| 1 | 15 | 15 | 30 |
| 2 | 20 | 20 | 40 |
| 3 | 15 | 15 | 30 |
| **TOT.** | **50** | **50** | **100** |

## 4. PCCL: Laboratory course (01 credit course)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).

**Continuous Internal Evaluation:**

CIE will be conducted by the department and it will have only 01 component:

I. Theory Component. (Not required for Laboratory course)
II. Practical Component.

**II. Practical Component:**

**C.** Conduction of each experiment/program should be evaluated for 50 marks and average of all the experiments/program shall be taken (rubrics will be published by the lab conduction committee).

**D.** One laboratory Internal Assessment test will be conducted for 50 marks (rubrics will be published by the lab conduction committee).

**The final CIE marks will be 50 =** Avg. of (C & D)

The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).

**Semester-End Examination:**

Only laboratory SEE will be conducted jointly by the internal examiner and external examiner appointed by COE as per the scheduled timetable for duration of 03 hours.

- The examination shall be conducted for 100 marks and shall be reduced to 50 marks proportionately.
- All laboratory experiments/programs are to be included for practical examination.
- Breakup of marks (Rubrics) and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners (OR) based on the course

The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together.

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| **The documents of all the assessments shall be maintained meticulously.** | requirement evaluation rubrics shall be decided jointly by examiners.<br>• Students can pick one question (experiment/program) from the questions lot prepared by the internal /external examiners jointly.<br>• Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.<br>• General rubrics suggested for SEE: writeup-20%, Conduction procedure and results -60%, Viva-voce 20% of maximum marks.<br>• Change of experiment is allowed only once and shall be assessed only for 85% of the maximum marks. | |
| **5. AEC: Ability Enhancement Courses (01 credit courses)** | | |
| The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. | | |
| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br><br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and will have only 01 component:<br>**I. Theory component.**<br>Theory Component will consist of<br>A. Internal Assessment Test<br>B. Formative assessments<br><br>**A. Internal Assessment Test:**<br>• There are 02 tests each of 50 marks conducted during 6th week & 15th week, respectively.<br>• The question paper will be of Multiple-Choice Questions (MCQ).<br>• The student have to answer all questions.<br>• Internal Assessment Test question paper shall be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course | The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).<br><br>**Semester-End Examination:**<br>Theory SEE will be conducted by COE as per the scheduled timetable for duration of 02 hours and total marks of 50.<br><br>• Multiple choice Question paper.<br>• The students have to answer all questions. | The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together. |

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| **B. Formative assessments:**<br>• 01 formative assessments of 50 marks shall be conducted by the Course coordinator based on the dept. planning before 14th week.<br>• The formative assessments include Assignments/seminars/case study/field survey/ report presentation/course project/etc.<br>• The assignment QP shall indicate marks of each question and the relevant COs & RBT levels.<br>• The rubrics required for the other formal assessments shall be defined by the departments along with mapping of relevant COs & POs.<br><br>**The final CIE marks will be 50:**<br>Average of all 03 events (02 Internal Assessment test and 01 formative assessment).<br>**The documents of all the assessments shall be maintained meticulously.** | | |
| **6. HSMC: (01 credit course)** | | |
| The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. | | |
| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br><br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and will have only 01 component:<br><br>**I. Theory component.**<br>Theory Component will consist of<br>A. Internal Assessment Test<br>B. Formative assessments<br><br>**A. Internal Assessment Test:**<br>• There are 02 tests each of 50 marks conducted during 6th week & 15th week, respectively.<br>• The question paper will be of Multiple-Choice Questions (MCQ).<br>• The student have to answer all questions. | The minimum passing mark for SEE is 40% of the maximum marks (20 out of 50 marks).<br><br>**Semester-End Examination:**<br>Theory SEE will be conducted by COE as per the scheduled timetable for duration of 02 hours and total marks of 50.<br><br>• Multiple choice Question paper.<br>• The students have to answer all questions.<br>• Marks scored shall be proportionally reduced to 50 marks. | The student is declared as a pass in the course if he/she secures a minimum of 45% (45 marks out of 100) in the sum total of the CIE and SEE taken together. |

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|---|---|---|
| • Internal Assessment Test question paper shall be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course<br><br>**B. Formative assessments:**<br>• 01 formative assessments of 50 marks shall be conducted by the faculty based on the dept. planning before 14th week.<br>• The formative assessments include Assignments/seminars/case study/field survey/ report presentation/course project/etc.<br>• The assignment QP shall indicate marks of each question and the relevant COs & RBT levels.<br>• The rubrics required for the other formal assessments shall be defined by the departments along with mapping of relevant COs & POs.<br><br>**The final CIE marks will be 50:**<br>Average of all 03 events (02 IA test and 01 formative assessment).<br>**The documents of all the assessments shall be maintained meticulously.** | | |
| **7. HSMC: (0 credit courses)** | | |
| The weightage is only for Continuous Internal Evaluation (CIE). | | |
| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br><br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and it will have only 01 component:<br>**I. Theory component.**<br>Theory Component will consist of<br>C. Internal Assessment Test<br>D. Formative assessments<br><br>**A. Internal Assessment Test:**<br>• There are 02 tests each of 50 marks conducted during 6th week & 15th week, respectively.<br>• The question paper will be of Multiple-Choice Questions (MCQ).<br>• The student have to answer all questions. | • No Semester End Examination. | The student is declared as a pass in the course if he/she secures a minimum of 50% (25 marks out of 50) in the CIE. |

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| • Internal Assessment Test question paper shall be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course<br><br>**B. Formative assessments:**<br>• 01 formative assessments of 50 marks shall be conducted by the faculty based on the dept. planning during random times.<br>• The formative assessments include Assignments/seminars/case study/field survey/ report presentation/course project/etc.<br>• The assignment QP shall indicate marks of each question and the relevant COs & RBT levels.<br>• The rubrics required for the other formal assessments shall be defined by the departments along with mapping of relevant COs & POs.<br>**The final CIE marks will be 50 =** Average of all 03 events (02 IA test and 01 formative assessment).<br>**The documents of all the assessments shall be maintained meticulously.** | | |
| **8. NCMC: (0 credit course)** | | |
| The weightage is only for Continuous Internal Evaluation (CIE). | | |
| The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50).<br>**Continuous Internal Evaluation:**<br>CIE will be conducted by the department and it will have only 01 component:<br>**I. Theory component.**<br>Theory Component will consist of only 01 assessment<br>A. Internal Assessment Test (not required for NCMC course).<br>B. Formative assessments.<br><br>**B. Formative assessments:**<br>• 01 formative assessments of 50 marks shall be conducted by the faculty based on the dept. planning during random times.<br>• The formative assessments include Quiz/Assignments/seminars/case study/field survey/ report presentation/course project/etc.<br>• The assignment QP shall indicate marks of each question and the relevant COs & RBT levels. | • No Semester End Examination. | The student is declared as a pass in the course if he/she secures a minimum of 50% (25 marks out of 50) in the CIE. |

| | | |
|---|---|---|
| • The rubrics required for the other formal assessments shall be defined by the departments along with mapping of relevant COs & POs.<br>**The final CIE marks will be 50**<br>**The documents of all the assessments shall be maintained meticulously.** | | |

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Autonomous Institute affiliated to Visvesvaraya Technological University, Belagavi
Accredited by NAAC with 'A+'grade, Certified by ISO 9001 - 2015
Recognized by UGC, New Delhi with 2(f) & 12 (B)

# Program Outcomes (POs)- Graduate Attributes

**Engineering Graduates will be able to:**

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Accredited by NBA

Accredited by NAAC with A+

Recognized by UGC, New Delhi with 2(f) and 12(B)

Certified by ISO 9001 – 2015

ATAL Ranking:
Band Performer

Band of 151 to 300 in
Innovation Category