Course Title:	Mathematics for CES - I		
Course Code:	22MATC11	CIE Marks	50
Course Type(Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40hoursTheory+10-12Lab slots	Credits	04

Course objectives: The goal of the course Mathematics for Civil Engineering Stream - I(22MATC11)is to

- Familiarize the importance of series expansion and Vector calculus essential for civil engineering.
- Analyze Civil engineering problems applying Partial derivatives and understand the value of limit (continuity) of function by using indeterminate forms.
- Develop the knowledge of polar curves to trace different types of curves.
- Applications of first order first degree differential equations.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

Teaching-Learning Process

Pedagogy(General Instructions):

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

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

Course outcome (Course Skill Set)

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

CO1	Learn the Notion of Partial differentiation to compute rate of change of multivariate functions.
CO2	Apply multivariate calculus to solve engineering problems.
CO3	Learn the concepts based on calculus to solve problems on polar curves and its applications in determining the bendness of a curve.
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 Vector by using computational software.

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**

	(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
CO1						
CO2						
CO3						
CO4						
CO5						

Course Articulation Matrix / Course mapping :

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1										1
CO2	3	3										1
CO3	3	1										1
CO4	3	3										1
CO5	3	2										1
AVG	3	2										1

Note: 1-Low mapped, 2-Medium mapped, 3-High mapped

MODULE-1 : INDETERMINATE FORMS AND PARTIAL DIFFERENTIATION

Introduction to Indeterminate forms and Partial differentiation relating to Civil Engineering.
Indeterminate forms - L' Hospital's rule. Problems.
Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables. Problems .
Self study : Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.
Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values.
(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE-2 : SERIES EXPANSION AND VECTOR CALCULUS

Introduction to Series expansion and Vector Calculus in Civil Engineering applications.
Taylor's and Maclaurin's series expansions for one variable (statements only)- Problems
Vector Differentiation : Scalar and vector fields. Gradient, directional derivative, divergence and curl - physical interpretation, solenoidal and irrotational vector fields. Problems.
Self-Study: Velocity and acceleration of a moving particle.
Applications: Heat and mass transfer, oil refinery problems, environmental engineering.
(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE-3: DIFFERENTIAL CALCULUS

Introduction to polar coordinates and curvature in Civil Engineering applications.
Polar coordinates, Polar curves, angle between the radius vector and tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems.

Self-study: Center and circleof curvature, evolutes, involutes and envelopes.
Applications: Angle of elevation and survey engineering.
(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE- 4: LINEAR AND NON-LINEAR ORDINARY DIFFERENTIAL EQUATION OF FIRST ORDER

Introduction to first order ordinary differential equations pertaining to the applications for Civil engineering.
Exact and reducible to exact differential equations -Integrating factors type-1. , linear and reducible linear. Applications of ODE's – Orthogonal trajectories, Conduction of heat, Newton's law of cooling. Problems.
Self-Study: Applications of ODE's, Solvable for x ,y and p.
Applications of ordinary differential equations: Rate of Decay and growth.
(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE- 5: LINEAR ALGEBRA

Introduction of linear algebra related to Civil Engineering applications.
Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations : Gauss-Jordan method and approximate solution by Gauss Seidel method. Eigen values and Eigen vectors, Rayleigh's power method to find the dominant Eigen value and Eigen vector.
Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method, Gauss-elimination method. Inverse of a square matrix by Cayley-Hamilton theorem.
Applications of Linear Algebra: Optimum solution.
(RBT Levels: L1, L2 and L3) (8 Hours)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding the sum of the series up to infinity
2	Finding the given series convergent and divergent
3	Evaluating the limits
4	Finding the Partial derivatives of a given function Finding partial derivatives, Jacobian and plotting the graph
5	Applications to Maxima and Minima of two variables
6	2D plots for Cartesian and polar curves Finding of intersection between two polar curves
7	Finding the angle between the radius vector and the tangent
8	Finding the pedal equation of the polar curves
9	Finding radius of curvature of a given curve
10	Solution of first order differential equation and plotting the graphs
11	Program to compute area, volume and centre of gravity
12	Solving the Linear differential equations
13	Evaluating the rank of matrix
14	Numerical solution of system linear equations , test for consistency .

Suggested software's : Mathematica/MatLab/Python/Scilab

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

50%. The minimum passing marks for the CIE is 45% of the maximum marks (22.5 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

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

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks.

The CIE marks for the theory component shall be 50 marks and scored will be reduced to 30.As below

- Three Tests each of 15 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90- 100% respectively. Average of Best Two performances of the Internal Tests shall be considered for 15 Marks.
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

CIE for the practical component of the IC:

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 35 marks are for conducting the experiment and preparation of the laboratory record, the other 15 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 50 marks. Marks of all experiments' write-ups are added and scaled down to 20 marks.

Semester End Examination(SEE)

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of three sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)Text Books

B. S. Grewal: "Higher Engineering Mathematics", Khanna publishers, 44th Ed.,2021.

E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" Mc Graw-Hill Education,11th Ed.,2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
3. **N.P. Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications,10th

Ed.,2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" Mc Graw–Hill Book Co., Newyork, 6th Ed., 2017.
5. **C.B Gupta, S. R Singh and Mukesh Kumar:** "Engineering Mathematics for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
6. **H. K. Dassand Er. Rajnish Verma:** "Higher Engineering Mathematics "S . Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed.,2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Mathematics for EES –I		
Course Code:	22MATE11	CIE Marks	50
Course Type(Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hoursTheory+10-12Lab slots	Credits	04

Course objectives: The goal of the course Mathematics for Electrical and Electronics Engineering-I I(22MATS11) is to

- Familiarize the importance of series expansion and Vector calculus essential for computer science engineering.
- Analyze computer science engineering problems applying Partial derivatives and understand the value of limit (continuity) of function by using indeterminate forms.
- Develop the knowledge of polar curves to trace different types of curves.
- Applications of first order first degree differential equations.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop student's theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework and quizzes, and documenting

students' progress.

5. Five assignment problems on each module.
6. Encourage the students for group learning to improve their creative and analytical skills.
7. Show short related video lectures in the following ways:
    - As an introduction to new topics (pre-lecture activity).
    - As a revision of topics (post-lecture activity).
    - As additional examples (post-lecture activity).
    - As an additional material of challenging topics (pre-and post-lecture activity).
    - As a model solution of some exercises (post-lecture activity).

Course outcome (Course Skill Set)

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

CO1	Solve the engineering problems of sequence and series.
CO2	Learn the Notion of Partial differentiation to compute rate of change of multivariate functions.
CO3	Learn the concepts based on calculus to solve problems on polar curves and its applications in determining the bendness of a curve.
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 Vector by using computational software.

Bloom's level of the course outcomes:

CO#	**Bloom's Level**					
	Remember (L1)	**Understand (L2)**	**Apply (L3)**	**Analyze (L4)**	**Evaluate (L5)**	**Create (L6)**
CO1						
CO2						
CO3						
CO4						
CO5						

Course Articulation Matrix / Course mapping :

CO#	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	1										1
CO2	3	1										1
CO3	3	2										1
CO4	3	3										1
CO5	3	2										1

AVG	3	2										1

Note: 1-Low mapped, 2-Medium mapped, 3-High mapped

MODULE-1 SEQUENCE AND SERIES

Introduction of Sequence and series in EE & EC Engineering
Infinite series, tests for convergence/divergence, Limit comparison test, Ratio test, root test, Raabe's test, Alternating series, Absolute convergence and conditional convergence.
Self-study: Gauss's test, Cauchy integral test
Applications: Sequence and Series expansion in communication signals.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE-2: INDETERMINATE FORMS AND PARTIAL DIFFERENTIATION

Introduction of Indeterminate forms and partial differentiation in EE & EC Engineering applications.
Indeterminate forms - L' Hospital's rule. Problems.
Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and Minima for a function of two variables. Problems.
Self-study: Euler's Theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.
Applications: Applications of maxima and minima in computer science engineering.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE-3 : DIFFERENTIAL CALCULUS

Introduction to polar coordinates and curvature relating to EE &EC Engineering applications.
Polar coordinates, Polar curves, angle between the radius vector and tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems only.
Self-study: Center and circle of curvature, evolutes, involutes, and envelopes
Applications: Image processing.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE- 4: LINEAR AND NON-LINEAR ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER

Introduction to first order ordinary differential equations pertaining to the applications for EE & EC Engineering.
Exact and reducible to exact differential equations -Integrating factors type-1, linear and reducible to linear. Applications of ODE's – Orthogonal trajectories, Rate of Decay and growth, L-R and C-R circuits. Problems.
Self-Study: Applications of ODE's, Solvable for x , y ,p and Clairaut's form.
Applications of ordinary differential equations: L-R and C-R circuits, Newton's law of cooling, Conduction of heat.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE- 5 :LINEAR ALGEBRA

Introduction of liner algebra related to EE & EC Engineering applications.
Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector. Problems
Self-Study: Solution of system of equations by Gauss-Jacobi iterative method, Gauss-elimination method. Inverse of a square matrix by Cayley- Hamilton theorem.
Applications of Linear Algebra: Network Analysis, Markov Analysis, Critical point of a network
system. Optimum solution.
(RBT Levels: L1, L2 and L3) (8 Hours)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding the sum of the series up to infinity
2	Finding the given series convergent and divergent
3	Evaluating the limits
4	Finding the Partial derivatives of a given function Finding partial derivatives, Jacobian and plotting the graph
5	Applications to Maxima and Minima of two variables
6	2D plots for Cartesian and polar curves Finding of intersection between two polar curves
7	Finding the angle between the radius vector and the tangent
8	Finding the pedal equation of the polar curves
9	Finding radius of curvature of a given curve
10	Solution of first order differential equation and plotting the graphs
11	Program to compute area, volume and centre of gravity
12	Solving the Linear differential equations
13	Evaluating the rank of matrix
14	Numerical solution of system linear equations , test for consistency .

Suggested software's : Mathematica/MatLab/Python/Scilab

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (22.5 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).
A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks. The CIE marks for the theory component shall be 50 marks and scored will be reduced to 30.As below

- Three Tests each of 15 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90- 100% respectively. Average of Best Two performances of the Internal Tests shall be considered for 15 Marks.
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

CIE for the practical component of the IC:

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 35 marks are for conducting the experiment and preparation of the laboratory record, the other 15 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 50 marks. Marks of all experiments' write-ups are added and scaled down to 20 marks.

Semester End Examination (SEE)

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of three sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:**"Higher Engineering Mathematics" McGraw-Hill Education,11th Ed.,2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.

3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications,10th Ed.,2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw–Hill Book Co., New York, 6thEd., 2017.
5. **C.B Gupta, S. R Singh and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc- Graw Hill Education (India) Pvt .Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rdEd., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Mathematics for CSS – I		
Course Code:	22MATS11	CIE Marks	50
Course Type(Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:2:2:0	Exam Hours	03

Total Hours of Pedagogy	40hoursTheory+10-12Lab slots	Credits	04

Course objectives: The goal of the course Mathematics for Computer science & Engineering Stream - I(22MATS11) is to

- Familiarize the importance of series expansion and Vector calculus essential for computer science engineering.
- Analyze computer science engineering problems applying Partial derivatives and understand the value of limit (continuity) of function by using indeterminate forms.
- Develop the knowledge of polar curves to trace different types of curves.
- Applications of first order first degree differential equations.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

Teaching-Learning Process

Pedagogy(General Instructions):

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

8. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop student's theoretical and applied mathematical skills.
9. State the need for Mathematics with Engineering Studies and Provide real-life examples.
10. Support and guide the students for self–study.
11. You will also be responsible for assigning homework and quizzes, and documenting students' progress.
12. Five assignment problems on each module.
13. Encourage the students for group learning to improve their creative and analytical skills.
14. Show short related video lectures in the following ways:
    - As an introduction to new topics (pre-lecture activity).
    - As a revision of topics (post-lecture activity).
    - As additional examples (post-lecture activity).
    - As an additional material of challenging topics (pre-and post-lecture activity).
    - As a model solution of some exercises (post-lecture activity).

Course outcome (Course Skill Set)

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

CO1	Solve the engineering problems of sequence and series.
CO2	Learn the notions of Partial differentiation to compute rate of change of multivariate functions.
CO3	Learn the concepts based on calculus to solve problems on polar curves and its applications in determining the bendness of a curve.
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 Vector by using computational software.

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1						
CO2						
CO3						
CO4						
CO5						

Course Articulation Matrix / Course mapping :

CO#	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1										1
CO2	3	3										1
CO3	3	1										1
CO4	3	3										1
CO5	3	2										1
AVG	3	2										1

Note: 1-Low mapped, 2-Medium mapped, 3-High mapped

MODULE-1 SEQUENCE AND SERIES

Introduction of Sequence and series in CS Engineering
Infinite series, tests for convergence/divergence, Limit comparison test, Ratio test, root test, Raabe's test, Alternating series, Absolute convergence and conditional convergence.

Self-study: Gauss's test, Cauchy integral test
Applications: Sequence and Series expansion in communication signals.

(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE-2: INDETERMINATE FORMS AND PARTIAL DIFFERENTIATION

Introduction of Indeterminate forms and partial differentiation in CS Engineering applications. Indeterminate forms - L' Hospital's rule. Problems.
Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables. Problems.
Self-study: Euler's Theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.
Applications: Applications of maxima and minima in computer science engineering.
(RBT Levels: L1, L2 and L3) (8 Hours)

MODULE-3 : DIFFERENTIAL CALCULUS

Introduction to polar coordinates and curvature relating to CS Engineering applications.
Polar coordinates, Polar curves, angle between the radius vector and tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems only.
Self-study: Center and circle of curvature, evolutes, involutes, and envelopes
Applications: Image processing.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE- 4: LINEAR AND NON-LINEAR ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER

Introduction to first order ordinary differential equations pertaining to the applications for CS Engineering.
Exact and reducible to exact differential equations -Integrating factors type-1, linear and reducible to linear. Applications of ODE's – Orthogonal trajectories, Rate of Decay and growth, L-R and C-R circuits. Problems.
Self-Study: Applications of ODE's, Solvable for x , y ,p and Clairaut's form.
Applications of ordinary differential equations: L-R and C-R circuits, Newton's law of cooling, Conduction of heat.
(RBT Levels: L1, L2 and L3)
(8 Hours)

MODULE- 5 :LINEAR ALGEBRA

Introduction of liner algebra related to CS Engineering applications.
Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector. Problems

Self-Study: Solution of system of equations by Gauss-Jacobi iterative method, Gauss-elimination method. Inverse of a square matrix by Cayley- Hamilton theorem.
Applications of Linear Algebra: Network Analysis, Markov Analysis, Critical point of a network
system. Optimum solution.
(RBT Levels: L1, L2 and L3) (8 Hours)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding the sum of the series up to infinity
2	Finding the given series convergent and divergent
3	Evaluating the limits
4	Finding the Partial derivatives of a given function Finding partial derivatives, Jacobian and plotting the graph
5	Applications to Maxima and Minima of two variables
6	2D plots for Cartesian and polar curves

	Finding of intersection between two polar curves
7	Finding the angle between the radius vector and the tangent
8	Finding the pedal equation of the polar curves
9	Finding radius of curvature of a given curve
10	Solution of first order differential equation and plotting the graphs
11	Program to compute area, volume and centre of gravity
12	Solving the Linear differential equations
13	Evaluating the rank of matrix
14	Numerical solution of system linear equations , test for consistency .

Suggested software's : Mathematica/MatLab/Python/Scilab

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (22.5 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

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

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks. The CIE marks for the theory component shall be 50 marks and scored will be reduced to 30.As below

- Three Tests each of 15 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90- 100% respectively. Average of Best Two performances of the Internal Tests shall be considered for 15 Marks.
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

CIE for the practical component of the IC:

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 35 marks are for conducting the experiment and preparation of the laboratory record, the other 15 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 50 marks. Marks of all experiments' write-ups are added and scaled down to 20 marks.

Semester End Examination(SEE)

7. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

8. The question paper will have ten full questions carrying equal marks.
9. Each full question carries 20 marks.
10. There will be two full questions (with a maximum of three sub questions) from each module
11. Each full question will have sub questions covering all the topics under a module.
12. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)Text Books

3. **B. S. Grewal**:"Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
4. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

10. **V. Ramana:**"Higher Engineering Mathematics" Mc Graw-Hill Education,11th Ed.,2017
11. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
12. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications,10th Ed.,2022.
13. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw–Hill Book Co., New York, 6thEd., 2017.
14. **C.B Gupta, S. R Singh and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc- Graw Hill Education (India) Pvt .Ltd 2015.
15. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rdEd., 2014.
16. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
17. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
18. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Physics for CSS		
Course Code:	22PHYS12/22	CIE Marks	50
Course Type (Theory/Practical)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L+T)	3	Exam Hours	03
Total Hours of Pedagogy	40 hrs	Credits	03

Course objectives
This course will enable the students to

- Gain a fundamental understanding of lasers and Optical fibers and their applications in Engineering.
- Develop fundamental understanding of quantum mechanics and their applications.
- Acquire an understanding of electrical properties of materials, especially superconductors.
- Gain fundamental understanding of the principles of quantum information and quantum computing including their concepts and applications.
- Gain an understanding of quantum gates and physics of animation.

Teaching-Learning Process

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective

1. Flipped Class
2. Smart Class Room
3. Blended Mode of Learning
4. Interactive Simulations and Animations
5. Assignments based learnings
6. NPTEL and Other Videos for theory topics
7. Lab Experiment Videos

Module-1(8Hours)

Laser and Optical Fibers:

LASER: Basic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients, Laser Action & Numerical Problems, Population Inversion, Metastable State, Requisites of a laser system, Types of Lasers, Semiconductor Diode Laser, Applications: Barcode scanner, Laser Printer, CD writing/reading.

Optical Fiber : Principle and structure, Acceptance angle and Numerical Aperture (NA), Expression for NA (derivation) & Numerical Problems, Types of Optical Fibers, Attenuation and Fiber Losses, Applications of Optical Fibers: Local Area Network (LAN) and Fiber Optic Communication.

Prerequisite: Properties of light

Self-learning: Total Internal Reflection & Propagation Mechanism (Optical Fibers)

Module-2(8 Hours)

Quantum Mechanics:

Inadequacies of Classical Mechanics (Blackbody radiation & Photo electric effect), de Broglie Hypothesis and Matter Waves, de Broglie wavelength, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus-Non Relativistic) & Numerical Problems, Wave Function, Physical Significance of a wave function, Time independent Schrodinger wave equation, Eigen functions and Eigen Values, Motion of a particle in a one dimensional potential well of infinite depth.

Pre requisite: Wave–Particle dualism;

Self-learning: deBroglie Hypothesis

Module-3(8 Hours)

Electrical Conductivity in metals :

Electrical Conductivity in metals, Concept of Resistivity and Mobility, Numerical Problems on resistivity and mobility, Assumptions and failures of Classical Free Electron Theory, Assumptions and success of Quantum Free Electron Theory, Fermi Energy (Qualitative).

Superconductivity:

Introduction to Superconductors, Temperature dependence of resistivity, Meissner Effect, Critical Field, Temperature dependence of Critical field & Numerical Problems, Types of Superconductors, BCS theory (Qualitative), High Temperature superconductivity, Josephson Junctions (Qualitative), Applications of superconductors - Maglev vehicle, SQUID's (Qualitative).

Prerequisites: Basics of Electrical conductivity

Self-learning: Resistivity and mobility

Module-4(8 Hours)

Quantum Information & Quantum Computing:

Principles of Quantum Information & Quantum Computing: Introduction to Quantum Computing, Moore's law & its end. Single particle quantum interference, Differences between classical & quantum computing, concept of qubit and its properties. Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits.

Properties of a qubit: Mathematical representation. Summation of probabilities.

Dirac representation and matrix operations: Matrix representation of 0 and 1 states, Identity Operator I, Determination of I|0> and I|1>, Pauli Matrices and its operations on |0> and |1> states, Explanation of i) Conjugate of a matrix ii) Transpose of a matrix. Unitary Matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product).

Prerequisites: Matrices

Self-learning: Moore's law

Module-5(8 Hours)

Quantum Gates & Physics of Animation :

Quantum Gates

Single Qubit Gates: Quantum Not Gate , Pauli –Z Gate, Hadamard Gate, Phase Gate (or S Gate), T-Gate

Multiple Qubit Gates: Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of Swap gate, Controlled –Z gate, Toffoli gate.

Physics of Animation :

Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Motion and Timing in Animations, Constant Force and Acceleration. The Odd rule, Odd rule Scenarios & Numerical Problems, Motion Graphs.

Prerequisites: Motion in one dimension

Self-learning: Frames, Frames per Second

Course outcome (Course Skill Set)

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

CO1. Describe the fundamental principles of lasers and Optical fibers, highlighting their properties and real-world applications.

CO2. Describe the core principles of quantum mechanics including its fundamental concepts and applications.

CO3. Provide concise overview of conductors and superconductors highlighting their characteristics, differences and applications.

CO4. Explain about quantum information and computing, focusing on matrix operations.

CO5. Explain the principles and operations of quantum gates along with their significance in quantum computing and physics of animation.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (23 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

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

Continuous Internal Evaluation (CIE):

The CIE shall be conducted by the course teacher throughout the semester. The suggested components of CIE for Theory course are

The CIE marks for the theory component shall be 50 marks is as detailed below

- Three Tests each of 15 Marks; (Third test is improvement test).
- CIE will be conducted by the university as per scheduled time table with question papers for the subject (duration of 1 hour 15 minutes)
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

Semester End Examination (SEE)

- Theory SEE will be conducted by University as per the scheduled time table, with question papers for the subject (duration 03 hours)
- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50 marks.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Solid State Physics,S O Pillai, New Age International Private Limited, 8th Edition, 2018,.
2. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
3. Concepts of Modern Physics, Aurthur Beiser, Mc Grawhill, 6th Edition, 2009.
4. Lasers and Non Linear Optics, B B Loud, New age international, 2011 edition.
5. A text book of Engineering Physics by M.N.Avadhanulu, PG.Kshirsagar and T V S ArunMurthy, Eleventh edition, S Chand and Company Ltd. NewDelhi-110055.
6. Quantum Computation and Quantum Information, Michael A.Nielsen & Isaac L.Chuang, Cambridge Universities Press, 2010 Edition.
7. Quantum Computing,Vishal Sahani, Mc GrawHill Education, 2007Edition.
8. Engineering Physics, S P Basavaraj, 2005Edition,
9. Physics for Animators, Michele Bousquet with Alejandro Garcia,C R C Press,Taylor & Francis, 2016.
10. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini,Giuseppe Sergioli, Trends in Logic,Volume 48, Springer.
11. Statistical Physics: Berkely Physics Course, Volume 5, F .Reif, McGraw Hill.

Web links and Video Lectures (e-Resources):

Web links:

1. **LASER** :www.youtube.com/watch?v=WgzynezPiyc
2. **Superconductivity :**https://www.youtube.com/watch?v=MT5Xl5ppn48
3. **OpticalFiber:**www.youtube.com/watch?v=N_Ka8EpCUQo
4. **QuantumMechanics**:https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s
5. **Quantum Computing:**https://www.youtube.com/watch?v=jHoEjvuPoB8
6. **Physics of Animation:**www.youtube.com/watch?v=kj1kaA_8Fu4
7. **NPTEL Superconductivity:** https://archive.nptel.ac.in/courses/115/103/115103108/
8. **NPTEL Quantum Computing :**https://archive.nptel.ac.in/courses/115/101/115101092
9. **Virtual LAB :**https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

10. **VirtualLAB**:https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1

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

http://nptel.ac.inhttps://swayam.gov.in
https://virtuallabs.merlot.org/vl_physics.
Htmlhttps://phet.colorado.edu
https://www.myphysicslab.com

COs and POs Mapping

COs	Pos											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2										1
CO2	3	2										1
CO3	3	2										1
CO4	3	2										1
CO5	3	2										1
Avg	3	2										1

Level 3 - Highly Mapped, Level 2- Moderately Mapped, Level 1 – Low Mapped

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped
Note: The CO-PO mapping values are indicative. The course coordinator can alter the mapping using Competency and Performance Indicators mentioned in the AICTE Exam reforms

Course Title:	Physics for CSS		
Course Code:	22PHYS12/22	CIE Marks	50
Course Type (Theory/Practical)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L+T)	3	Exam Hours	03
Total Hours of Pedagogy	40 hrs	Credits	03

Course objectives

This course will enable the students to

- Gain a fundamental understanding of lasers and Optical fibers and their applications in Engineering.
- Develop fundamental understanding of quantum mechanics and their applications.
- Acquire an understanding of electrical properties of materials, especially superconductors.

- Gain fundamental understanding of the principles of quantum information and quantum computing including their concepts and applications.
- Gain an understanding of quantum gates and physics of animation.

Teaching-Learning Process

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective

8. Flipped Class
9. Smart Class Room
10. Blended Mode of Learning
11. Interactive Simulations and Animations
12. Assignments based learnings
13. NPTEL and Other Videos for theory topics
14. Lab Experiment Videos

Module-1(8Hours)

Laser and Optical Fibers:

LASER: Basic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients, Laser Action & Numerical Problems, Population Inversion, Metastable State, Requisites of a laser system, Types of Lasers, Semiconductor Diode Laser, Applications: Barcode scanner, Laser Printer, CD writing/reading.

Optical Fiber : Principle and structure, Acceptance angle and Numerical Aperture (NA), Expression for NA (derivation) & Numerical Problems, Types of Optical Fibers, Attenuation and Fiber Losses, Applications of Optical Fibers: Local Area Network (LAN) and Fiber Optic Communication.

Prerequisite: Properties of light

Self-learning: Total Internal Reflection & Propagation Mechanism (Optical Fibers)

Module-2(8 Hours)

Quantum Mechanics:

Inadequacies of Classical Mechanics (Blackbody radiation & Photo electric effect), de Broglie Hypothesis and Matter Waves, de Broglie wavelength, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus-Non Relativistic) & Numerical Problems, Wave Function, Physical Significance of a wave function, Time independent Schrodinger wave equation, Eigen functions and Eigen Values, Motion of a particle in a one dimensional potential well of infinite depth.

Pre requisite: Wave–Particle dualism;

Self-learning: deBroglie Hypothesis

Module-3(8 Hours)

Electrical Conductivity in metals :

Electrical Conductivity in metals, Concept of Resistivity and Mobility, Numerical Problems on resistivity and mobility, Assumptions and failures of Classical Free Electron Theory, Assumptions and success of Quantum Free Electron Theory, Fermi Energy (Qualitative).

Superconductivity:

Introduction to Superconductors, Temperature dependence of resistivity, Meissner Effect, Critical Field, Temperature dependence of Critical field & Numerical Problems, Types of Superconductors, BCS theory (Qualitative), High Temperature superconductivity, Josephson Junctions (Qualitative), Applications of superconductors - Maglev vehicle, SQUID's (Qualitative).

Prerequisites: Basics of Electrical conductivity

Self-learning: Resistivity and mobility

Module-4(8 Hours)

Quantum Information & Quantum Computing:

Principles of Quantum Information & Quantum Computing: Introduction to Quantum Computing, Moore's

law & its end. Single particle quantum interference, Differences between classical & quantum computing, concept of qubit and its properties. Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits.
Properties of a qubit: Mathematical representation. Summation of probabilities.
Dirac representation and matrix operations: Matrix representation of 0 and 1 states, Identity Operator I, Determination of I|0> and I|1>, Pauli Matrices and its operations on |0> and |1> states, Explanation of i) Conjugate of a matrix ii) Transpose of a matrix. Unitary Matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product).

Prerequisites: Matrices
Self-learning: Moore's law

Module-5(8 Hours)

Quantum Gates & Physics of Animation :
Quantum Gates
Single Qubit Gates: Quantum Not Gate , Pauli –Z Gate, Hadamard Gate, Phase Gate (or S Gate), T-Gate
Multiple Qubit Gates: Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of Swap gate, Controlled –Z gate, Toffoli gate.
Physics of Animation :
Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Motion and Timing in Animations, Constant Force and Acceleration. The Odd rule, Odd rule Scenarios & Numerical Problems, Motion Graphs.
Prerequisites: Motion in one dimension
Self-learning: Frames, Frames per Second

Course outcome (Course Skill Set)

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

CO1. Describe the fundamental principles of lasers and Optical fibers, highlighting their properties and real-world applications.

CO2. Describe the core principles of quantum mechanics including its fundamental concepts and applications.

CO3. Provide concise overview of conductors and superconductors highlighting their characteristics, differences and applications.

CO4. Explain about quantum information and computing, focusing on matrix operations.

CO5. Explain the principles and operations of quantum gates along with their significance in quantum computing and physics of animation.

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (23 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).
A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum and total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.
Continuous Internal Evaluation (CIE):
The CIE shall be conducted by the course teacher throughout the semester. The suggested components of CIE for Theory course are
The CIE marks for the theory component shall be 50 marks is as detailed below

- Three Tests each of 15 Marks; (Third test is improvement test).

- CIE will be conducted by the university as per scheduled time table with question papers for the subject (duration of 1 hour 15 minutes)
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

Semester End Examination (SEE)

- Theory SEE will be conducted by University as per the scheduled time table, with question papers for the subject (duration 03 hours)
- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50 marks.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

12. Solid State Physics,S O Pillai, New Age International Private Limited, 8th Edition, 2018,.
13. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
14. Concepts of Modern Physics, Aurthur Beiser, Mc Grawhill, 6th Edition, 2009.
15. Lasers and Non Linear Optics, B B Loud, New age international, 2011 edition.
16. A text book of Engineering Physics by M.N.Avadhanulu, PG.Kshirsagar and T V S ArunMurthy, Eleventh edition, S Chand and Company Ltd. NewDelhi-110055.
17. Quantum Computation and Quantum Information, Michael A.Nielsen & Isaac L.Chuang, Cambridge Universities Press, 2010 Edition.
18. Quantum Computing,Vishal Sahani, Mc GrawHill Education, 2007Edition.
19. Engineering Physics, S P Basavaraj, 2005Edition,
20. Physics for Animators, Michele Bousquet with Alejandro Garcia,C R C Press,Taylor & Francis, 2016.
21. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini,Giuseppe Sergioli, Trends in Logic,Volume 48, Springer.
22. Statistical Physics: Berkely Physics Course, Volume 5, F .Reif, McGraw Hill.

Web links and Video Lectures (e-Resources):

Web links:

11. **LASER** :www.youtube.com/watch?v=WgzynezPiyc
12. **Superconductivity :**https://www.youtube.com/watch?v=MT5Xl5ppn48
13. **OpticalFiber:**www.youtube.com/watch?v=N_Ka8EpCUQo
14. **QuantumMechanics**:https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s
15. **Quantum Computing:**https://www.youtube.com/watch?v=jHoEjvuPoB8
16. **Physics of Animation:**www.youtube.com/watch?v=kj1kaA_8Fu4
17. **NPTEL Superconductivity:** https://archive.nptel.ac.in/courses/115/103/115103108/
18. **NPTEL Quantum Computing :**https://archive.nptel.ac.in/courses/115/101/115101092
19. **Virtual LAB :**https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
20. **VirtualLAB**:https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1

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

http://nptel.ac.inhttps://swayam.gov.in
https://virtuallabs.merlot.org/vl_physics.

Htmlhttps://phet.colorado.edu
https://www.myphysicslab.com

COs and POs Mapping

COs	Pos											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2										1
CO2	3	2										1
CO3	3	2										1
CO4	3	2										1
CO5	3	2										1
Avg	3	2										1

Level 3 - Highly Mapped, Level 2- Moderately Mapped, Level 1 – Low Mapped

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped
Note: The CO-PO mapping values are indicative. The course coordinator can alter the mapping using Competency and Performance Indicators mentioned in the AICTE Exam reforms

CourseTitle:		Phy
Course Code:	22PHYE12/22	C
Course Type (Theory/Practical)	Theory	S
		T
Teaching Hours/Week (L+T)	03	E
Total Hours of Pedagogy	40 hrs	

Course objectives

This course will enable the students to

- Gain a fundamental understanding of lasers and Optical fibers and their applications in Engineering.
- Acquire an understanding the concept of dielectric properties & superconductors.
- Develop fundamental understanding of quantum mechanics and their applications.
- Gain fundamental knowledge of vector calculus and principles of Electromagnetic waves.
- Gain a fundamental understanding of semiconductors and their associated devices.

Teaching-Learning Process

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

1. Flipped Class
2. Smart Class Room
3. Blended Mode of Learning
4. Interactive Simulations and Animations
5. Assignments based learning
6. NPTEL and Other Videos for theory topics
7. Lab Experiment Videos

Module-1(8Hours)

Lasers: Characteristics of LASER, Interaction of radiation with matter, Expression for energy density of radiation ar action, Types of Lasers, Principle, Construction and working of Ga-As laser. Application of Lasers in Defence (Lase **Optical Fibers:** Propagation mechanism, TIR, angle of acceptance, Numerical aperture and Numerical Problems on V parameter and Numerical Problems, Types of optical fibers. Attenuation and Mention of expression for attenuatior system, Merits and demerits of optical fiber.

Prerequisite: Properties of light

Self-learning: Propagation Mechanism & TIR in optical fiber

Module-2 (8 Hours)

Dielectric Properties: Basic concepts of conductors, insulators and semiconductors, Polar and non-polar dielectrics Application of dielectrics in transformers, Capacitors.

Superconductivity:

Introduction to Superconductors, Temperature dependence of resistivity, Meissner Effect, Critical temperature, Type Problems, BCS theory (Qualitative), High Temperature superconductivity, Applications of Superconductivity - SQU

Prerequisites: Difference between Insulators & Dielectrics.

Self-learning: DielectricsBasics

Module-3 (8 Hours)

Quantum Mechanics:

Inadequacies of Classical Mechanics (Blackbody radiation & Photo electric effect), de Broglie Hypothesis and Matte application (Non existence of electron inside the nucleus-Non Relativistic) & Numerical Problems, Wave Function, wave function, Eigen functions and Eigen Values, Motion of a particle in a one dimensional potential well of infinite

Prerequisite: Wave–Particle dualism

Self-learning: deBroglie Hypothesis

Module-4 (8 Hours)

Maxwell's Equations and EM waves:

Maxwell's Equations: Fundamentals of vector calculus. Divergence and curl of electric field and magnetic field (sta Faraday's laws of EMI, Current density & equation of continuity; displacement current (with derivation), Maxwell's **EM Waves**: Plane electromagnetic waves in vaccum, their transverse nature, Numerical problems.

Prerequisite: Electricity & Magnetism

Self-learning: Fundamentals of vector calculus.

Module-5 (8 Hours)

Semiconductor and Devices:

Fermi energy and Fermi factor, Variation of Fermi factor with temperature and energy & Numerical Problems, Ferm semiconductor (derivation) & Numericals, Hall effect and mention its application, Photodiode and Power responsivi

Prerequisite: Basics of Semiconductors

Self-learning: Solar cell

Course outcome (Course Skill Set)

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

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

CO1. Describe the fundamental principles of lasers and Optical fibers, highlighting their properties and real-world ap

CO2. Provide concise overview of dielectrics and superconductors highlighting their characteristics and applications

CO3. Describe the core principles of quantum mechanics including its fundamental concepts and applications.

CO4. Explain the fundamentals of vector calculus and their applications in the study of EM waves.

CO5. Provide concise overview of semiconductor theory and explain the working principles of semiconductor devic

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The mini out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum and total of the CIE (Co together.

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The suggested components of CIE for Th The CIE marks for the theory component shall be 50 marks is as detailed below

- Three Tests each of 15 Marks; (Third test is improvement test).
- CIE will be conducted by the university as per scheduled time table with question papers for the subject (dur
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

Semester End Examination (SEE)

- Theory SEE will be conducted by University as per the scheduled time table, with question papers for the su
- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. A Textbook of Engineering Physics-M.N. AvadhanuluandP.G.Kshirsagar,10th revised, S.Chand & Company Lt
2. An Introduction to Lasers theory and applications by M.N.Avadhanulu and P.S.Hemne revised Edition 2012. S
3. Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications - 2017.
4. Concepts of Modern Physics-Arthur Beiser:6th Ed; Tata McGraw Hill Edu Pvt Ltd-NewDelhi2006.
5. Fundamentals of Fibre Optics in Telecommunication & SensorSystems, B.P.Pal, New Age International Publis
6. Introduction to Electrodynamics, David Griffith, 4thEdition, Cambridge University press2017.
7. Lasers and Non Linear Optics– B.B.Laud, 3rd Ed, New Age International Publishers 2011.
8. LASERS Principles,Types and Applications by K.R.Nambiar- New Age International Publishers.
9. Solid State Physics-S O Pillai, 8th Ed-New Age International Publishers-2018.

Web links and Video Lectures (e-Resour

Web links:

1. **Laser:** www.britannica.com/technolog
2. **Laser:** https://nptel.ac.in/courses/115/102/
3. **Quantum Mechanics:** https://nptel.ac.in/courses/1
4. **Physics:** http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
5. **Numerical Aperture of fiber:** https://bop-iitk.vlabs.ac.in/exp/numerical-aperture-measurement

Activity Based Learning (Suggested Activities in Class)/ Pr

http://nptel.ac.inhttps://swayam.gov.in
https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeethamhttps://vlab.amrit
https://virtuallabs.merlot.org/vl_physics
htmlhttps://phet.colorado.edu
https://www.myphysicslab.com

COs and POs Mapping 2023-24

COs	Pos											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2										1
CO2	3	2										1
CO3	3	2										1
CO4	3	2										1
CO5	3	2										1
Avg	3	2										1

Level 3- Highly Mapp
0- Not Mapped Note:
alter the mapping u

Introduction to Computer Science & Engineering
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022 -2023)
SEMESTER – I

Subject Code	22ESC146	**CIE Marks**	50
Number of Lecture Hours/Week(L:T:P)	2:0:0	**SEE Marks**	50
Total Number of Lecture Hours	30	**Exam Hours**	03
CREDITS - 02			

Course Objectives: This course will enable students to

- To understand Concepts of Computers
- To acquire the knowledge of software concepts.
- To understand basic concepts of Computer network.
- To understand the concepts of Data structure and database management system.
- Learn emerging Technologies.

Module I	**Teaching Hours**	
Introduction to Computers and Technology: Functions of a computer, Computer Hardware, **Memory and Processors**: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture. **Number system** – decimal, binary, octal and hexadecimal number, interconversion of decimal to binary and vice-versa. Sign and Magnitude representation, ones and Two's Complement representation, ASCII codes.	6	
Module II		
Software Concepts: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware, acquiring computer software, Types of programming languages, assembler, compiler, interpreter, linker, loader (Definitions only), **Operating Systems**: Types (real Time, Single User / Single Tasking, Single user / Multi tasking, Multi user / Multi tasking, GUI based OS. Overview of desktop operating systems, Windows and LINUX.	6	

Module III		
Computer Networks and Introduction to Internet: Definition of computer network, Types: LAN, MAN and WAN **Network Topologies**: Star, Ring, Hybrid Network, Wireless Networks, concept of a client and server, Different Search Tools, Web Browsers, Definition, Uses of Internet Basic Services: Electronic mail, File Transfer Protocol, Telnet.	6	
Threats and prevention: Viruses, Worms, Trojan horse, Spam, Cookies, Adware, Firewall, http vs https. **Network Security Concepts:** Firewall, Cookies, Hackers and Crackers Antivirus and their workings		
Module IV		
Introduction to Data Structures: Definition and applications of Stacks, Queues & Linked Lists. **Database Concepts**: Introduction to database concepts, difference between database and file system, Characteristics of database approach, data models, database system architecture and data independence. relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key	6	
Module V		
Current Trends and Technologies: Introduction to Parallel Computing, Mobile Computing, Quantum computing, E-Technologies (E-Commerce, Electronic Payment system, Electronic data interchange) ,Immersive Experiences, Big data and its characteristics, Internet of Things (IoT), Sensors, Smart cities, Cloud Computing and Cloud Services (SaaS, IaaS, PaaS); Grid Computing.	6	
Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.		
Reference Books: 1. Fundamentals of Computers By V. Rajaraman 2. Computers and Common Sense By R. Hunt and Shelly Y. 3. Computer Fundamentals (5Th Edition) By P. K. Sinha 4. Vikas Gupta: Computer Concepts & C Programming, Dreamtech Press 2013.		

Course outcomes:

1.Interpret the basic concepts of computer systems and number system.
2. Classify software types and their computing functions.
3. Recognize threats and apply network security measures.
4.Apply the knowledge of data structures and DBMS to solve real world problems efficiently.
5.Explore the concepts of current trends and technologies in computer science.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**
CO2	**3**	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**
CO3	**3**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**

CO4	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**
CO5	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**3**	**-**
AVG	**2.75**	**2.33**	**3**	**-**	**-**	**1.2**	**-**	**-**	**-**	**-**	**-**	**3**	**1.6**	**3**	**-**

Introduction to AI and DS

(Effective from the academic year 2022-2023)

SEMESTER – I/II

Subject Code	22ESC148/248	**CIE Marks**	50
Number of Lecture Hours/Week (L: T:P)	2:0:0	**SEE Marks**	50
Total Number of Lecture Hours	30	**Exam Hours**	03

CREDITS – 02

Course Learning objectives: This course will enable students:

- To impart knowledge about Artificial Intelligence.
- To become familiar with basic principles of AI toward problem solving.
- To impart knowledge about the concepts involved in machine learning.
- To introduce the fundamental concepts of data science and its applications.
- To provide an overview of an exciting growing field of IoT

MODULE I: INTRODUCTION TO ARTIFICIAL INTELLIGENCE	6 Hours RBT: L1,L2

Definition, Evolution of AI, Goals of AI, Approaches of AI, Need of AI, Components of AI, Classifications of AI, Sub-areas of AI, Foundations of AI, Pros and Cons, Application of AI, Current trends in AI, Future of AI

MODULE II: INTELLIGENT AGENTS	6 Hours RBT: L1,L2,L3

Agents and Environment- Agent terminology, Intelligent Agent, Rational Agent, Characteristics of Intelligent Agent, Structure of Intelligent agent, Working of Intelligent agent, Types of Intelligent agent, Applications of Intelligent Agent; Agent Environment in AI - Properties of Environment.

MODULE III: INTRODUCTION TO MACHINE LEARNING	6 Hours RBT: L1,L2,L3

Definition of Machine learning, need of Machine learning, techniques of machine learning, scope and types of algorithms used in AI&ML.

1. MODULE IV: INTRODUCTION TO DATA SCIENCE	6 Hours RBT: L1,L2

What is Data science? Datafication, Drew Conway's Venn diagram of data science, a data science profile, exploratory data analysis (EDA), data science process, data scientist's role in this process.

MODULE V: INTRODUCTION TO INTERNET OF THINGS	6 Hours RBT: L1,L2

What is Internet of Things? Sensors, Actuators, Smart Objects and Sensor Networks. Internet of Things application examples: Smart metering, E-Health, City Automation, Automotive Applications, Home

Course Title:	**Applied Chemistry for Civil Engineering Stream**		
Course Code:	**22CHEC12/22**	CIE Marks	50
Course Type	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L/T)	3	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course objectives

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

Teaching-Learning Process

Teaching-Learning Process

These are samples trategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective

Flipped class

Smart class room

Bended mode of leaning

Interactive simulations and animation

Tutorial & remedial classes for needy students (not regular T/R)

- Conducting Makeup classes
- 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
- Daily learning through assignments

Module-1: Structural Materials (8 hr)

Metals and Alloys: Introduction, Properties and application of Iron and its alloys,
Cement: Introduction, composition, properties, classification, manufacturing process of cement, process of setting and hardening of cement, additives for cement and testing of cement.
Refractories: Introduction, classification based on chemical composition, properties and application of refractory materials (clay bricks. silicon bricks, casting materials)
Glass: Introduction, Composition, Types, Preparation of Soda-lime glass, properties and applications of Soda-lime glass.

Module-2: Energy Conversion Systems and Corrosion (8 hr)

Energy conversion: Fuel Cells: Introduction, construction, working and applications of methanol–oxygen and polymer electrolyte membrane (PEM) fuel cell.
Storage devices: Introduction, construction and working of Li-ion battery.

1. NOTE: Wherever the contact hours is not sufficient, tutorial hour can be converted to theory hours

Corrosion: Introduction, electrochemical corrosion of steel in concrete, types (differential metal and aeration), Stress corrosion in civil structures, corrosion control (design and selection of materials, galvanization, anodization and sacrificial anode method).

Module-3: Nanotechnology and Water Technology (8 hr)

Nanotechnology: Introduction, size dependent properties of nanomaterial (surface area and catalytic), Synthesis of nanomaterial by sol-gel method and precipitation method.
Nanomaterials: Introduction, properties and engineering applications of carbon nanotubes, graphene and nanomaterials for water treatment (Metal oxide).
Water technology: Introduction, water parameters, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by ion exchange method, desalination of water by reverse osmosis, determination of COD, numerical problems.

Module-4:Polymer and Composites (8 hr)

Polymer: Introduction, type of polymerization with examples (Addition and condensation), molecular weight of polymers, numerical problems. Synthesis, properties and engineering applications of polyethylene (PE) and polyvinyl chloride (PVC).
Fibers and composites: Synthesis, properties and applications of Kevlar and nylon fibers.
Adhesives: Introduction, properties and applications of epoxy resin.
Biodegradable polymers: Synthesis of polylactic acid (PLA) and their applications.

Module-5:Phase Rule and Analytical Techniques (8 hr)

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: One component (water system) .
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 (Glass electrode); its application in the determination of pH of beverages.

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO1.	Identify the terms and Processes involved in scientific and engineering applications
CO2.	Explain the phenomena of chemistry to describe the methods of engineering processes
CO3.	Solve for the problems in chemistry that are pertinent in engineering applications
CO4.	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO5.	Analyze properties and Processes associated with chemical substances in multidisciplinary situations

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (23 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

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

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The suggested components of CIE for Theory course are

The CIE marks for the theory component shall be 50 marks is as detailed below

- Three Tests each of 15 Marks; (Third test is improvement test).
- CIE will be conducted by the university as per scheduled time table with question papers for the subject (duration of 1 hour 15 minutes)
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

Semester End Examination (SEE)

1. Theory SEE will be conducted by University as per the scheduled time table, with question papers for the subject **(duration 03 hours)**
2. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50 marks.
3. The question paper will have ten full questions carrying equal marks.
4. Each full question carries 20 marks.
5. There will be two full questions (with a maximum of three sub questions) from each module
6. Each full question will have sub questions covering all the topics under a module.
7. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.

2. Engineering Chemistry, Satyaprakash& Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. GrourKrishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.

Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.

10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin& A.C. Arsenault, RSC Publishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, TakatoshiTsujimura, Wiley–Blackwell , 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley & Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch Seventh Edition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers, 4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah& Pushpa Iyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

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=PLyhmwFtznRhuz8L1bb3X- 9IbHrDMjHWWh https://www.youtube.com/watch?v=j5Hml6KN4TI https://www.youtube.com/watch?v=X9GHBdyYcyo https://www.youtube.com/watch?v=1xWBPZnEJk8 https://www.youtube.com/watch?v=wRAo-M8xBHM
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning https://www.vlab.co.in/broad-area-chemical-sciences https://demonstrations.wolfram.com/topics.php https://interestingengineering.com/science

COs and POs Mapping (Individual teacher has to fill up)												
	PO											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**3**	**1**	**1**				**1**					
CO2	**3**	**1**	**1**				**1**					
CO3	**3**	**1**	**1**				**1**					
CO4	**3**	**1**	**1**				**1**					
CO5	**3**	**1**	**1**				**1**					

SHARNBASVA UNIVERSITY

Computer Science and Engineering and allied branches (Chemistry group)

Course Title:	**Applied Chemistry for Computer Science & Engineering stream**		
Course Code:	**22CHES 12/22**	CIE Marks	50
Course Type	(Theory)	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L/T)	3	Exam Hours	3
Total Hours of Pedagogy	40 hours	Credits	3

Course objectives

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

Teaching-Learning Process

These are samples trategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective

Flipped class

Smart class room

Bended mode of leaning

Interactive simulations and animation

Tutorial & remedial classes for needy students (not regular T/R)

- Conducting Makeup classes
- 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
- Daily learning through assignments

MODULE 1: Energy Storage Systems and Sensors (8hr)

Energy Storage Systems: Introduction to batteries, construction, working and applications of Ni-MH battery, Lithium ion and Sodium ion batteries.

Sensors: Introduction, working principle and applications of Conductometric sensors, Electrochemical sensors, Thermometric sensors, and Optical sensors. Sensors for the measurement of dissolved oxygen (DO). Electrochemical gas sensors for SOx and NOx.

MODULE 2: **Display and Memory Systems (8hr)**

Display Systems: Photoactive and electroactive materials, Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals (LC's) - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Light emitting electrochemical cells.

Memory : Introduction, Basic concepts of electronic memory, History of organic/polymer electronic memory devices, Classification of electronic memory devices, types of organic memory devices (organic molecules, polymeric materials, organic- inorganic hybrid materials).

1. NOTE: Wherever the contact hours is not sufficient, tutorial hour can be converted to theory hours

MODULE 3: Electrode System and Corrosion(8hr)

Corrosion Chemistry: Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and anode method. Corrosion Penetration Rate (CPR) - Introduction and numerical problem.
Electrode System: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrod

MODULE 4: Green Fuels and Polymers (8hr)

Green Fuels: Introduction, construction and working of solar photovoltaic cell, advantages, and disadvantages. Ge
Polymers: Introduction, Molecular weight - Number average, weight average and numerical problems. Conductin commercial applications. Preparation, properties, and commercial applications of graphene oxide.

MODULE 5: Analytical Techniques and E-Waste Management (8hr)

Analytical Techniques: Introduction, principle and instrumentation of Conductometry; its application in the estima
E-Waste: Introduction, sources of e-waste, Composition, Characteristics, and Need of e- waste management. Toxic due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatm

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO1.	Identify the terms and processes Applications
CO2.	Explain the phenomena of chemistry to describe the methods of enginee
CO3.	Solve for the problems in chemistry that are pertinent in engineering applic
CO4.	Apply the basic concepts of chemistry to explain the chemical properties
CO5.	Analyze properties and Processes multidisciplinary situations

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) i
marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of

A student shall be deemed to have satisfied the academic requirements and earned the credits allotte
50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum and to
Examination) taken together.

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The suggested components of C
The CIE marks for the theory component shall be 50 marks is as detailed below

- Three Tests each of 15 Marks; (Third test is improvement test).
- CIE will be conducted by the university as per scheduled time table with question papers for the sub
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

Semester End Examination (SEE)

8. Theory SEE will be conducted by University as per the scheduled time table, with question papers f
9. The SEE question paper will be set for 100 marks and the marks scored will be proportionately redu
10. The question paper will have ten full questions carrying equal marks.
11. Each full question carries 20 marks.
12. There will be two full questions (with a maximum of three sub questions) from each module
13. Each full question will have sub questions covering all the topics under a module.
14. The students will have to answer five full questions, selecting one full question from each module.

2.

3. Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.
9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell , 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta

Frackowiak, Wiley-VCH; 1st edition, 2013.

15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley & Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, Nirali Prakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch Seventh Edition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers, 4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah &

Pushpa Iyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

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=PLyhmwFtznRhuz8L1bb3X- 9IbHrDMjHWWh

https://www.youtube.com/watch?v=j5Hml6KN4TI
https://www.youtube.com/watch?v=X9GHBdyYcyo
https://www.youtube.com/watch?v=1xWBPZnEJk8
https://www.youtube.com/watch?v=wRAo-M8xBHM

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

https://www.vlab.co.in/broad-area-chemical-sciences
https://demonstrations.wolfram.com/topics.php
https://interestingengineering.com/science

COs and POs Mapping (Individual teacher has to fill up)

	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1				1					
CO2	3	1	1				1					
CO3	3	1	1				1					
CO4	3	1	1				1					
CO5	3	1	1				1					

SHARNBASVA UNIVERSITY

Electrical & Electronics Engineering and Allied branches (Chemistry group)

<table>
<tr><td>Course Title:</td><td colspan="3">Chemistry for Electrical and Electronics Engineering stream</td></tr>
<tr><td>Course Code:</td><td>22CHEE12/22</td><td>CIE Marks</td><td>50</td></tr>
<tr><td rowspan="2">Course Type</td><td rowspan="2">(Theory)</td><td>SEE Marks</td><td>50</td></tr>
<tr><td>Total Marks</td><td>100</td></tr>
<tr><td>Teaching Hours/Week (L/T:P: S)</td><td>3:0:0</td><td>Exam Hours</td><td>03</td></tr>
<tr><td>Total Hours of Pedagogy</td><td>40 hours Theory/tutorial and demonstration</td><td>Credits</td><td>03</td></tr>
<tr><td colspan="4">Course objectives
• To enable students to acquire knowledge on principles of chemistry for engineering applications.
• To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
• To provide students with a solid foundation in analytical reasoning required to solve societal problems.</td></tr>
<tr><td colspan="4">Teaching-Learning Process
These are samples trategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching–Learning more effective
Flipped class
Smart class room
Bended mode of leaning
Interactive simulations and animation
Tutorial & remedial classes for needy students (not regular T/R)
• Conducting Makeup classes
• 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</td></tr>
</table>

- Daily learning through assignments

MODULE 1: Conducting Materials and polymers (8hr)

Conductors and Insulators: Introduction, principle with examples.

Semiconductors: Introduction, production of electronic grade silicon-Czochralski process (CZ) and Float Zone (FZ) methods.

Polymers: Introduction, Molecular weight - Number average, Weight average and numerical problems.Conducting polymers – synthesis and conducting mechanism of polyacetylene. Preparation, properties and commercial applications of graphene oxide.

PCB: Electroless plating – Introduction, Electroless plating of copper in the manufacture of double-sided PCB.

MODULE 2: Battery Technology and Sensors(8hr)

Batteries: Introduction to batteries, construction, working and applications of Ni-MH battery, Lithium ion and Sodium ion batteries.

Fuel Cells: Introduction, construction, working and applications of methanol–oxygen and polymer electrolyte membrane (PEM) fuel cell.

Sensors: Introduction, working principle and applications of Conductometric sensors, Electrochemical sensors, Thermometric sensors, and Optical sensors. Sensors for the measurement of dissolved oxygen (DO). Electrochemical gas sensors for SOx and NOx.

MODULE 3: Corrosion Science and Energy Conversion Systems(8hr)

1. NOTE: Wherever the contact hours is not sufficient, tutorial hour can be converted to theory hours

Corrosion Chemistry: Introduction, electrochemical theory of corrosion, types of corrosion- differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Corrosion Penetration Rate (CPR) - Introduction and numerical problem.
Electrode System: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrode. Concentration cell– Definition, construction and Numerical problems.

Solar Energy: Introduction, importance of solar PV cell, construction and working of solar PV cell, advantages and disadvantages.

MODULE 4: Display and Memory Systems (8hr) (8hr)

Display Systems: Photoactive and electroactive materials, Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals (LC's) - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Light emitting electrochemical cells.
Memory : Introduction, Basic concepts of electronic memory, History of organic/polymer electronic memory devices, Classification of electronic memory devices, types of organic memory devices (organic molecules, polymeric materials, organic- inorganic hybrid materials).

MODULE 5: Nanomaterials, E-Waste Management and Analytical Techniques (8hr)

Nanomaterias : Introduction, size dependent properties of nanomaterials (surface area, catalytic and electrical), preparation of NPs by sol-gel and precipitation methods
E-Waste: Introduction, sources of e-waste, Composition, Characteristics, and Need of e- waste management. Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatment)
Analytical Techniques: Introduction, principle and instrumentation of Colorimetric sensors; its application in the estimation of copper, Potentiometric sensors; its application in the estimation of iron, Conductometric sensors; its application in the estimation of weak acid.

Course outcome (Course Skill Set) At the end of the course the student will be able to:	
CO1.	Identify the terms and processes Involved in scientific and engineering applications
CO2.	Explain the phenomena of chemistry to describe the methods of engineering processes
CO3.	Solve for the problems in chemistry that are pertinent in engineering applications
CO4.	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO5.	Analyze properties and processes Associated with chemical substances in multidisciplinary situations

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.

2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. GrourKrishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12thEdition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.

Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.

10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin& A.C. Arsenault, RSC Publishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.

Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.

OLED Display Fundamentals and Applications, TakatoshiTsujimura, Wiley–Blackwell , 2012

14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,

Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The

National Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley & Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch Seventh Edition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers, 4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah& Pushpa Iyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

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=PLyhmwFtznRhuz8L1bb3X- 9IbHrDMjHWWh

https://www.youtube.com/watch?v=j5Hml6KN4TI
https://www.youtube.com/watch?v=X9GHBdyYcyo
https://www.youtube.com/watch?v=1xWBPZnEJk8
https://www.youtube.com/watch?v=wRAo-M8xBHM

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

https://www.vlab.co.in/broad-area-chemical-sciences
https://demonstrations.wolfram.com/topics.php
https://interestingengineering.com/science

COs and POs Mapping (Individual teacher has to fill up)

	PO											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**3**	**1**	**1**				**1**					
CO2	**3**	**1**	**1**				**1**					
CO3	**3**	**1**	**1**				**1**					
CO4	**3**	**1**	**1**				**1**					
CO5	**3**	**1**	**1**				**1**					

4. SHARNBASVA UNIVERSITY, KALABURAGI

Outcome Based Education (OBE) and Choice Based Credit System (CBCS) B.Tech. in Mechanical Engineering - 2022-Scheme

1st Year (I/II Semester) w.e.f 2022-23

ELEMENTS OF MECHANICAL ENGINEERING						
Course Code	**22EME14/24**				**CIE Marks**	**50**
Number Lecture Hour/Week	**L**	**T**	**P**	**TOTAL**	**SEE Marks**	**50**
	3	**0**	**0**	**3**		
Number of Lecture Hours	**40**				**Exam Hours**	**03**
Credits-03						

Course Objectives: This course will enable students to
• Understand the working principle of boilers, refrigeration and air conditioning.
• Understand the basics of steam & gas turbines and IC engines.
• Understand the joining and manufacturing processes through machine tools.
• Understand the basics of various means of power transmission.
• Understand the conversion of energy sources and biofuels.

MODULE NO.	TOPICS	TEACHING HOURS	RBT LEVELS
1	**Steam Formation and Properties:** Classification of boilers, Lancashire boiler, Babcock and Wilcox boiler, boiler mountings and its accessories. **Basics of refrigeration and air conditioning:** Working principal vapor compression and vapor absorption refrigeration systems and its applications.	**08**	**L1 & L2**
2	**Steam turbines:** Classification of steam turbine, Principle of operation of Impulse and reaction turbines. **Gas Turbines:** Classification of gas turbine, working principles (Open cycle and closed cycle gas turbines). Water turbines: Classification of water turbine and their working principles. **Internal Combustion Engines:** Classification of IC engines, I.C. Engine terminologies, 2 Stroke and 4 stroke Petrol & diesel engines & simple numerical.	**08**	**L1 & L2**
3	**Joining processes:** Soldering, Brazing and Welding: Definitions, classification and method of soldering, Brazing and welding. **Machine Tools and Operations:** Lathe, drilling and milling machines, Turning, facing, knurling, Thread cutting, Taper Turning methods, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, - Plane milling, End milling, Slot milling.	**08**	**L1 & L2**

4	**Power Transmission:** **Belt Drives** - Classification and applications. **Gears** - Definitions, Terminology, types and uses. **Gear Drives and Gear Trains** – Definitions and classifications, simple numerical.	**08**	**L1 & L2**
5	**Energy Resources:** Non-renewable and renewable energy resources, Petroleum based solid, liquid and gaseous fuels, Combustion and combustion products of fuels, Solar Power: Solar Radiation, Solar constant (definition only), Solar Thermal energy harvesting, solar photovoltaic principle. Wind Power: principle of operation of a typical windmill. Hydro Power: Principles of electric power generation from hydro power plants, Nuclear Power: Principles of Nuclear power plants, Bio Fuels: introduction to bio fuels.	**08**	**L1 & L2**

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

CO.1	Acquire the knowledge of steam formation and its application. Also gain basic understanding of refrigeration systems.
CO.2	Understand and analyze the working principle, operation and application of prime movers.
CO.3	Demonstrate the methods and operations of metal removal process using Lathe, drilling, Milling.
CO.4	Design and analyze the power transmission systems along with its Implementations.
CO.5	Explore the knowledge of various Non-conventional Energy sources.

Mapping of course outcomes with program outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO.1	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**
CO.2	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**
CO.3	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**
CO.4	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**
CO.5	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**

High-3, Medium-2, Low-1

QUESTION PAPER PATTERN:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. V.K. Manglik, “Elements of Mechanical Engineering”, PHI Publications, 2013. (unit 1,2,4,5).

2. K.R. Gopalkrishna, “A text Book of Elements of Mechanical Engineering”- Subhash Publishers, Bangalore. (Unit -1,2,3,4,5)

REFERENCE BOOKS:

1. S. Trymbaka Murthy, “A Text Book of Elements of Mechanical Engineering”, 4th Edition 2006, Universities Press (India) Pvt Ltd, Hyderabad.
2. K.P. Roy, S.K. Hajra Choudhury, Nirjhar Roy, “Elements of Mechanical Engineering”, Media Promoters & Publishers Pvt Ltd,Mumbai,7th Edition,2012

E-RESOURCES:

1. NPTEL videos and notes.

BASIC ELECTRICAL ENGINEERING

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the Academic Year 2022-23)

Course Code : 22BEE13/23	**Marks : 50**
Contact Hours/Week : 03	**SEE Marks: 50**
Total Hours: 40	**Exams. Hours: 03**
Semester: I/II	**Credits: 03**

Course Objectives: The course will enable the students to:

1. Understand the analysis of simple circuits with DC excitation.
2. Understand the analysis of AC series circuits
3. Understand the generation of three-phase power and analysis of three-phase circuits.
4. Understand the construction and operation of Transformer and Three Induction Motor.

5. Understand electricity billing and personal safety measures.

MODULE 1:

DC Circuits

Analysis of Series, Parallel and Series-Parallel circuits with dc excitation, Kirchhoff's laws.

Electromagnetic Induction

Faraday's Laws of Electromagnetic Induction, Types of induced EMF, Self-Inductance, Mutual -Inductance and Coefficient of coupling.

08 – Hours

MODULE 2:

Single phase AC Circuits

Generation of AC voltage, Phase, Phase Difference, Peak value, Average value and RMS value, Phasor representation of alternating quantity. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series circuits. Real power, Reactive power, Apparent power, Power factor.

08- Hours

MODULE 3:

Three phase AC Circuits

Necessity and advantages of three phase systems, generation of three phase power. Definition of Phase sequence, balanced supply and balanced load. Relation between line and phase values of voltages and currents in a balanced star and delta connections. Power in balanced three-phase circuits, measurement of three phase power by two-wattmeter method. Illustrative examples.

08- Hours

MODULE 4:

Single Phase transformer

Necessity of transformer, Principle of operation and construction of singlephase transformers (core and shell types). EMF equation, losses, efficiency, Voltage regulation. Illustrative problems on emf equation and efficiency only.

Three Phase Induction Motor

Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor, slip, significance of slip, applications and numericals on the slip

08- Hours

MODULE 5:

Electricity bill:

Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

02– Hours

Domestic Wiring

Service mains, meter board and distribution board. Brief discussion on concealed conduit wiring. Two way and three-way control of a lamp.

Elementary discussion on Circuit protective devices:

Fuse and Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock, Objectives of Earthing, types of earthing; pipe and plate earthing, Residual current circuit breaker (RCCB).

06 - Hours

Course outcomes:

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

CO1: Analyze DC circuits and explain the concept of Electromagnetic Induction
CO2: Analyze single phase AC series electric circuits.
CO3: Analyze three phase Circuits.
CO4: Explain the working principles of transformers and Three Phase Induction Motors.
CO5: Explain wiring methods, electricity billing and working principles of circuit protective devices and personal safety measures.

Question Paper Pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V.K Mehata, Rohit Mehta "Principles Electrical Engineering and Electronics "S Chand and Company , 2nd edition, 2015

SL.NO	PO/CO	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
1	CO1	3	3											3		
2	CO2	3	3											3		
3	CO3	3	3											3		
4	CO4	3	3				1							3		
5	CO5	3					3	3						3		
		3	3				2	3						3		

BASIC ELECTRONICS ENGINEERING [As per NEP, Outcome based Education (OBE), and Choice Based Credit System (CBCS) Scheme] SEMESTER-II			
Course Code	22BEL23	CIE Marks	50
Number of Lecture Hour/Week	3	SEE Marks	50
Course Type Theory/Practical/Integrated	Theory	Exam Hours	03
Number of Lecture Hours	40	Credits	03
CREDITS-03			
Course Objectives: Students will be taught to: • Understand characteristics operation and application of PN- Junction diode and its			

application.

- Understand the characteristic operation and application of Bipolar junctiontransistor. Design biasing circuits.
- Understand differentnumbersystems,workingoffundamental building blocks of digital circuits, and design of simple digital circuits.
- Understand the working principle of various special electronics devices and transducers.

- To understand the principle of basic communicationsystem and analysis of basic modulation techniques.

Module -1	**Teaching Hours**
P-N junction diode: Characteristics and Parameters, Diode approximations. **Applications of Diode :**Introduction, Half wave rectifier, Full wave rectifier (Analysis-Efficiency, Ripple factor), Full wave rectifier power supply. **Zener Diodes:** Junction Breakdown, Circuit Symbol and Package, Characteristics and Parameters, Zener Diode Voltage Regulator.	08 Hours
Module -2	
BJT configuration: BJT Operation, BJT voltages and currents, BJT amplification, Common Base, Common Emitter, Common Collector Characteristics. Relation between α and β, Numerical examples as applicable, DC load line and bias point, DC biasing circuit- fixed bias and voltage divider bias for common emitter configuration.	08 Hours
Module -3	
Digital Electronics: Introduction, Switching and Logic Levels, Digital Waveform. Number Systems: Decimal Number System, Binary Number System, Octal Number System, Hexadecimal NumberSystem. **Number base conversions:** Binary to Decimal, Decimal to Binary, Binary to Octal, Octal to Binary, Binary to Hexadecimal, Hexadecimal to Binary, Decimal to Octal, Octal to Decimal, Decimal to Hexadecimal, Hexadecimal to Decimal, Octal to Hexadecimal, Hexadecimal to octal. Complement of Binary Numbers, Binary addition, Binary subtraction. Boolean Algebra Theorems, De Morgan's theorem. **Logic gates:** Basic and Universal gates. Algebraic Simplification and Implementation of Digital circuits using Basic & Universal Gates.Half adder and Full adder Implementations.	08 Hours
Module -4	
Special Semiconductor Devices: Construction and working principles of LED, Seven Segment Display,Opto couplers, Relays. **Transducers**: Introduction, Capacitive Transducers, Thermal transducers, Optoelectronic transducer, and Piezoelectric transducers	08 Hours
Module -5	
Introduction, Block diagram of communication system, Modulation, Need for Modulation, Types of modulation, Analysis of AM and FM, Generation and detection of AM and FM.	08 Hours

Course Outcomes: After studying this course, students will be able to:

CO1: Explain and analyze the applications of diodes.

CO2: Understand and analyze the transistor biasing circuits.

CO3: Understand number system conversions and design basic digital circuits using logic gates.

CO4: Apply the knowledge of various transducers principle in sensor system and special devices in various other applications.

CO5: Understand the principles of communication system and analyze various modulation techniques.

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

Text Books:

1. David A. Bell, “Electronic Devices and Circuits”,Oxford University Press, 5th Edition,2008.
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-8.
3. Electronic Instrumentation and Measurements (3rd Edition) – David A. Bell, Oxford University Press,2013
4. George Kenedy, Bernard Davis “Electronics and Communication System”,3rd edition.

Web links and Video Lectures (e-Resources):

1. https://nptel.ac.in/courses/122106025
2. https://nptel.ac.in/courses/108105132
3. https://nptel.ac.in/courses/108105064
4. https://www.electronics-tutorials.ws/io/io_1.html
5. https://theinstrumentguru.com/7-segment-led-display

ENGINEERING MECHANICS

B.Tech, I Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course Code:22CIV13	CIE:50
Number of Lecture hours/Week:03	SEE:50
Total Number of Lecture Hours:42	Exam Hours:03
CREDITS – 03	

Course Objectives: The objective of this course is to make students to learn:

1. To make students to learn scope of various fields of civil Engineering. Basics of Civil engineering concepts and to learn about components and classifications of roads, bridges and dams.
2. To develop students' ability to analyse the problem involving Forces, Moments with their applications
3. To analyse about non concurrent forces, beams, loads and different support conditions.
4. To develop the student's ability to find out the centre of gravity and their applications.
5. To develop the student's ability to find out the moment of inertia and their applications.

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1						
CO2						
CO3						
CO4						
CO5						

Course Articulation Matrix / Course mapping:

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3					3	2	1	1			2	3		
CO2	3	3	2	2					1			2	3		
CO3	3	3	2	2					1			2	3		
CO4	3	3	2	2					1			2	3		
CO5	3	3	2	2					1			2	3		
Note: 1-Low, 2-Medium, 3-High															

Modules	Teaching Hours/RBT levels
Module -1	
Introduction to civil engineering: Introduction to Civil Engineering. Scope for different fields of Civil Engineering- Surveying, Building Materials, Construction Technology, Geo technical Engineering, Structural Engineering, Irrigation Engineering, Transportation Engineering and Environmental Engineering. **Roads**: Classification of roads and their functions, components and comparison between flexible and rigid pavements (Advantages and Limitations). **Bridges**: Components of bridge, Types of Bridges - Beam and Slab bridge, Arch bridge, Suspension bridge, Bascule bridge, Cable stayed bridge, Square & Skew bridge **Dams**: Classification of dams based on material, Structural behaviour and	**8 Hours/ L1, L2**

functionality with simple sketches.	
Module -2	
Introduction to engineering mechanics: Force, Classification of force and Elements of force, Parallelogram law of forces, principle of transmissibility. Principle of physical independence of force and principal of superposition of force, Moment of forces, Couple, Moment of couple, characteristics of couple, equivalent system, Resolution of force into force and a couple, Resolution of force, Numerical Problems on moment of force and couple. **Analysis of concurrent force system**: Definition of resultant, composition of co planar concurrent force system, Principle of resolved parts, Numerical problems.	**10 Hours/ L2, L3, L4**
Module -3	
Analysis of non-concurrent force system: non-concurrent force system, Geometrical representation of Moment,Varignon's Principle and Numerical problems on co planar non concurrent force system. **Support and support reaction** : Definition of support reaction ,types of beams, types of loads, types of supports and Numerical Problems on various types of loads UDL,UVL and Couple.	**8 Hours /L2, L3**
Module -4	
Centroid: Introduction to the concept, centroid of line and area ,centroid of basic geometrical figures, computing centroid for - I,T,L,I,C,Z and full/quadrant circular sections and their built up sections, numerical problems.	**8 Hours/ L1, L2, L3**
Module -5	
Moment of inertia: Introduction to the concept, Radius of gyration, parallel axis theorem, perpendicular axis theorem, moment of inertia of basic planar figures, computing moment of inertia for T, L, I, C, Z and full / quadrant circular sections and their built-up sections, numerical problems.	**8 Hours/L1, L2, L3**

Course Outcomes (COs):

After a successful completion of the course, the student will be able to:

CO#	Course Outcomes
CO1	Mention the applications of various fields of Civil Engineering.To study the Classification, Functions and components of Roads, Bridges and Dams.
CO2	Compute the action of Forces, Moments, Couples and resultant of given force system subjected to various loads.
CO3	Compute Resultant of Non concurrent forces and to study about Various types of beams, loads and supports and calculate the support reaction for different support conditions and ladings.
CO4	Locate the centroid of plane and built-up sections.
CO5	Compute the moment of inertia of plane and built-up sections.

Question paper pattern:

1. The question paper will have ten questions.
2. Each full question consists of 10 marks.
3. There will be 2 full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

CIE+ Assignments: 15+35=50 Marks
There will be 3 CIE's, the average of best of 2 CIE's will be considered and submission of assignment books carries 35 marks.

Text Books:

1. Kolhapure B K.,Elements of civil engineering and Engineering Mechanics,2014,EBPB
2. Bansal R.K., Rakesh Ranjan Beohar and Ahmed Ali khan , Basic civil engineering and engineering mechanics , 2015, Laxmi publications.
3. A Textbook on Elements of Civil Engineering and Mechanics" by S S Bhavikatti.

Reference Books:

1. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi.
2. Beer FP and Johnson ER, "Mechanics for Engineers- Dynamics and Statics"- 3rd SI Metric edition, Tata McGraw Hill. - 2008.
3. Elements of Civil Engineering and Engineering MechanicsbyM.N. Shesha Prakash and Ganesh. B. Mogaveer, PHI Learning, 3rRevised edition (2014).
4. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 2009.

Principles of Programming with C

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022-2023)
SEMESTER – I

Subject Code	**22PPC13**	**CIE Marks**	**50**
Number of Lecture Hours/Week(L:T:P)	**3:0:0**	**SEE Marks**	**50**
Total Number of Lecture Hours	**40**	**Exam Hours**	**03**
CREDITS – 03			

Course objectives: This course will enable students to

- Understand the concepts of Problem Solving.
- Apply Programming constructs of C language to solve the real-world problems.
- Explore the user defined data structures like arrays, structures, and pointers in implementation solutions to problems.
- Design and Develop Solutions to problems using modular programming constructs such as functions and procedures.

Module I	**Teaching Hours**

Fundamentals of Problem Solving :Problem solving Methodology: Introduction to Problem solving, Problem definition, Problem Analysis, Design of a Solution, Algorithms, Flowcharts, Development of Programs(Coding, testing, debugging), Characteristics of a Good Program, Types of Errors, Approaches to Problem solving (Top-down, Bottom-up, Modular, Structured) **Overview of C:** Basic Structure of C Program, C-tokens, variable and data types, Operators, and expressions.	8 Hours
Module II	
Managing input and output operations. Unformatted and Formatted Input and Output. **Control Statements**: Decision Making with if statement, Simple if statement, the if else and nested if statements, the else if ladder, Switch statement, Unconditional control Statements. **Decision Making and Looping**: while statement, do-while statement, for statement, jumps in loops, Example programs.	8 Hours
Module III	
Arrays: One dimensional Array, declaration, Initialization, Two dimensional Arrays notations and representations, manipulating with arrays, Example programs. **Strings**: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, String-handling functions, Example programs.	8 Hours
Module IV	
Functions: Definition of function, Elements of User Defined Functions, Parameter Passing techniques, Categories of functions, recursive function, programming examples. **Pointers:** Introduction to pointers, declaring pointer variables, Types of pointers, Passing arguments to functions using pointers programming examples.	8 Hours
Module V	
Structures and Unions: Initialization. Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members **Unions:** Union, Size of Structures, bit fields , Programming examples. **Files**: Introduction to files, using files in C, reading and writing data files. , Detecting end of file	8 Hours

TEXTBOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie: The C Programming Language, Prentice Hall of India.

E. Balaguruswamy: Programming in ANSI C, 7th Edition, Tata McGraw-Hill.

REFERENCE BOOKS:

Vikas Gupta: Computer Concepts & C Programming, Dreamtech Press 2013

R S Bichkar: Programming with C, University Press, 2012.

Perter Norton: Introduction to Computers, by Peter Norton 7th edition.

https://www.geeksforgeeks.org/

Jacqueline Jones and Keith Harrow: Problem Solving with C, 1st Edition, Person 2011.

6. Behrouz A. Forouzan, Richard F. Gilberg: Computer Science - A Structured Approach Using C 3rd Edition, Cengage Learning, 2007.

CO1	Describe the basic components of a computer, analyze simple problems, and develop algorithms to solve them.
CO2	Design problem solution with programs using the concepts of

	conditional and branching statements.
CO3	Apply the concepts of arrays store, access, and manipulate data efficiently in C programs
CO4	Implement modular solutions to programming problems by defining and invoking user-defined and built-in functions.
CO5	Implement programs by using derived data types and file operations.

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

5. SHARNBASVA UNIVERSITY, KALABURAGI

Outcome Based Education (OBE) and Choice Based Credit System (CBCS) B.Tech. in Mechanical Engineering - 2022-Scheme

1st Year (I/IISemester) w.e.f 2022-23

COMPUTER AIDED ENGINEERING DRAWING (COMMON TO ALL)						
Course Code	**22CED13/23**				**CIE Marks**	**50**
Number Lecture Hour/Week	**L**	**T**	**P**	**TOTAL**	**SEE Marks**	**50**
	1	**0**	**4**	**05**		
Number of Lecture Hours	**40**				**Exam Hours**	**03**
Credits-03						

Course Objectives: This course will enable students to
• Students will be able to understand the basic principles and conventions of engineering drawing to analyze and draw the projections of points & lines
• Students will be able to analyze and draw the orthographic projection of planes
• Students will be able to understand the projection concepts in solids and apply concepts in the area design
• Students will be able to visualize the components isometric projection.
• Identify the interdisciplinary engineering components or systems through its graphical representati

MODULE NO.	**TOPICS**	**TEACHING HOURS**	**R LEV**

1	**Introduction:** Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves. **Orthographic Projections of Points and Lines:** Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).	**10**	**L1, L2**
2	**Orthographic Projections of Planes:** Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular lamina.	**09**	**L1, L2**
3	**Orthographic Projection of Solids:** Orthographic projection of right regular solids (**Solids Resting on HP** **only**): Prisms & Pyramids (Square, pentagon, hexagon), Cylinders, Cones, Cubes &Tetrahedron.	**09**	**L1, L2**
4	**Isometric Projections:**	**06**	**L1, L2**
	Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. Isometric projection of combination of two simple solids.		
5	**Multidisciplinary Applications & Practice *(For CIE Only):*** **Free hand Sketching;** True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart &Four-wheeler carts to dimensions etc **Electric Wiring and lighting diagrams;** Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software **Basic Building Drawing;** Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges, trusses using Auto CAD or suitable software, **Electronics Engineering Drawings**- Like, Simple Electronics Circuit Drawings, practice on layers concept. **Graphs & Charts**: Like Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software.	**06**	**L1, L2, L3**

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

CO.1	Students will be able to understand the basic principles and conventions of engineering drawing to analyze and draw the projections of points & lines
CO.2	Students will be able to analyze and draw the orthographic projection of planes
CO.3	Students will be able to understand the projection concepts in solids and apply concepts in the area design

CO.4	Students will be able to visualize the components by isometric projection.
CO.5	Identify the interdisciplinary engineering components or systems through its graphical representatio

Mapping of course outcomes with program outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12	PS01	PSO 2	PSO 3
CO.1	3	2	-	-	3	1	-	1	1	3	-	3	1	1	-
CO.2	3	2	-	-	3	1		1	1	3	-	3	1	2	-
CO.3	3	3	-	-	3	1	1	-	1	3	-	3	1	1	-
CO.4	3	2	-	-	3	-	-	-	1	3	-	3	1	1	-
CO.5	3	2	-	-	3	-		-	1	3	-	3	2	1	1

QUESTION PAPER PATTERN:

1.SEE shall be conducted and evaluated for maximum marks 100. Marks obtained shall be accounted for SEE final marks,

reducing it by 50%

2.Question paper shall be set by Examiners and made available for each batch asper schedule.

Questions are to be set preferably from Text Books.

1.Evaluation shall be carried jointly by both the examiners.

2.Scheme of Evaluation: To be defined by the examiners jointly and the same shall be submitted to the univer along with question paper.

3.One full question shall be set from each of the Module from Modules 1,2,3 and 4 as per the below tabled weightage details

Question paper Pattern

Q. No.	From Modules	Marks allotted
1.	Module 1 or 2	30
2.	Module 3	40
3.	Module 4	30

Scheme of Evaluation

Q. No.	Solutions & Sketching on sketch book	Computer display and Printout	Total Marks
1	10 Marks	20 Marks	30
2	15 Marks	25 Marks	40
3	15 Marks	15 Marks	30
Total	40 Marks	60 Marks	100

TEXT BOOKS:

1. *S.N. Lal, & T Madhusudhan*:, Engineering Visualization, 1st Edition, Cengage, Publication
2. *Parthasarathy N. S., Vela Murali*, Engineering Drawing, Oxford University Press,2015.

- REFERENCE BOOKS:

1. *Bhattacharya S. K.*, Electrical Engineering Drawing, New Age International publishers, second edition 1998,reprint2005.
2. *Chris Schroder*, Printed Circuit Board Design using AutoCAD, Newnes,1997.
3. *K S Sai Ram* Design of steel structures, , Third Edition by Pearson
4. *Nainan p kurian* Design of foundation systems, Narosa publications
5. *A S Pabla*, Electrical power distribution, 6th edition, Tata Mcgrawhill
6. *Bhatt, N.D.*, *Engineering Drawing: Plane and Solid Geometry*, 53rd edition, Charotar Publishing House Pvt.Limited, 2019
7. *K. R. Gopalakrishna, & Sudhir Gopalakrishna*: Textbook Of Computer Aided Engineering Drawing,39thEdition, Subash Stores, Bangalore,2017

➢ E-RESOURCES:

1. https://vtu.ac.in/wp-content/uploads/2019/12/COMPUTER-AIDED ENGINEERING- DRAWING-updated on-30.10.2017-syla.pdf
2. https://vtu.ac.in/en/study-material/

Course Title:	**INTRODUCTION TO ELECTRICAL ENGINEERING** [As per NEP 2020, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scheme]		
Course Code:	**22ESC142/242**	**CIE Marks:**	50
Semester:	**1-2**	**SEE Marks:**	50
Course Type (Theory/Practical/Integrated):	Theory	**Total Marks:**	100
Teaching Ho	2:0:0:0	**Exam Hours:**	3

urs/ Week (L: T:P :S):			
Total Hours of Pedagogy:	26 hours	**Credits :**	2

Course Objectives: This Course will enable the students to:

1 Understand the basics of different types of power generating schemes.
2. Understand the analysis of DC circuits.
3 Understand the analysis of AC circuits.
4 Understand the three phase circuits and also basics of single-phase transformer.
5 Understand the fundamentals of basics of domestic wiring.

Module-1 5 hours L1, L2

POWER GENERATION: Conventional and non-conventional energy resources. Hydel, nuclear, solar and wind power generation (Block diagram approach).

Module-2 5 hours L1, L2,L3

DC CIRCUITS: Ohm's law and its limitations, KCL, KVL, series, parallel, series-parallel circuits, numerical.

Module-3 5 hours L1, L2,L3

AC FUNDAMENTALS:Generation of AC voltage, definition of time period, frequency, phase, phase difference, RMS value, avera value (Excluding proof). Analysis of R, L, C, R-L, R-C, R-L-C series circuits, power factor, active factor, reactive power, apparent power, numerical.

Module-4 6 hours L1, L2,L3

THREE PHASE CIRCUITS: Generation of three phase AC quantity, advantages, star and delta connections, relation between line phase quantities (Excluding proof).
SINGLE PHASE TRANSFORMER: Necessity of transformer, Construction and working principle, types of transformer (core and shell type), EMF equation, numerical on EMF equation..

Module-5 5 hours L1, L2

DOMESTIC WIRING: Service mains, meter board and distribution board, two way and three way control of lamps, Elementary discussion on fuse, Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock. Earthing: Necessity and types o earthing.

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

CO1: Analyze different types of power generating schemes.
CO2:Analyze DC circuits.
CO3: Analyze AC circuits.
CO4: Analyze three phase circuits and also basics of single-phase transformer.
CO5: Analyze the fundamentals of domestic wiring.

Question Paper Pattern:

SEE Assessment:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying 20 marks each.
3. There will be two full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics of the module.
5. Students have to answer any Five Full questions, choosing at least one full question from each module

CIE Assessment:
1. Three tests will be conducted each of 15 marks, average of best of two tests will be considered 2. Session wise Assignment will be 25 Marks. Attendance carry 05 Marks and Library and Seminar will carry 05 Marks. In total th componenet carries 35 Marks all three together.
Text/ Refe renc e Boo ks:
1. B.L. Theraja, A.K.Theraja, “A Textbook of Electrical Technology”, S. Chand publications, 2008. 2.D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010. 3. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009. 4.L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.

COURSE OUTCOME AND PROGRAM OUTCOME MAPPING

Course Name:	INTRODUCTION TO ELECTRICAL ENGINEERING
Course Code:	22ESC142/242

Sl. No.	CO\PO	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
1	CO1	1	2	3	3	2								3	
2	CO2	3	3	3	3	2								3	
3	CO3	3	3	3	3	2								3	
4	CO4	3	3	3	3	2								3	
5	CO5	1	3	3	3	3								3	
	Average	2	3	3	3	2								3	

INTRODUCTION TO ELECTRONICS ENGINEERING [As per NEP, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scheme] SEMESTER-I/II			
Subject Code	22ESC143/243	CIE Marks	50
Number Lecture Hour/Week	2	SEE Marks	50
Course Type Theory/Practical/Integrated	Theory	Exam Hours	03
Number of Lecture Hours	30	Credits	02

CREDITS-02	
Course Objectives: Students will be taught to: • Understand characteristics operation and application of PN- Junction diode and its application. • Understand the operational amplifiers and its applications. • Understand different number systems, working of fundamental building blocks of digital circuits, and design of simple digital circuits. • Understand the basics of embedded system and its application areas. • To understand the principle of transducers, sensors and actuators and their interfacing. Basic principle of communication system and analysis of basic modulation techniques.	
Modules	**Teaching Hours**
Module -1	
P-N junction diode: Characteristics and Parameters, Diode approximations. **Diode Applications:**Half-wave rectifier, Full-wave rectifiers.	**06 Hours**
Module -2	
Operational Amplifiers - Ideal op-amp; characteristics of ideal and practical op-amp; Practical opamp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator.	**06 Hours**
Module -3	
Number base conversions: Binary to Decimal, Decimal to Binary, Binary to Octal, Octal to Binary, Binary to Hexadecimal, Hexadecimal to Binary, Decimal to Octal, Octal to Decimal, Decimal to Hexadecimal, Hexadecimal to Decimal, Octal to Hexadecimal, Hexadecimal to Octal. Complement of Binary Numbers, Binary addition, Binary subtraction. Boolean Algebra Theorems, De Morgan's theorem,. **Logic gates: Basic and Universal gates. Algebraic Simplification andImplementationofDigitalcircuitsusingBasic gates, Half adder and Full adderImplementations.**	**06 Hours**
Module -4	
Embedded Systems – Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an EmbeddedSystem, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC.	**06 Hours**
Module-5	
Sensors and Interfacing –Transducers, Sensors, Actuators, LED, 7-Segment LED Display (Only working principle and types). **Communication Systems:** Introduction, Block diagram of communication system, Modulation, Need for Modulation, Demodulation, Different types of modulation (Only Definitions), Advantages of digital communication over analog communication.	**06 Hours**
Course Outcomes: After studying this course, students will be able to: CO1: Explain and analyze the application of diode in rectifier circuits. CO2: Explain and analyze the application of Operational Amplifiers. CO3: Understand number system conversions and design basic digital circuits using logic gates. CO4: Understand the basics of embedded system and identify the difference between microprocessor and microcontroller. CO5: Develop the knowledge of sensor, actuators and communication systems. **CO-PO Mapping Table:**	

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

Text Book:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition,2008.
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-8.
3. Introduction to embedded systems, K. V. Shibu, TMH education Pvt. Ltd.,2009
4.George Kenedy, Bernard Davis " Electronics and Communication System",3rd edition.

Web links and Video Lectures (e-Resources):

1. https://nptel.ac.in/courses/122106025
2. https://nptel.ac.in/courses/108105132
3. https://nptel.ac.in/courses/108105064
4. https://www.electronics-tutorials.ws/io/io_1.html
5. https://theinstrumentguru.com/7-segment-led-display/

INTRODUCTION TO CIVIL ENGINEERING

B.Tech, I Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code: 22ESC141/241	CIE Marks: 50
Number Lecture Hour/Week:2	SEE Marks: 50
Course Type Theory/Practical/Integrated: Theory	Exam Hours: 03
Number of Lecture Hours: 30	Credits: 02

CREDITS – 02

Course Learning Objectives:

The objectives of this course are:

- To make students to learn scope of various fields of civil engineering. Basics of Civil engineering concepts and importance of infrastructural development.
- To learn about Components and classifications of roads, bridges and dams.
- To study the uses, sources, classifications and manufacture of various Building materials.
- Students are able to understand the components of building with their function.
- To make students to learn Surveying, types and tools of surveying.

MODULES	Teaching Hours/RBT level
Module -1	
Introduction to civil engineering: Introduction to Civil Engineering. Scope for	**06 Hours**

different fields of Civil Engineering- Surveying, Building Materials, Construction Technology, Geo technical Engineering, Structural Engineering, Hydraulics, Water Resource Engineering and Irrigation Engineering, Transportation Engineering and Environmental Engineering. **Infrastructure-**Types of Infrastructure, Role of civil engineering in infrastructural development, Effect of Infrastructural facilities on socio economic development of country.	**LI, L2**
Module -2	
Roads: Types, Classification of roads and their functions, components and comparison between flexible and rigid pavements (Advantages and Limitations). **Bridges**: Components of bridges, Purpose of providing bridges and Classification of bridges with simple sketches. **Dams:** Classification of dams based on material, Structural behavior and functionality with simple sketches.	**06 Hours** **L1, L2**
Module -3	
Building Materials: Stones –Classification, sources, uses of stones. Building Blocks- Composition of good brick earth, manufacturing of Bricks, Classification of bricks, Cement-Types of cement, Flow chart for manufacture of cement by wet process and dry process, chemical composition of cement, uses of cement, Aggregate-Fine aggregate (Natural sand, M sand and Slag sand), Coarse aggregate (Natural & Artificial), Lime-Classification binding materials, sources, components, uses of lime.	**06 Hours** **L1, L2**
Module -4	
Building components and structures: Foundations: Types, requirements of good foundations. **Super structure**: brick masonry, stone masonry, beams, columns, lintels, roofing, flooring, plastering.	**06 Hours** **L1, L2**
Module-5	
Surveying: Introduction to surveying, Application of surveying and classification of surveying and chain surveying, compass surveying and leveling, modern tools of surveying.	**06 Hours** **L1, L2**

Course outcomes:

After a successful completion of the course, the student will be able to:

CO1: Mention the applications of various fields of Civil Engineering.

CO2: To study the Classification, Functions and components of Roads, Bridges and Dams.

CO3: To study the Classification, uses, sources and manufacture of building materials.

CO4: To study about the building components and structures.

CO5: To study the Classification of surveying and modern tools of surveying.

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	3	1									
CO2	3	2	2		1							1
CO3	3	3	2		2							1
CO4	3	2	2		1							1
CO5	3	2	2		1							1

Question Paper Pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduce to 60.
- The question paper will have ten full questions carrying equal marks.

- Each full question carries 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

CIE+ Assignments: 15+35=50 Marks
There will be 3 CIE's, the average of best of 2 CIE's will be considered and submission of assignment books carries 35 marks.

Text Books:

1. Kolhapure B K.,Elements of civil engineering and Engineering Mechanics,2014,EBPB
2. A Textbook on Elements of Civil Engineering and Mechanics" by S S Bhavikatti.
3. Dr.B.C.Punmia , Surveying Volume-I & II, Laxmi publications.
4. S.K.Duggal , Building Materials,2017.
5. S.C.Rangwala, Building construction, Charotar Publishing house,2005.

Reference books:

1. Bansal R.K., Rakesh Ranjan Beohar and Ahmed Ali khan , Basic civil engineering and engineering mechanics , 2015, Laxmi publications.
2. Dr.K.R.Arora , Surveying Volume-I, Standard book house.
3. S.P.Arora ,S.P.Bindra , Building construction,2014,Dhanpat rai publications.

6. SHARNBASVAUNIVERSITY,KALABURAGI

OutcomeBasedEducation(OBE)andChoiceBasedCreditSystem(
CBCS) B.Tech. in Mechanical Engineering - 2022-Scheme
1stYear(I/IISemester)w.e.f2022-23

INTRODUCTIONTOMECHANICALENGINEERING						
CourseCode	**22ESC144/244**				**CIE Marks**	**50**
NumberLectureHour/Week	**L**	**T**	**P**	**TOTAL**	**SEEMarks**	**50**
	2	**0**	**0**	**2**		
Number of Lecture Hours	**30**				**Exam Hours**	**03**
Credits-02						

Course Objectives: This course will enable students

- To develop basic Knowledge on Mechanical Engineering Fundamentals of Energy Sources.
- To understand the concept of different types of Machine tool operations and Modern.
- To understand the Manufacturing Processes like Machine tool operations, CNC&3D printing.
- To know the concept of I Cengines and Future Mobility vehicles.
- TogiveexposureinthefieldofEngineeringMaterialsandManufacturingProcessesTechnology

MODULE NO.	TOPICS	TEACHING HOURS	RB LEV

1	**MODULE-1** Role of Mechanical Engineering in Industries and Society – Emerging Trendsand Technologies in different sectors Introduction and applications of Energy sources. Solar Power: solar photovoltaic principle. Wind Power: principle of operation of a typical wind mill. Hydro Power: Principles of electric power generation from hydro power plants, nuclear power :Principles of electric power generation from nuclear power plants. Limitations of fossil fuels.	**06**	**L1, L2**
2	**MODULE-2** **Introduction to IC Engines:** Components and Classification of IC Engines, Working Principles, 4-Strokes Petrol and Diesel Engines, petrol and diesel engines differences, application of IC Engines. **ElectricandHybridVehicles:** ComponentsofElectricandHybrid Vehicles.Advantagesanddisadvantages ofEVsandHybrid vehicles.	**06**	**L1, L2**

3	**MODULE-3** **Machine Tool Operations :** Working Principle of lathe,Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine ,drilling operations: drilling, boring, reaming. Working of Milling Machine, Milling operations: plane 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 CNC, advantages and applications of CNC, 3D printing.	**06**	**L1, L2**
4	**MODULE-4** **Basics of refrigeration and air conditioning.** Definitions and working principle of vapor compression refrigeration, vapor absorption refrigeration systems and air conditioning, properties of good refrigerant. **Gas Turbines:** Classification of gas turbine, working principles (Open cycle and closed cycle gas turbines).Water turbines: Classification of water turbine and their working principles.	**06**	**L1, L2**
5	**MODULE-5** **Engineering Materials:** Types and applications of Ferrous & Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer. Shape Memory Alloys. **Metal Joining Processes:** Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.	**06**	**L1, L2**

COURSE OUT COMES: At theend of the course the student will be able to:

CO.1	ExplaintheconceptsofemergingtrendsandroleofMechanicalEngineeringandEnergy sources.
CO.2	Describe the Internal combustion engines and Electric & Hybrid vehicles.
CO.3	Explain the machine tools operations and advanced manufacturing systems.
CO.4	Explain there frigeration and air conditioning and gas turbines working principles.
CO.5	Explain the Properties of Common Engineering Materials and various Metal Joining Processes.

Mappingofcourseoutcomeswithprogramoutcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS01	PSO 2	PSO 3
CO.1	3	-	-	-	-	-	-	-	-	-	-	-		-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-		-	-
CO.3	3	-	-	-	-	-	-	-	-	-	-	-		-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-		-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-		-	-

QUESTIONPAPER PATTERN:

- Thequestionpaperwillhavetenquestions.
- EachfullQuestionconsistingof20marks
- Therewillbe2fullquestions (withamaximumoffoursubquestions)fromeachmodule.
- Eachfullquestionwillhavesubquestionscoveringallthetopicsunderamodule.
- Thestudentswillhave toanswer5fullquestions,selectingonefullquestionfrom each module.

TEXTBOOKS:

1. Elementsof MechanicalEngineering,KRGopalaKrishna,SubhashPublications,2008
2. AnIntroductiontoMechanicalEngineering,JonathanWickertandKemperLewis,Third Edition, 2012

REFERENCEBOOKS:

1. ElementsofWorkshop Technology(Vol.1and2),HazraChoudharyandNirzarRoy,Media PromotersandPublishersPvt.Ltd.,2010.
2. ManufacturingTechnology-Foundry,FormingandWelding,P.N.RaoTataMcGrawHill3rd Ed., 2003.
3. InternalCombustionEngines,V.Ganesan,TataMcGrawHillEducation;4thedition,2017
4. Robotics, AppuKuttanKKK.InternationalPvtLtd,volume1

E-RESOURCES:

1. NPTELvideos andnotes.https://onlinecourses.nptel.ac.in/noc18_ge09/preview
2. E-bookURL:https://www.pdfdrive.com/renewable-energy-sources-and-their-applications-e334235

Introduction to Computer Science & Engineering
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022 -2023)
SEMESTER – I

Subject Code	22ESC146	CIE Marks	50
Number of Lecture Hours/Week(L:T:P)	2:0:0	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	03
CREDITS – 02			

Course Objectives: This course will enable students to

- To understand Concepts of Computers
- To acquire the knowledge of software concepts.
- To understand basic concepts of Computer network.
- To understand the concepts of Data structure and database management system.
- Learn emerging Technologies.

Module I	Teaching Hours	
Introduction to Computers and Technology: Functions of a computer, Computer Hardware, **Memory and Processors**: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture. **Number system** – decimal, binary, octal and hexadecimal number, interconversion of decimal to binary and vice-versa. Sign and Magnitude representation, ones and Two's Complement representation, ASCII codes.	6	
Module II		
Software Concepts: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware, acquiring computer software, Types of programming languages, assembler, compiler, interpreter, linker, loader (Definitions only), **Operating Systems**: Types (real Time, Single User / Single Tasking, Single user / Multi tasking, Multi user / Multi tasking, GUI based OS. Overview of desktop operating systems, Windows and LINUX.	6	
Module III		
Computer Networks and Introduction to Internet: Definition of computer network, Types: LAN, MAN and WAN **Network Topologies**: Star, Ring, Hybrid Network, Wireless Networks, concept of a client and server, Different Search Tools, Web Browsers, Definition, Uses of Internet Basic Services: Electronic mail, File Transfer Protocol, Telnet.	6	

ats and prevention: Viruses, Worms, Trojan horse, Spam, Cookies, Adware, vall, http vs https. **Network Security Concepts:** Firewall, Cookies, Hackers and kers Antivirus and their workings		
ule IV		

duction to Data Structures: Definition and applications of Stacks, Queues & ed Lists. **Database Concepts**: Introduction to database concepts, difference een database and file system, Characteristics of database approach, data models, ase system architecture and data independence. relational data l: concept of domain, tuple, relation, keys - candidate key, primary key, alternate oreign key	6	
ule V		
ent Trends and Technologies: Introduction to Parallel Computing, Mobile puting, Quantum computing, E-Technologies (E-Commerce, Electronic Payment m, Electronic data interchange) ,Immersive Experiences, Big data s characteristics, Internet of Things (IoT), Sensors, Smart cities, Cloud Computing loud Services (SaaS, IaaS, PaaS); Grid Computing.	6	
tion paper pattern: uestion paper will have ten questions. There e 2 questions from each module. question will have questions covering all the topics under a module. tudents will have to answer 5 full questions, selecting one full question from each module.		
ence Books: amentals of Computers By V. Rajaraman puters and Common Sense By R. Hunt and Shelly Y. puter Fundamentals (5Th Edition) By P. K. Sinha Gupta: Computer Concepts & C Programming, Dreamtech Press 2013.		

Course outcomes:

1.Interpret the basic concepts of computer systems and number system.
2. Classify software types and their computing functions.
3. Recognize threats and apply network security measures.
4.Apply the knowledge of data structures and DBMS to solve real world problems efficiently.
5.Explore the concepts of current trends and technologies in computer science.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	1	-	-	-	-	-	-	3	3	-
CO2	3	2	-	-	-	1	-	-	-	-	-	-	2	3	-
CO3	3	-	-	-	2	2	-	-	-	-	-	-	1	3	-
CO4	-	-	-	-	-	1	-	-	-	-	-	-	1	3	-
CO5	2	-	-	-	-	1	-	-	-	-	-	3	1	3	-
AVG	2.75	2.33	3	-	-	1.2	-	-	-	-	-	3	1.6	3	-

INTRODUCTION TO IOT

[As per Choice Based Credit System (CBCS) Scheme]

SEMESTER-I

Subject Code	22ETC15A	CIE Marks	50
Number of Lecture Hours/Week	3	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03

CREDITS-03

Course Objectives The objectives of the course are to enable students to:

1. Understand the basic components of IoT
2. Understand the sensor's characteristics.
3. Identify the differences between the sensor transducer and the smart sensor.
4. Understand different communication technologies
5. Understand Arduino programming and IoT applications.

Module -1	**Teaching Hours**
NTRODUCTION TO IoT What is IoT? Origin of terminology, Characteristics, IoT market share, Evolution of connected devices, Connectivity layers, Baseline technologies, Modern-day IoT applications components, Functional components of IoT, IoT categories, IoT Gateways, Key technologies for IoT, IoT challenges	8 Hours
Module -2	
SENSORS Transducers, Sensor vs Transducers, Sensor features, Classification of sensors, Sensors (LDR, RTD, FSR, LVDT, Inductive Sensor (Speed Sensor), sound) working.	8 Hours
Module -3	

SMART SENSORS AND ACTUATORS Introduction to the smart sensor, Smart sensor block diagram, Actuators for tool automation, Types of actuators, Hydraulic, Pneumatic, Electrical, Thermal, Magnetic, Mechanics	8 Hours
Module -4	
CONNECTIVITY TECHNOLOGIES OR COMMUNICATION PROTOCOL Bluetooth, RFID, NFC, Zigbee, Zwave, IEEE 802.15.4,6LOWPAN, ISA100, NFC Interoperability in IoT, what is interoperability? Why interoperability is important in the context of IoT? Types of Interoperability with example, Current challenges in IoT	8 Hours
Module -5	
Introduction to Arduino programming: Features of Arduino, Types of Arduinos, Board details, Arduino IDE, Arduino function libraries with examples, Integration of sensors and actuators with Arduino, Introduction to python programming, Introduction to Raspberry pi, Implementation of IoT with Raspberry pi, Cloud computing, AI in IoT, Case study: applications of IoT in Health care, agriculture.	8 Hours
Course Outcomes: After studying this course, students will be able to: CO-1:Comprahend the basic components of IoT CO-2:Use and operate sensors in the IoT application CO-3Explain and analyze smart sensors and actuators CO-4understand and analyze various communication technologies. CO-5 Use Arduino board and Python application software in IoT applications.	
Text Books: a.i.1. Arshdeep Bhaga and Vijay Madisetti, "Internet of Things – A Hands-on Approach 2014	
Reference Book: 1. Raj Kamal, "Internet of Things- Architecture and Design Principles", McGraw Hill Education. 2. Qusay F. Hassan, Internet of Things A to Z Technologies and Applications, IEEE press, WILEY, ISBN:978-1-111-945674-2.	

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note: 1-Low, 2-Medium, 3-High

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

5

Introduction Artificial Intelligence and Machine Learning

(Effective from the academic year 2022-2023)

SEMESTER – I

Course Code	22ESC147	**CIE Marks**	50
Number of Lecture Hours/Week (L: T:P)	3:0:0	**SEE Marks**	50
Total Number of Lecture Hours	26	**Exam Hours**	3

CREDITS – 02

Course Learning objectives: This course will enable students to:

- Understand the basic ideas and history of Artificial Intelligence (AI).
- Learn what intelligent systems and agents are, and how they work.
- Explore how computers can solve problems using search techniques.
- Get introduced to Machine Learning and how it is used in real life.
- Know the different types of Machine Learning and where they are applied.

Module I: Introduction to Artificial Intelligence	**6 Hours**
Introduction, Brief History, Intelligent Systems, Categorization of Intelligent Systems, Components of AI Program, Foundations of AI, Sub-areas of AI, Applications, Development of AI Languages, Current Trends in AI, Future of AI.	
Module II: Intelligent Agents	**5 Hours**
Rational Agents, Mapping from Sequences to Actions, Properties of Environments, Structure of Intelligent Agents, Types of Agents: Simple Reflex Agents, Goal Based Agents, Utility-Based Agents.	
Module III: Searching Algorithms	**5 Hours**
Uninformed Search Strategies: Breadth-First Search, Uniform Cost Search, Depth-First Search, Analysis of Search Methods, Informed Search Strategies: Heuristic Functions, Best-First Search, Greedy Search, A* Algorithm, Optimal Solution by A* Algorithm.	
7. Module IV: Introduction to Machine Learning	**5 Hours**

What is Machine Learning? How Machine Learning Works, Machine Learning Steps, Life Without Machine Learning, Use of Machine Learning in Daily Life, Types of Machine Learning, Applications of Machine Learning.

Module V: Machine Learning Types	**5 Hours**

Introduction to Supervised, Unsupervised and reinforcement learning with its types, Comparison Between Supervised and Unsupervised Learning, how do you Choose the Right Machine Learning Solution to Use? Most Common Machine Learning Algorithms.

Course Outcomes: After studying this course, students will be able to:

CO1: Describe what Artificial Intelligence is, how it started, and where it is used today.
CO2: Identify different types of intelligent agents and explain how they make decisions.
CO 3: Apply basic search techniques to solve simple problems in AI.
CO 4: Explain how Machine Learning works, list its types, and give examples of its real-world use.

Question paper pattern:

- The question paper will have ten questions.
- There will be 2 questions from each module.
- Each question will have questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI, Pearson Education.
2. Artificial Intelligence – Structures and Strategies for Complex Problem Solving , George F Luger, Addison Wesley, Fifth Edition
3. Machine Learning, Tom Mitchell , McGraw Hill, 1997.

References:

1. https://www.tutorialspoint.com/machine_learning/machine_learning_tutorial.pdf
2. https://www.simplilearn.com/tutorials/machine-learning-tutorial/what-is-machine-learning
3. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition
4. Trevor Hastie, Robert Tibshirani, Jerome Friedman, “The Elements of Statistical Learning”, 2nd edition, springer series in statistics.
5. Ethem Alpaydın, “Introduction to machine learning”, second edition, MIT press

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3											
CO2	3	2										
CO3	3	2	2									
CO4	3				2							1

Course Title:	**INTRODUCTION TO ENERGY ENGINEERING**		
Course Code:	**22ESC*** **	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L: T:P: S)	2:2:0:0	Exam Hours	03
Total Hours	40 hours	Credits	03

Course Learning Objectives

To develop basic Knowledge on power generation with Steam and Diesel.

- Comprehend the basic concept of power generation using water and Nuclear fuels.

To know the concept of Solar collectors and wind mills.

- To know the working principles of Tidal power plant and Ocean thermal power plant.
- To acquire a basic understanding of Geothermal Energy Conversion and Biogas gas plant.

Teaching-Learning Process

Chalk and Talk method.

Adopting diverse teaching methods to develop the outcomes through Power Point presentations and Video demonstrations or Simulations.

- Arranging visits to show the live working models other than laboratory topics.

Module-1 (8 hours)

Steam Power Plant: Different Types of Fuels used for steam generation, Boilers, Classification and boiler mountings and accessories. Layout of steam power plant.

Diesel Engine Power Plant: Applications of Diesel Engines in Power field. Method of starting Diesel engines. Auxiliaries like cooling and lubrication system, filters, centrifuges, Oil heaters, intake and exhaust system, Layout of diesel power plant.

Module-2 (8 hours)

Hydro-Electric Plants: Hydrographs, flow duration and mass curves, and numerical. Storage and pondage, pumped storage plants, low, medium and high head plants, Penstock, water hammer, surge tank, gates and valves. General layout of hydel power plants.

Nuclear Power Plant: Principles of release of nuclear energy; Fusion and fission reactions. Nuclear fuels used in the reactors. Elements of the nuclear reactor; moderator, control rod, fuel rods, coolants. Brief description of reactors of the following types-Pressurized water reactor, Boiling water reactor, Sodium graphite reactor, Fast Breeder reactor. Radiation hazards, Shielding, Radioactive waste disposal.

Module-3 (8 hours)

Solar Energy: Solar Extra-terrestrial radiation and radiation at the earth surface, radiation-measuring instruments, working principles of solar flat plate collectors, solar pond and photovoltaic conversion. Applications of solar energy.

Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines, horizontal and vertical axis wind mills.

Module-4 (8 hours)
Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, classification, harnessing tidal energy, limitations. **Ocean Thermal Energy Conversion: Principle of working, Classification, Rankine cycle, problems associated with OTEC.**
Module-5 (8 hours)
Geothermal Energy Conversion: Principle of working, types of geothermal energy conversion with schematic diagram, problems associated with geothermal conversion, scope of geothermal energy. Energy From Bio Mass: Photosynthesis, Biogas production from organic wastes by anaerobic fermentation, classification of bio gas plants, factors affecting bio gas generation.

Course Outcome (Course Skill Set)	
At the end of the course the student will be able to:	
CO1	Explain the concepts of Steam power plant and Diesel power plant.
CO2	Explain the working of Hydroelectric power plant and nuclear power plant.
CO3	Explain the Working Principle of Solar collectors and wind mills.
CO4	Explain the Working Principle of Tidal power plant and Ocean Thermal Energy Conversion.
CO5	Explain the Concepts of Geothermal energy and Biogas plant.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year) Text Books:

1. Power Plant Engineering, P. K. Nag Tata McGraw Hill 2nd edition 2001.
2. Power Plant Engineering, Domakundawar, Dhanpath Rai sons. 2003.

Reference Books:

1. Power Plant Engineering, R. K. Rajput, Laxmi publication, New Delhi.
2. Principles of Energy conversion, A. W. Culp Jr., McGraw Hill. 1996.
3. Non-conventional Energy sources, G D Rai Khanna Publishers.
4. Non-conventional resources, B H Khan TMH – 2007.

INTRODUCTION TO DRONE TECHNOLOGY [As per NEP, Outcome based Education (OBE), and Choice Based Credit System (CBCS) Scheme] SEMESTER-I/II			
Course Code	22ETC15B	CIE Marks	50
Number of Lecture Hour/Week	3	SEE Marks	50
Course Type Theory/Practical/Integrated	Theory	Exam Hours	03
Number of Lecture Hours	40	Credits	03
CREDITS-03			

Course Objectives: Students will be taught to: • To make the students to understand the basic concepts of UAV drone systems. • To introduce Design of UAV drone system. • To introduce the stability and control of an aircraft. • To introduce UAV drone integration/ installation/ configuration.	
Module -1	**Teaching Hours**
Introduction to Drones: Introduction to Unmanned Aircraft Systems, History of UAV drones, classification of drones, System Composition, applications.	08 Hours
Module -2	
Design of UAV Drone Systems: Introduction to Design and Selection of the System, Aerodynamics and Airframe Configurations, Characteristics of Aircraft Types, Design Standards and Regulatory Aspects-India Specific, Design for Stealth.	08 Hours
Module -3	
Avionics Hardware of Drones: Autopilot, AGL-pressure sensors servos-accelerometer – gyros-actuators- power supply-processor, integration, installation, configuration.	08 Hours
Module -4	
Communication, Payload and Control Dispensable and Non-Dispensable payloads – Control of HTOL, VTOL, Control of Payloads and Sensors - Communication media, Radio communication.	08 Hours
Module -5	
Navigation and Testing: Waypoints navigation, ground control software, System Ground Testing, System In-flight Testing, Future Prospects and Challenges.	08 Hours
Course Outcomes: After studying this course, students will be able to: **CO1**: Design UAV drone system **CO2:** Understand and analyze working of different types of engines and its area of applications. **CO3:** Integrate, install and configure the UAV **CO4:** Realize static and dynamic stability dynamic instability and control concepts **CO5:** Develop the knowledge of ground control software, ground testing, in-flight testing of drone .	
Text Books: 1. Reg Austin "Unmanned Aircraft Systems UAV design, development and deployment", Wiley, 2010. 2. Robert C. Nelson, Flight Stability and Automatic Control, McGraw-Hill, Inc, 1998. 3. Kimon P. Valavanis, "Advances in Unmanned Aerial Vehicles: State of the Art and the Road to Autonomy", Springer, 2007 4. Paul G Fahlstrom, Thomas J Gleason, "Introduction to UAV Systems", UAV Systems, Inc, 1998 5. Dr. Armand J. Chaput, "Design of Unmanned Air Vehicle Systems", Lockheed Martin Aeronautics.	

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note: 1-Low, 2-Medium, 3-High

CO /PO	PO .1	PO .2	PO .3	PO .4	PO .5	PO .6	PO .7	PO .8	PO .9	PO .10	PO .11	PO .12	PSO .1	PSO .2	PSO .3
CO 1	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 3	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 4	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 5	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-

SEMESTER-I/II			
Subject Code	22ETC15C	CIE Marks	50
Number Lecture Hour/Week	3	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
CREDITS-03			

Course Objectives: Students will be taught to:

- Understand the fundamentals and types of signals.
- Understand digital communication and its significance.
- Definition and types of modulation
- Introduction to Bandwidth Utilization, Multiple Access and types
- Introduction to Wireless Communication and Wireless Networks.

Modules	**Teaching Hours**
Module : 01	
Basics of Communication. What is signal and its classification. Definition of communication and its classification. Modes of Communication, comparison of analog and digital communication. Basic block diagram of communication system model.	**08 Hours**
Module : 02	
Pulse Code Modulation. Block of Digital Communication System its need and significance. Limitation of Digital Communication system, PCM block diagram. Bandwidth Utilization - Multiplexing & Spreading. Multiplexing – FDM, WDM, Synchronous TDM, Statistical TDM. Spectrum – FHSS and DSSS.	**08 Hours**
Module : 03	
Modulation Schemes: Definition of Modulation, types of modulation and need for modulation. **Analog Modulation: Amplitude, Frequency and Phase.** **Digital Modulation: Various Digital data formats, ASK, FSK, PSK, BPSK.**	**08 Hours**
Module : 04	
Multiple Access: Random Access – ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled Access, Channelization- FDMA, TDMA, CDMA.	**08 Hours**
Module : 05	
Fundamental of Wireless Communication : Wireless Communication System – Limitations, Technologies in digital wireless communication. Types of wireless communication systems. Basics of Wireless Networks : Introduction to Wireless Network, Architecture(WBAN & WPAN) and classification. Wireless Switching Technologies.	**08 Hours**

Course Outcomes: After studying this course, students will be able to:
CO1: Develop the knowledge of signals, basic communication system and its classification.
CO2: Explain and analyze the basic Converter of Signals and Pulse Code Modulation.
CO3: Understand the principles of digital communication and analyze various modulation techniques.
CO4: Understand and analyze the bandwidth utilization, Multiple Access and its Types.

CO5: Develop the basic knowledge of Wireless Communication system and Networking.

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

Text Book:

1. Simon Haykin, "An Introduction to Analog and Digital Communications" Wiley India Edition, 2011 ISBN 978-81-265-0932-4.
2. Simon Haykin, "Signal &Systems",Barry Van Veen and Simon S. Haykin. 2nd Edition Wiley India Edition, ISBN 0-471-16474-7.
3. Behrouz A Forouzan, "Data Communication and Networking" 4th Edition, McGraw Hill Education.
4. S S Mani & M S Kakasageri, "Wireless and Mobile Networks" Wiley India Edition, 2013 ISBN 978-81-265-2069-5.

Web links and Video Lectures (e-Resources):

1. https://studocu.com/in/n/17940216?sid=01670740220

INTRODUCTION TO VLSI TECHNOLOGY [As per Choice Based Credit System (CBCS) Scheme] SEMESTER-I			
Subject Code	22ETC15D	CIE Marks	50

Number of Lecture Hours/Week	3	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03

CREDITS-03

Course Overview: This is an introductory course which covers basic theories and techniques of digital VLSI design in CMOS technology. In this course, we will study the fundamental concepts and structures of designing digital VLSI systems include CMOS devices and circuits, standard CMOS fabrication processes, CMOS design rules.

Course Objectives The objectives of the course are to enable students to:

• To learn the MOS Process Technology.

• To have an exposure to the design rules to be followed.

Module -1 Introduction to VLSI	**Teaching Hours**
Introduction, History, Level of Integration, Transistors, FETs and MOFFETs, Types of MOSFETs, Enhancement mode and Depletion mode.	8 Hours
Module -2 Fabrication Process	
Basic materials- insulator, conductor and semiconductor, types of semiconductors, Primary Chip Ingredients, Fabrication process sequence: Silicon manufacture, Wafer processing, Lithography, Oxide growth and removal, Diffusion and ion implantation, Annealing, Silicon deposition, Metallization, Testing, Assembly and packaging.	8 Hours
Module -3 Gate level Design	
CMOS logic gates: CMOS inverter, CMOS NAND gate, CMOS NOR gate, Complex gates in CMOS logic, OAI Logic Function (OR) Design of XNOR gate using CMOS logic. Switch Logic, Pass Transistors.	8 Hours
Module -4	
VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Layout Diagrams for NMOS and CMOS Inverters and Gates	8 Hours
Module -5 Introduction to ASICs	
Introduction to ASICs Types of ASICs, Standard Cell Array, Gate Arrays, Programmable Array Logic- PLAs, CPLDs, FPGAs, Design flow entry.	8 Hours
Course outcomes: After studying this course, students will be able to CO-1: Understand and analyze MOSFET characteristics in detail. CO-2: Understand and analyze VLSI fabrication process in depth. CO-3: Understand and analyze different VLSI design logics like nMOS, pMOS, CMOS, switch & pass transistors. CO-4: Develop the knowledge of stick diagram, design rules & layouts of different combinational logic circuits. CO-5: Explain and analyze the basics of different types of ASIC's	

Text Books:

1. Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, "Essentials of VLSI circuits and systems", PHI, 2005 Edition.
2. Weste and Eshraghian, "Principles of CMOS VLSI Design", Pearson Education, 1999.

Reference Books:

1. John P. Uyemura, "Chip Design for Submicron VLSI: CMOS Layout & Simulation", Thomson Learning.
2. John .P. Uyemura, JohnW iley, "Introduction to VLSI Circuits and Systems", 2003.

3. John M. Rabaey, “Digital Integrated Circuits” PHI, EEE, 1997.
4. Wayne Wolf, “Modern VLSI Design” Pearson Education.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note: 1-Low, 2-Medium, 3-High

CO	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PO.*	*PS*	*PS*	*PS*
CO	*3*		*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*3*	*-*	*-*
CO	*3*	*2*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*3*	*-*	*-*
CO	*3*	*3*		*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*3*	*-*	*-*
CO	*3*	*3*	*3*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*3*	*-*	*-*
CO	*3*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*3*	*-*	*-*

Introduction to Cyber Security [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2022-2023) SEMESTER – I			
Subject Code	**22ETC15E**	**CIE Marks**	50
Number of Lecture Hours/Week(L:T:P)	3:0:0	**SEE Marks**	50
Total Number of Lecture Hours	40	**Exam Hours**	03
CREDITS – 03			

Course Objectives:

- To familiarize cybercrime terminologies and perspectives
- To understand Cyber Offenses and Botnets
- To gain knowledge on tools and methods used in cybercrimes
- To understand phishing and computer forensics

Module I	**Teaching Hours**
Introduction to Security Systems: :Definition of Security,Four Components of an effective security system, Basic terminologies,types of security:physical security v/s cyber security,Cyber crime:Definition and orgin of words,types of crimes, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes,An Indian Perspective, Hacking and Indian Laws., Global Perspectives **RBT: L1, L2, L3.**	08 Hours
Module II	
Cyber Offenses: **How Criminals Plan Them:** Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercaafe & cybercrimes.**Botnets:** The fuel for cybercrime, Attack Vector. **RBT: L1, L2, L3**	08 Hours
Module III	
Tools and Methods used in Cybercrime: Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spyways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attackes, Attacks on Wireless networks **RBT: L1, L2, L3.**	08 Hours
Module IV	
Phishing and Identity Theft: Introduction, methods of phishing, phishing,phising techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft	08 Hours

RBT: L1, L2, L3.	
Module V	
Understnading Computer Forensics: Introdcution, Historical Background of Cyberforensics, Digital Foresics Science, Need for Computer Foresics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics. **RBT: L1, L2, L3.**	08 Hours

Course Outcome (Course Skill Set)

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

CO1	Define security types and classify cybercrimes with legal context.
CO2	Describe cyber offense planning and identify common attack methods.
CO3	Illustrate Tools and Methods used in cybercrime
CO4	Analyze phishing methods and identity theft mechanisms
CO5	Describe cyber forensic processes and apply evidence handling methods.

Question paper pattern:

- The question paper will have ten questions.
- There will be 2 questions from each module.
- Each question will have questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018)

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=yC_hFm0BX28&list=PLxApjaSnQGi6Jm7Lxu
- https://www.youtube.com/watch?v=nzZkKoREEGo&list=PL9ooVrP1hQOGPt4
- https://www.youtube.com/watch?v=6wi5DI6du4&list=PL_uaeekrhGzJlB8XQk
- https://www.youtube.com/watch?v=KqSqyKwVuA8

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**2**	**-**	**2**	**-**	**1**	**2**	**-**	**3**	**-**	**-**	**-**	**2**	**1**	**1**	**1**
CO2	**3**	**2**	**2**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**2**	**1**
CO3	**2**		**3**	1	**3**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**2**	**1**
CO4	**1**	**1**	**3**	**-**	**2**	**2**	**-**	2	**-**	**-**	**-**	1	**1**	**2**	**1**
CO5	**1**	**1**	**2**	1	**2**	**2**	-	2	**-**	**-**	**-**	2	**1**	**2**	**1**

AVG	**2**	**1.33**	**2.4**	**1**	**1.8**	**2**		**1.8**				**1.4**	**1**	**1.8**	**1**

Introduction to Blockchain Technology and Digital Currency **[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2022-2023) SEMESTER –I/II**			
Subject Code	22ETC15F	**CIE Marks**	50
Number of Lecture Hours/Week(L:T:P)	3:0:0	**SEE Marks**	50
Total Number of Lecture Hours	40	**Exam Hours**	3
CREDITS – 03			

Course Objectives: This course will enable students

- Define and explain the fundamentals of Blockchain.
- Illustrate the technologies of blockchain.
- Describe the models of blockchain.

Module I	**Teaching Hours**
Introduction: Distributed systems, History of blockchain, Introduction to blockchain, Application of blockchain technology, Tiers of blockchain.	08
Module II	
Blockchain 101: Features of a blockchain, Types of blockchain-bitcoin, Ethereum, CAP theorem and blockchain, Benefits and limitations of blockchain.	08
Module III	
Decentralization:Decentralization using blockchain, Methods of decentralization, routes to decentralization, Smart Contracts.	08
Module IV	
Bitcoin & Alternative Coins: Bitcoin, Bitcoin definition, Transactions, Blockchain,The bitcoin network, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash Text.	08
Module V	

Cryptography: Introduction to cryptography, Confidentiality, Integrity, Authentication, DES, AES, Cryptography hashes SHA-256.	08

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

Text Books:

1.Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1-78712-544-5, 2017

Reference Books:

1. Morris Mano, "Computer System Architecture", PHI, 19862.William Stallings Computer Organization & Architecture, 7th Edition, PHI 2006.
2. Kai Hwang and Naresh Jotwani, Advanced Computer Architecture (SIE): Parallelism, Scalability, Programmability, McGraw Hill Education 3/e. 2015.
3. R D Sudhakar Samuel: IIustrative approach to Logic Design, Sanguine-Pearson, 2010.

Course Outcomes:

CO1 — Understand the fundamentals of distributed systems and blockchain technology.
CO2 — Analyze various blockchain types and evaluate blockchain properties.
CO3 — Apply decentralization concepts and smart contracts in blockchain systems.
CO4 — Understand the structure and functioning of Bitcoin and alternative cryptocurrencies.
CO5 — Understand and apply cryptographic techniques used in blockchain systems.

CO, PO and PSO mapping table

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	2	2	1	2	1	2	1	2	3	2	1
CO2	3	3	3	-	2	2	2	2	-	1	-	2	3	2	1
CO3	3	3	3	-	3	2	2	3	2	2	1	2	3	2	2
CO4	3	3	2	-	3	2	2	2	-	1	1	2	3	2	2
CO5	3	2	2	-	3	2	1	3	-	1	1	2	2	3	2

8. SHARNBASVA UNIVERSITY, KALABURAGI

Outcome Based Education (OBE) and Choice Based Credit System
(CBCS) B.Tech. in Mechanical Engineering - 2022-Scheme
1st Year (I/IISemester) w.e.f 2022-23

RENEWABLE ENERGY SOURCES						
Course Code	**22ETC15H/25H**				**CIE Marks**	**50**
Number Lecture Hour/Week	**L**	**T**	**P**	**TOTAL**	**SEE Marks**	**50**
	3	**0**	**0**	**3**		
Number of Lecture Hours	**40**				**Exam Hours**	**03**
Credits-03						

Course Objectives: This course will enable students
• To understand energy scenario, energy sources and their utilization.
• To explore society's present needs and future energy demands.
• To Study the principles of renewable energy conversion systems.
• To be exposed to energy conservation methods.
• To understand the concept of green energy and principles.

MODULE NO.	TOPICS	
1	**MODULE-1** **Introduction**: Principles of renewable energy; energy and sustainable development, fundamentals and social implications. worldwide renewable energy availability, renewable energy availability in India, brief descriptions on solar energy, wind energy, tidal energy, wave energy, ocean thermal energy, biomass energy, geothermal energy, oil shale. Introduction to Internet of energy (IOE).	**08**
MODULE-2		
2	**Solar Energy:** Fundamentals of Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; solar radiation Measurements- Pyrheliometers, Pyrometer, Sunshine Recorder. Solar Thermal systems: Flat plate collector, solar distillation. **Solar electric power generation**- Principle of Solar cell, Photovoltaic system for electric power generation, solar pond electric power plant, advantages, disadvantages and applications of solar photovoltaic system.	**08**
MODULE-3		

3	**Wind Energy**: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated	**08**
	with wind power, Basic components of wind energy conversion system (WECS); Classification of WECS- Horizontal axis- single, double and multiblade system. Vertical axis - Savonius and darrieus types. **Biomass Energy**: Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome; Urban waste to energy conversion; Biomass gasification of Updraft and Downdraft gasifier.	
MODULE-4		
4	**Tidal Power**: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations. **Ocean Thermal Energy Conversion:** Principle of working, open cycle OTEC power plant and closed cycle OTEC power plant, problems associated with OTEC.	**08**
MODULE-5		
5	**Green Energy**: Introduction, Fuel cells: Classification of fuel cells – H2; Operating principles, Zero energy Concepts. Benefits of hydrogen energy, hydrogen production technologies (electrolysis method only), hydrogen energy storage, applications of hydrogen energy, problems associated with hydrogen energy.	**08**

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

CO.1	Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
CO.2	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation.
CO.3	Describe the conversion principles of wind energy and the biomass energy resources
CO.4	Describe the conversion and operating principles of tidal power and OTEC systems
CO.5	Explain green energy and acquire the basic knowledge of ocean thermal energy conversion.

Mapping of course outcomes with program outcomes

22ETC15H	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS01	PSO 2	PSO 3
CO.1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.4	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.5	-	-	-	-	-	-	-	-	-	-	-	1	-	-

QUESTION PAPER PATTERN:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. Nonconventional Energy sources, G D Rai, Khanna Publication, Fourth Edition,
2.Energy Technology, S. Rao and Dr. B.B. Parulekar, Khanna Publication. 3.Solar energy, Subhas P Sukhatme, Tata McGraw Hill, 2nd Edition,1996.

REFERENCE BOOKS:

1. Principles of Energy conversion, A. W. Culp Jr.,, McGraw Hill, 1996
2. Non-Convention Energy Resources, Shobh Nath Singh, Pearson, 2018

E-RESOURCES:

1.E-book URL: https://www.pdfdrive.com/non-conventional-energy-sources- e10086374.html
2.E-book URL:https://www.pdfdrive.com/non-conventional-energy-systems-nptel- d17376903.html
3.E-book URL: https://www.pdfdrive.com/renewable-energy-sources-and-their- applications- e33423592.html
4.E-book URL: https://www.pdfdrive.com/lecture-notes-on-renewable-energy-sources- e34339149.html
5.https://onlinecourses.nptel.ac.in/noc18_ge09/preview

WASTE MANAGEMENT **B.Tech, I Semester, Civil Engineering** **[As per Choice Based Credit System (CBCS) scheme]**	
Course Code: 22ETC15I/25I	CIE: 50

Number of Lecture hours/Week: 03	SEE: 50
Total Number of Lecture Hours: 42	Exam hours: 03

CREDITS – 03

Course Objectives: This course will enable students to;

1. Understand the basic concepts of waste, types of wastes produced, people's responsibility in waste management.
2. Know the methods of waste collection, role of private and public sector in waste collection.
3. Understand different aspects of solid waste management.
4. Know and understand different hazardous waste produced and its management.
5. Understand recyclable waste materials for engineering applications.

MODULES	Teaching Hours/RBT level
Modules1	
Introduction to Waste Management: Introduction to Terminology of Waste, Problem of Wastes, Types of Waste, People's Responsibility of Waste Management. Overview of waste management in India, Legal Landmarks in the History of Waste management in India.	**08 HRS L1,L2**
Modules2	
Waste collection system and organization: Environmental aspects of waste collection, role of public authority and private sector in waste collection, organizing collection of residential waste, fee schemes, public awareness programs.	**08 HRS L1,L2**
Module 3	
Municipal Solid Waste Management: An Overview Definition of solid waste, monitoring responsibilities, Effects of improper disposal of solid wastes - public health effect, Principles of solid waste management Sources and types of solid waste - sampling and characterization, storage and handling of solid waste.	**08 HRS L1,L2**
Module 4	
Different hazardous wastes management: Hazardous waste definition, sources, identification and classification; Hazardous waste management in developing countries- Collection, handling, storage and transport. Hazardous waste management-	**09 HRS L1,L2**
Module 5	
Recyclable Waste Materials For Engineering Applications : Construction debris, fly ash, gypsum, red mud, blast furnace slag and other materials. Concept of E-waste.	**09HRS L1,L2**

Course outcomes:

After studying this course, students will be able to;

CO1: Understand types of wastes, characterization of wastes, effect of waste, necessity of waste management and legal framework for waste management in India.

CO2: Understand methods of waste collection and necessity of public awareness in waste

collection.
CO3: Understand solid waste collection, storage and management in detail.
CO4: Understand the hazardous wastes produced and how to manage hazardous waste.
CO5: Understand the basic concept of emerging technologies that will help in recycle and managing the waste for engineering applications.

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2					1								
CO2	2	1					1								
CO3	2	2					2								
CO4	2	2					2								
CO5	2	2					3								
Note: 1-Low, 2-Medium, 3-High															

Question Paper Pattern:
1. The question paper will have ten questions.
2. Each full question consists of 10 marks.
3. There will be 2 full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

CIE+ Assignments: 15+35=50 Marks

There will be 3 CIE's, the average of best of 2 CIE's will be considered and submission of assignment books carries 35 marks.

Text Books:

1. Tchobanoglous G., Theisen H., and Vigil S.A , Integrated Solid Waste Management, Engineering Principles and Management Issues,. (2014)., 2nd Ed., McGraw-Hill, USA.
2. John Pichtel , Waste Management Practices: Municipal, Hazardous and Industrial, , CRC Press, 2014, 2nd Edition.
3. John Pichtel ,Waste Management Practices: Municipal, Hazardous and Industrial, CRC Press, 2014, 2nd Edition.

REFERENCE BOOKS:

a.i.1. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, Environmental Engineering, McGraw Hill Education, 2017, 1st Indian Edition.
a.i.2. Tchobanoglous G and Kreith F, Handbook of Solid Waste Management, McGraw-Hill Education, 2002, 2nd Edition.
a.i.3. LaGrega M.D., Buckingham P.L. and Evans J.C., Waveland Pr Inc, Hazardous Waste Management,., 2010, Reissue Edition.
a.i.4. Tchobanoglous G, Theisen H and Vigil SA, Integrated Solid Waste

Management, Engineering Principles and Management Issues, McGraw Hill Education, 2014, Indian Edition.

9. NATURAL HAZARDS & DISASTERS

B.Tech, I Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course code: 22ETC15K/25K	CIE: 50
Number of lecture hours per week: 03	SEE: 50
Total number of lecture hours: 42	Exam hours: 03

CREDITS 03

Course Learning Objectives: This course will enable students to study

1. About the natural hazard, its history and disaster, types and its impact on human.
2. About Earth quick, its history, causes of earth quick and its related hazards.
3. About the history of recent floods, types of floods, its causes and effects.
4. About landslides in India, to understand its types and causes, and to check for the remedial measures.
5. About the effect of Tsunami, its characteristics and its effects on living organisms.

Modules	**Teaching Hours/RBT level**
Module-1	

Introduction to Natural Hazards, History, Natural Hazards and Disasters, Type of Natural Hazards, Human Impact on Natural Disaster.	8HR L1,L2
Module-2	
Earthquake: History, Earthquakes and their causes, Earthquake and related hazard.	8HR L1,L2
Module-3	
Flood: History of recent floods, Definitions of flood, Types of flood, Causes of flood, Effects of flood.	8HR L1,L2
Module-4	
Landslides: Definition, Landslides in INDIA, Types of landslides, Causes of landslides, Effects and Prevention.	9HR L1,L2
Module-5	
Introduction To Tsunami: History, Causes, Characteristics, Tsunami and its effects.	9HR L1,L2

Course outcomes:

After studying this course, students will be able to:

CO1: know about the natural hazard, its history and disaster, types and its impact on human.

CO2: Get the knowledge of Earth quick, its history, causes of earth quick and its related hazards.

CO3: history of recent floods, types of floods, its causes and effects.

CO4: know about landslides in India, to understand its types and causes, and to check for the remedial measures.

CO5: know about the effect of Tsunami, its characteristics and its effects on living organisms.

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	2	1									
CO2	3	1	2									
CO3	3	2	1									
CO4	3	2	2									
CO5	3	2	1									

Question Paper Pattern:

1. The question paper will have ten questions.
2. Each full question consists of 10 marks.
3. There will be 2 full questions (with a maximum of four sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 5 full questions, selecting one full question from each module.

CIE+ Assignments: 15+35=50 Marks

There will be 3 CIE's, the average of best of 2 CIE's will be considered and submission of assignment books carries 35 marks.

Textbooks:

1. N Krishna Raju, “Structural Design and Drawing of Reinforced Concrete and Steel”, University Press
2. Krishna Murthy, “Structural Design and Drawing – Concrete Structures”, CBS Publishers, New Delhi

Reference Books:

1. SP 34: Handbook on Concrete Reinforcement and Detailing, Bureau of Indian Standards.
2. IS 13920, Ductile Design And Detailing Of Reinforced Concrete Structures Subjected To Seismic Forces - Code Of Practice, Bureau of Indian Standard.

WEB PROGRAMMING
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022-2023)
SEMESTER – I/II

Subject Code	22PLC151	CIE Marks	50
Number of Lecture Hours/Week(L:T:P)	3:0:0	SEE Marks	50
Total Number of Lecture Hours	40	Exam Hours	3

CREDITS – 03

Course objectives: This course will enable students to

Understand the fundamental concepts of the internet, its history, applications, and the role of ISPs.

Learn the structure and syntax of HTML and apply it to create basic web pages.

Enhance web pages using HTML for text formatting, images, and tables.

Understand and apply the principles of Cascading Style Sheets (CSS) for styling web content.

Gain hands-on experience in publishing and hosting websites using basic web hosting tools.

Module I: Overview of Internet	Teaching Hours
What is internet and its need, difference between internet and intranet, a brief history, internet applications, Internet Service Providers (ISP). concept of a web browser and web server, differences between web browser and web server. History of HTML, uses of HTML, applications of HTML, World Wide Web.	8 Hours
Module II: Introduction to HTML -1	
HTML Tags: concept of Tag, types of HTML tags, structure of HTML document. Quick tour of HTML elements. **Text formatting through HTML:** Paragraph breaks, line breaks, background and Background color attributes. **Emphasizing material in a web page:** Heading styles, drawing lines, text styles.	8 Hours
Module III: Introduction to HTML -2	
Text styles and other text effects: centring, spacing, controlling font size & colour. **Lists:** Using unordered, ordered, definition lists. **Adding Graphics to HTML Documents:** Using Image tag, attributes of Image tag, changing width & height of image **Handling Tables:** To define header rows & data rows, use of table tag and its attributes.	8 Hours
Module IV: Introduction to Cascading Style Sheets (CSS)	
Use of caption tag Linking Documents: Concept of hyperlink, types of hyperlinks, linking to the beginning of document. **Frames:** Introduction To frames, using frames & frameset tags, named frames how to fix the size of a frame. **Introduction to Cascading Style Sheets (CSS): What is CSS, Syntax of CSS, Sheets:** Definition, Importance, Different Approaches to Style Sheets, Using Multiple Approaches.	8 Hours
Module V: Web publishing and Hosting	
Web Publishing: Creating the Web Site, Saving the site, working on the web site, creating web site structure, Creating Titles for web pages	8 Hours

COURSE OUTCOMES

CO1	Explain the need for the internet, differentiate between internet and intranet, and describe internet applications and services.
CO2	Develop structured HTML documents using basic tags and formatting tools.
CO3	Design web pages using HTML features such as images, tables, and lists.web pages effectively.
CO4	Apply CSS to enhance web page presentation using different styling methods.
CO5	Demonstrate the ability to create, publish, and maintain a basic website using web hosting tools.

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	2	-	-	1	-	-	1	-	-	2	2	2	
CO2	1	-	2	-	-	1	-	1	1	-	-	2	2	2	2
CO3	1	-	2	-	-	1	-	1	1	-	-	2	2	2	2
CO4	1	-	2	-	-	1	-	1	1	-	-	2	2	2	2
CO5	1	-	2	-	-	1	-	1	1	-	-	2	2	2	2
AVG	1.0	-	2.0	-	-	1	-	1	1	-	-	2.0	2.0	2	2

Programming with Java

[As per Choice Based Credit System (CBCS)scheme]
(Effective from the academic year 2022-2023)
SEMESTER – I

Subject Code	**22PLC152**	**CIE Marks**	50
Number of Lecture Hours/Week Week (L: T:P)	3:0:0	**SEE Marks**	50
Total Number of Lecture Hours	**40**	**Exam Hours**	03

CREDITS – 03

Course Objectives: This course will enable students to:

- Study the fundamental features of object oriented programming language.
- Configure the JDK environment to write, test, and execute basic Java programs.
- Understand the concepts of Control statements.
- Implement Classes and Objects.
- Understand the concepts of Exceptions.

Module I: Introduction	08

History of Java, Principles of OOP, Features of Java, Bytecode, Java Environment: JDK Installation, Java Tokens, Data types, Identifiers: Rules for Identifiers, Types of variables, Variable declaration and initialization, Method definition, Classes, Java Program Structure.

Module II: Objects, Arrays, Control Statements	08

Creating Objects, Arrays: Types, Array declaration and initialization; Decision Making Statements: Simple if and if-else statements, Switch statements; Iterative statements.

Module III: Inheritance	08

Definition, Terms used in Inheritance, Why Inheritance? , Types: Single-level, Multi-level, Hierarchical Inheritance; Examples

10. Module IV: Polymorphism	08

Definition, Types, Method Overloading and Overriding; Examples

Module V: Exception Handling	08

Definition and Types of Errors, Definition and Types of Exceptions, Exception handling mechanisms, Use of try and catch; Examples

Question paper pattern:

- The question paper will have ten questions.
- There will be 2 questions from each module.
- Each question will have questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. E Balagurusamy, Programming with JAVA, A Primer, 5th edition
2. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007

Course Outcome:

1	To illustrate basics of JAVA programming
2	To demonstrate working of operators in JAVA
3	To create classes and objects for applications
4	To develop simple programs based on polymorphism and inheritance
5	To describe the concepts of importing packages and exception handling mechanism

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	2	2	-	2	-	-	-	-	-	-	-	3	2	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-	3	3	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	3	2	-
AVG	3	2	2.33	-	2	-	-	-	-		-	-	3	2.33	-

Python Programming

[As per Choice Based Credit System (CBCS)scheme]
(Effective from the academic year 2022-2023)
SEMESTER – I

Subject Code	**22PLC153**	**CIE Marks**	**50**
Number of Lecture Hours/Week Week (L: T:P)	**3:0:0**	**SEE Marks**	**50**
Total Number of Lecture Hours	**40**	**Exam Hours**	**3**

CREDITS – 03

Course Objectives: This course will enable students to:

- Explain the fundamentals of python programming language constructs and their applications.
- Inculcate knowledge of parsing of regular expressions and their usage in various application domains.
- Illustrate the process of structuring the data using lists, tuples, and dictionaries.
- Demonstrate the use of built-in functions to navigate the file system.

Module I: Introduction, Variables, and Data Types	08

History, Features, Installation and Execution, Input and Output, Basic Data Types and Operators, Strings, Compound Data Type, and Programming Examples.

Module II: Control Structures	08
Conditional statements, Looping Statements, Lists, Dictionaries Structuring Data, Manipulating Strings Programming Examples.	
Module III: Functions, Modules, and Packages	08
Functions, Modules, and Packages, Programming Examples	
11. Module IV: Files and Regular Expressions	08
File Input/Output, Text Processing, Pattern Matching, and Regular Expressions, Application: Querying Publication Data, programming examples	
Module V: Django Framework	08
Installing and Running Django, Creating and Running a Web Application, Parameter Passing with GET	

Question paper pattern:

9. The question paper will have ten questions.
10. There will be 2 questions from each module.
11. Each question will have questions covering all the topics under a module.
12. The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

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/)
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) (Download pdf/HTML files from the above links)

References:

1. Python Programming by Rajesh Nasre.
2. Guido van Rossum and the Python development team, Python Tutorial, Python Software Foundation, 2018.
3. Brian Heinold, A Practical Introduction to Python Programming, Creative Commons, 2012
4. w3schools, Python Tutorial, online https://www.w3schools.com/python/default.asp
5. Codes from Geeks For Geeks https://www.geeksforgeeks.org/python-programming-examples/
6. Codes from this book http://www.cse.iitm.ac.in/~rupesh/books/python

SWAYAM/NPTEL/MOOCs:

1. Coursera – Python for everybody, University of Michigan.
2. Coursera – Python Basics, University of Michigan.
3. https://nptel.ac.in/courses/106/106/106106182/
4. https://www.edx.org/learn/python.

CO1	Design and apply fundamental programming concepts using variables, data types, and operators to create structured solutions.
CO2	Investigate and solve problems using control structures, loops, and data collections.
CO3	Develop modular and reusable code through functions and packages.
CO4	Analyze and implement file operations and regular expressions to manage data efficiently.

CO5	Adapt and experiment with Python frameworks to build scalable applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	–	–	–	–	1	–	2	3	2	–
CO2	3	3	2	2	2	–	–	–	1	1	–	2	3	3	2
CO3	3	2	3	2	3	–	–	1	2	2	1	2	3	3	2
CO4	3	3	3	3	3	–	–	1	2	1	1	3	3	3	2
CO5	3	2	3	3	3	1	1	1	2	2	2	3	3	3	3
AVG	3.00	2.40	2.60	2.20	2.60	1.00	1.00	1.00	1.75	1.40	1.33	2.40	3.00	2.80	2.25

CO1	Design and apply fundamental programming concepts using variables, data types, and operators to create structured solutions.
CO2	Investigate and solve problems using control structures, loops, and data collections.
CO3	Develop modular and reusable code through functions and packages.
CO4	Analyze and implement file operations and regular expressions to manage data efficiently.
CO5	Adapt and experiment with Python frameworks to build scalable applications.

CO	PO1	PO 2	PO3	PO 4	PO 5	PO6	P O 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PS O2	PSO 3
CO1	3	2	2	1	2	–	–	–	–	1	–	2	3	2	–
CO2	3	3	2	2	2	–	–	–	1	1	–	2	3	3	2
CO3	3	2	3	2	3	–	–	1	2	2	1	2	3	3	2
CO4	3	3	3	3	3	–	–	1	2	1	1	3	3	3	2
CO5	3	2	3	3	3	1	1	1	2	2	2	3	3	3	3
AVG	3.00	2.40	2.60	2.20	2.60	1.00	1.00	1.00	1.75	1.40	1.33	2.40	3.00	2.80	2.25

Networking **[As per Choice Based Credit System (CBCS)scheme]** **(Effective from the academic year 2022-2023)** **SEMESTER-I/II**			
Subject Code	**22AEC26B**	**CIE Marks**	**50**
Number Lab practice Hour/Week(L:T:P)	**0:0:2**	**SEE Marks**	**50**
Total Number of Hours	**30**	**Exam Hours**	**03**
CREDITS-01			

Course Objectives: This course will enable students to:

1. Design the network topologies
2. Configure Switch and Router
3. Implement LAN and Verify the connectivity
4. Troubleshoot issues with devices in the network

Laboratory Experiments

1. Study of networking devices.
2. Discuss the network representation and topologies.
3. Configure Switch using CLI
4. Crimping of UTP cable
5. Build LAN using Switch
6. Configure Router using CLI
7. Build Multiple LAN using router
8. Study of IPv4 subnetting
9. Configure DHCP
10. Configure switches and routers with device hardening features to enhance security
11. Discuss troubleshoot issues with devices in the network.

Reference material information:

www.netacad.com

Conduct of Practical Examination:

• Experiment distribution

a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.

b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

• Marks Distribution

SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

CO1	**Understand and Identify Networking Devices** .
CO2	**Design and Represent Network Topologies** .
CO3	**Implement and Configure Network Hardware**
CO4	**Build and Secure LAN Environments**
CO5	**Develop Practical Networking Skills**

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	-	-	-	1	1	-	1	1	1	1
CO2	3	2	2	2	2	-	-	-	2	2	1	2	1	2	1
CO3	3	1	2	1	2	-	-	-	2	2	2	3	1	2	1
CO4	3	1	2	2	1	1	1	1	2	1	2	1	1	2	1
CO5	3	2	1	1	2	1	1	1	2	1	1	2	1	2	1
AVG	3	1.6	1.6	1.5	1.6	1	1	1	1.8	1.4	1.5	1.8	1	1.8	1

AEC	Electrical Wiring [As per NEP 2020, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scheme]		
Course Code:	**22AEC16C**	**CIE Marks:**	50
Semester:	**1-2**	**SEE Marks:**	50
Course Type (Theory/Practical/Integrated):	LAB	**Total Marks:**	100
Teaching Hours/Week (L:T:P:S):	2:0:0:0	**Exam Hours:**	3
Total Hours of Pedagogy:	24 hours	**Credits:**	1

Course Objectives: This Course will enable the students to:
1. Identify various electrical symbols,safety signs and understand the functions of electritian tools
2. Identify size and capacity of various wires and cables.
3. Understand the functions of protective devices
4. Differentiate various types of electrical wiring systems and prepare different wiring joints.
5.Rig up wiring connection of various appliances and preparation of meter board.

Experiments

PART A

1. Identify electrical symbols and various types of safety signs.
2. Identify various types of electritian tools and explain their functions.
3. Identify size and current capacity of various wires and cables..
4. Identify protective devices and explain their functions.
5. Differentiate various types of electrical wiring systems.

PART B

6. Make simple strait twist and rat-tail joints in single strand conductors.
7. Prepare the following "T"(Tee) joint, Britannia straiht joint, Western union joint.
8.Measure Current, Voltage and Power consumption in a simple AC Circuit.
9. Wire up fluorescent tube fitting, connect and test it..

10. Prepare a meter board for lighting installation using enery meter, fuse, MCB,DP Switch, ELCB and indicator.

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

CO1: Use approriate electritian tools, wires, protective devices, safty signs and wiring accessories.

CO2: Prepare different types of wiring joints.

CO3: Identify size and capacity of different wires and cables.

CO4: Apply standards for electrical wiring.

CO5: Rig up wiring circuits for various appliances.

Question Paper Pattern:
Conduct of Practical Examination:

1. All laboratory experiments are to be included for practical examination.
2. Breakup of marks and the instructions printed on the cover page script to be strictly adhered by the examiners.
3. students can pick one experiment from the questions lot prepared by the examiners.
4. Change of experiment is allowed only once and 15% marks allotted to the procedure part to be made zero.

CIE Assessment:

1. One test will be conducted for 15 marks.
2. Session wise Assignment will be 25 Marks. Attendance carries 05 Marks and Library and Seminar will carry 05 Marks. In total this componenet carries 35 Marks all three together.

Graduate Attributes (As per NBA)

Engineering Knowledge, Problem Analysis, Individual and Team work, Communication.

Course Name:														
Course Code:		22AEC16C												
Sl. No.	**CO\PO**	**1**	**2**	**4**	**5**	**6**	**7**	**9**	**10**	**11**	**12**	**PSO 1**	**PSO2**	**PSO3**
1	**CO1**	3	3	2				3			1			
2	**CO2**	3	3	2				3			1			
3	**CO3**	3	3	2				3			1			
4	**CO4**	3	3	2				3			1			
5	**CO5**	3	3	2				3			1			
	Average	3	3	2				3			1			

12. SHARNBASVA UNIVERSITY, KALABURAGI

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
B.Tech. in Mechanical Engineering - 2022-Scheme
1st Year (I/IISemester) w.e.f 2022-23

WELDING TECHNOLOGY						
Course Code	**22AEC16D/26D**				**CIE Marks**	**50**
Number Lecture Hour/Week	**L**	**T**	**P**	**TOTAL**	**SEE Marks**	**50**
	0	**0**	**2**	**2**		
Number of Lecture Hours	**15**				**Exam Hours**	**03**
Credits-01						

Course Objectives: This course will enable students to
• To impart knowledge regarding various advanced welding practices in industries.
• To understand the various parameters and requirements for welding processes
• To know the comparative merits and demerits of various welding processes.
• To understand the right kind of welding technique suitable for various joints.
• To learn about the joint designs adopted in different types of welding techniques.

	TOPICS	**TEACHING HOURS**
	Demonstration on use of Electric Welding Tools and Equipment's: Arc Welding Machine,	**04**
	Demonstration on use Gas welding Machine, Resistance welding machine.	**03**

	Demonstration on use of Soldering and Brazing Machine Tools and Equipment's.	**03**
	Welding models: Study of electric arc welding tools & equipment, Models: Butt Joint, Lap Joint, T joint & L-joint.	**03**
	Knowing Safety procedures and precautions in workshop.	**02**
	Understand the theoretical aspects of welding technology in depth.	
	Intelligently select the appropriate welding process for a particular application.	
	Describe the basic metallurgy of melted and HAZ of a metal or alloy. quality by inspection and testing methods.	
	Identify the cause of welding defects and avoid them.	
	Adjust welding parameters and techniques to optimize the weldment properties.	

COURSE OUTCOMES: At the end of the course the student will be ab

Mapping of course outcomes with program outcomes

22AEC104/204	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.3	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-

SCHEME OF SEE EXAMINATION (50 MARKS)

SEE marks for the practical course is 50 Marks.

Evaluation of test write-up/ type conduction procedure and result/viva will be conducted jointly by examiners. General rubrics suggested for SEE are mentioned here, Conduction procedure and result in - 70%, writeup-20%, Viva voce 10% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50.

➢ TEXT BOOKS:

1. Welding Engineering and Technology by Dr. R.S. Parmer, 2nd Edition, Khanna Publishers.
2. Welding Technology and Design by V. M. Radhakrishnan, New Age Internationals.

➢ REFERENCE BOOKS:

1. Materials and Processes in Manufacturing by E. Paul Degarmo,J.T. Black, Ronald A. Kohser. Eighth Edition, Prentice Hall India.

2.Elements of Workshop Technology Vol. I and II by S. K. Hajra Choudhury, A.K. Hajra Choudhury, Nirjhar Roy, Media Promoters & Publishers Pvt. Ltd.

E-RESOURCES:

1.https://archive.nptel.ac.in/courses/112/103/112103263/

2.https://onlinecourses.nptel.ac.in/noc21_me99/previ

Ability Enhancement Courses – AutoCAD

B.Tech I/II Semester, Civil Engineering

{ As per Choice Based Credit System (CBCS) Scheme}

SEMESTER- I/II

Course Code: 22AEC16E/26E	CIE Marks : 50
Teaching Hours/Week (L:T:P) : 1	SEE Marks : 50
Course Type Theory/Practical/Integrated : Pratical	Exam Hours : 03
Number of Lecture Hours : 16	Credits : 01

CREDITS - 01

Course Objectives :

1) Gain skill set to prepare Computer Aided Engineering Drawings using AutoCAD Software.
2) To develop the skill to draw the drawing with respect to different scale factors
3) Understanding the details of construction of different building elements
4) Visualize the completed form of the building and the intricacies of construction based on the engineering drawings
5) Get familiarization of practices used in industry. Know the procedure of submission of drawings and drawings and develop working and submission drawings for buildings

	Bloom's Level					
	Remember (L1)	**Understand (L2)**	**Apply (L3)**	**Analyze (L4)**	**Evaluate (L5)**	**Create (L6)**
CO1						
CO2						
CO3						
CO4						
CO5						

Bloom's level of the course outcomes:

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	
CO1	1	1			3	3	2	1	1	2	1	2	3		
CO2			2	1	3	3	1	1	1			2	3		
CO3	1	1	2	2	3	3	1		1			2	3		
CO4	3	3	2	2					1			2	3		
CO5	3	3	2	2					1			2	3		
Note: 1-Low, 2-Medium, 3-High															

Course Articulation Matrix / Course mapping :

Modules	Teaching Hours/RBT levels
Module-1	
Introduction: Basic introduction to AutoCAD, General features of CADD, CADD work station, Hardware and Software requirements, Advantages of using CADD, Starting up AutoCAD.	**04 Hours** L1, L2
Module-2	
Workspace: Understanding CADD Editor Screen- title bar, menu bar, ribbon, standard tool bar, drawing area, command prompt area, cross hair. File management- Create a new drawing, open a drawing, save a drawing, setting up units. Command Entry Options using -Command Line, Menus (File, Edit,	**03 Hours** L1.L2

View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help), Understanding the use of CADD Menus and Tool Bars.	
Module-3	
General commands in AutoCAD: Drawing Line using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, Absolute Polar coordinates, Relative Polar Coordinates, Direct distance entry and line command, Picking coordinates on the screen. Draw commands- line, polyline, circle, arc.	**03 Hours** L1, L2
Module-4	
Drawing commands in AutoCAD: Modify- Move, Copy, Stretch, Rotate, Mirror, Scale, Trim, Fillet, Array. Layer- Creating new layer, Layers settings. Dimensions and dimension properties, creating blocks, hatching.	**03 Hours** L1, L2
Module-5	
Simple Engineering Drawing with CAD Drawing tools: Draw Plan, Elevation and sectional view of single room building.	**03 Hours L1, L2, L3**

CO	Course Outcomes
CO 1	To understand the Software working procedure & Features
CO 2	To understand CADD Editor Screen Tilte bars
CO 3	Setting the Scale factor , Draw lines using commands feautered in Software
CO 4	To understand drawing the components of drawings in layers Modify Commands,
CO 5	Drawing a Single room plans as per industry practice

Course Outcomes (COs) :

Question paper pattern:

1. The question paper will have four questions categories in Two Part (A&B).
2. Each full question of Part A consists of 20 marks & Part B of 30marks.
3. There will be 2 full questions (with a maximum of two sub questions) from each module.
4. Each full question will have sub questions covering all the topics under a module.
5. The students will have to answer 2 full questions, selecting one full question from each module.

CIE+ Assignments: 15+35=50 Marks

There will be one CIE of 15 marks and submission of record books carries 35 marks.

Suggested Learning Resources:

1. MG Shah, CM Kale, SY Patki, “Building drawing with an integrated approach to Built Environment Drawing”, Tata McGraw Hill Publishing co. Ltd, New Delhi.
2. Gurucharan Singh, “Building Construction”, Standard Publishers, & distributors, New

Delhi.

3. Malik RS and a Meo GS, "Civil Engineering Drawing", Asian Publishers/Computech Publication Pvt Ltd

Ability Enhancement Courses – Environmental Studies

B.Tech I/II Semester, Civil Engineering

{ As per Choice Based Credit System (CBCS) Scheme}

Subject Code : 22AEC16F/26F	CIE Marks : 50
Number Lecture Hour/Week : 1	SEE Marks : 50
Course Type Theory/Practical/Integrated : Theory	Exam Hours : 02
Number of Lecture Hours : 16	Credits : 01

CREDITS-01

Course Learning Objectives:

The objectives of this course are:

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
3. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues
5. Understanding about GIS , Remote sensing and How Government organization & NGO are formed & work

Modules	Teaching Hours/RBT levels
Module -1	

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	**04 Hours L1, L2**
Module -2	
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.	**03 Hours L1, L2**
Module-3	

Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management.	**03 Hours L1, L2**
Module -4	
Air Pollution & Automobile Pollution: Definition, Effects – Global warming , Acid rain & Ozone layer depletion, controlling measures, Solid waste Management, E-Waste Management & Biomedical waste management – Sources, Characteristics & Disposal methods.	**03 Hours L1, L2**
Module-5	
Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. Environmental Acts & Regulations, Role of government, Legal aspects, Role of Nongovernmental Organizations (NGOs), Environmental Education & Women Education**.**	**03 Hours L1, L2**

Course outcomes:

After a successful completion of the course, the student will be able to:

CO1: To study basic concepts of Environment, Ecosystem Food chain & web.

CO2: To study about Natural Resources & Various cycles present in environment.

CO3: To study the Various pollutions & suggest steps to reduced its effects

CO4: To study about Air pollutions & Waste Managements.

CO5: To study the concepts of GIS & Remote sensing & Govt & NGO.

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	2	1				2					
CO2	1	1	2				1					

CO3	3	2	1				2					
CO4	3	2	2				2					
CO5	3	2	1				3					

Question Paper Pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have 50 full questions carrying equal marks.
- Each question carries 2 marks.
- There will be 20 questions from each module
- Each full question will have four options.The students will have to answer all 50 questions.

CIE+ Assignments: 15+35=50 Marks

There will be one CIE of 15 marks and submission of assignment books carries 35 marks.

Text Books:

1. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,

Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012.

Reference books:

1. Raman Sivakumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005
2. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007
4. Erach Bharucha, "Text Book of Environmental Studies", for UGC, University press, 2005
5. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Eleventh Edition,

Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, "Text Book of Environmental and Ecology", Acme Learning Pvt. Ltd. New Delhi.

Course Title:	**ELECTRONICS AND ELECTRICAL LAB**		
	[As per NEP 2020, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scheme]		
Course Code:	**22EECL19/29**	**CIE Marks:**	50
Semester:	**1-2**	**SEE Marks:**	50
Course Type (Theory/Practical/Integrated):	Practical	**Total Marks:**	100
Teaching Hours/Week (L:T:P:S):	0:0:2:0	**Exam Hours:**	2
Total Hours of Pedagogy:	24 hours	**Credits:**	1

Course Objectives: This Course will enable the students to:

1. verify KCL and KVL.
2. Measure electrical energy , power and power factor.
3. learn the two way and three way control of lamp.
4. Measure frequency, time and voltage levels of various waveforms using CRO and also study PN junction diode and Transistor
5. Understand the implementation of rectifiers and also verify truth table of various logic gates.

Experiments

1. To verify KCL and KVL
2. Measurement of current, power & power factor of Incandescent lamp, Fluorescent lamp, CFL lamp &

LED lamp.

3. Measurement of Energy by using 1-phase Energy meter & its calibration.

4. Two way & three way control of lamp.

5. Measurement of Power in 3-phase system using two- wattmeter methods.

6. Measurement of the following using CRO.

a) Frequency/ Time measurement of sine and square wave.
b) AC and DC voltages
c) Component testing(Diode & Transistor)

7. Study of characteristics of PN junction diode.

8. Implementation of half wave,full wave and bridge rectifiers.

9. Study of CB, CE transistor characteristics.

10. Realization of logic gates using IC's.

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

CO1: Establish a broad concept of various types of electrical circuits, tools and instrumentation.

CO2: Measure power & power factor of different types of lamps. .

CO3. Obtain the characteristics of PN junction diode, CB and CE transistors.

CO4: Measure frequency, time and voltage levels of various waveforms.

CO5: Realize various logic gates using IC's.

SEE Assessment:

1. All laboratory experiments are to be included for practical examination.
2. Breakup of marks and the instructions printed on the cover page script to be strictly adhered by the examiners.
3. students can pick one experiment from the questions lot prepared by the examiners.
4. Change of experiment is allowed only once and 15% marks allotted to the procedure part to be made zero.

CIE Assessment:

1. One test will be conducted for 15 marks.

2. Session wise Assignment will be 25 Marks. Attendance carries 05 Marks and Library and Seminar will carry 05 Marks. In total this componenet carries 35 Marks all three together.

Graduate Attributes (As per NBA)

Engineering Knowledge, Problem Analysis, Individual and Team work, Communication.

Conduct of Practical Examination:

1. Laboratory experiments are to be included for practical examination.
2. Breakup of marks and the instructions printed on the cover page of answer script to be strictly adhered by the examiners.
3. Students can pick one experiment from the questions lot prepared by the examiners.
4. Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.

Course Name:		

Course Code:		22EECL19/29													
Sl. No.	**CO\PO**	**1**	**2**	**3**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO3**	**PSO3**
1	**CO1**	3	3	2					3			1			
2	**CO2**	3	3	2					3			1			
3	**CO3**	3	3	2					3			1			
4	**CO4**	3	3	2					3			1			
5	**CO5**	3	3	2					3			1			
	Average	3	3	2					3			1			

Communicative English
[As per Choice Based Credit System (CBCS) Scheme]
(Effective From The Academic Year 2021-22)
As Per NEP 2020
SEMESTER –I

Course Code	**22AEC16/26J**	**CIE Marks**	**50**
Number of Lecture Hours/Week	**1HR**	**SEE Marks**	**50**
Total Number of Lecture Hours		**Exam Hours**	**03**
CREDITS - 03			
Course Objectives:			
1. .			
Revised Bloom's Taxonomy Levels: L1 – Remembering, L2 – Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, and L6 - Creating			
Module 1		Teaching Hours	RBT Levels

Introduction to Technical Communication. Meaning, Types and Importance of Communication. Barriers to effective Communication, Channels of Communication, Language as a tool of Communication		L1,L2,L3, L4,L5
Module 2		
Listening and Speaking Skills Listening and Comprehension Barriers to Listening Common Errors Technical terminology in the field of Sports, Finance, Economics, IT, Science, Agriculture, Politics, Law and Culture		L1,L2,L3, L4
Module 3		
Developing Phonetics and Vocabulary 1.Compound Words, Words Often mis-spelt and Misused 2. Idioms and Proverbs 3. Antonyms, Synonyms, Homonyms, Homophones 4. One Word Substitute		L1,L2,L3, L4
Module 4		
Formal Writing Skills 1. Report writing (Format of a Report, Reporting an event / news) 2.Writing personal letter 3. Letter to the Principal, Librarian, Head of the Dept. and Hostel Superintendent 4 Writing Business letters ,C.V. (Features, Format and example)		L1,L2,L3, L4
Module 5		
GRAMMAR 1.Tenses: The Sequence of Tenses, Rules in use of Tenses 2. Voice: Active Voice and Passive Voice 3.Contractions: It's and Its, They're, Their and There and End of Sentence Contractions 4. Abbreviations: Acronyms, Initialisms	10	L1,L2,L3, L4
Course Outcomes		
Question Paper Pattern: The question paper is set for 100 marks. Question paper consists of **five modules**. Each **module** carries **20** marks**.**		
Text Books		

INDIAN CONSTUTION

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022 -2023)
SEMESTER – II

Course Subject Code	HSM 22CIPE17/27	**CIE Marks**	50
Number of Lecture Hours/Week	01	**SEE Marks**	50
Total Number of Lecture Hours	15	**Exam Hours**	03

CREDITS – 01

Course objectives: This course will enable students to

- 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

Module I	**Teaching Hours**	**RBT Level**
Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	03 Hours	
Module II		
Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. FundamentalRights (FR's) and its Restriction and limitations in different Complex Situations. building.	03 Hours	
Module III		

Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	03 Hours	
Module IV		
Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	03 Hours	
Module V		
State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	03 Hours	

Course outcome (Course Skill Set): At the end of the course 22CIPE17/27 the student will be able to:

The students should be able to:

CO1: Analyze the basic structure of Indian Constitution

CO2: Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.

CO3: know about our Union Government, political structure & codes, procedures

CO4: Understand our State Executive & Elections system of India.

CO5: Remember the Amendments and Emergency Provisions, other important provisions given by the constitution

Assessment Details (both CIE and SEE)

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

Continuous Internal Evaluation (CIE):

Two Unit Tests each of 30 Marks (duration 01:15min)

First test after the completion of 30-40 % of the syllabus

Second test after completion of 80-90% of the syllabus

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

Two assignments each of 20 Marks

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

Semester End Examinations (SEE)

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **03 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

Textbook: 1. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022. 2. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**):Prentice –Hall, 2008.
Reference Books: 1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019. 2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru. 3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.** M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

NATIONAL SERVICE SCHEME

Course Title:	**NATIONAL SERVICE SCHEME**		
Course Code:	22AEC16L/22AEC26L	CIE Marks	50
Course Type	(Theory)	SEE Marks	50
		Total Marks	100
Semester:	**I/II**		
Teaching Hours/Week (L/T)	1	Exam Hours	02
Total Hours of Pedagogy	20 hours	Credits	01

Course objectives

- National Service Scheme (NSS) will enable the students to:
- Understand the community in general in which they work.
- Identify the needs and problems of the community and involve them in problem –solving.
- Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.

- Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.
- Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

MODULE 1:

Introduction to NSS: History, aims, objectives, and basic concepts. Motto, symbol, and significance of NSS. Organizational structure, duties, and roles of volunteers and officers.

MODULE 2:

Basic Concepts of NSS: Understanding the philosophy and fundamental principles of NSS. Importance of national integration and social harmony. Role of NSS in promoting unity and social justice.

MODULE 3:

Youth and Community Development: Role of youth in society and community building. Leadership skills and team building. Challenges faced by rural and urban communities.

Environment and Sustainability:

Understanding the importance of environmental conservation.

Role of NSS in promoting sustainable development and ecological balance.

MODULE 4:

Health, Hygiene, and Sanitation:

- **Importance of health education.**
- **Practices for good hygiene and sanitation.**
- **Basic awareness of public health issues and preventive measures.**

Social Issues and Responsibilities:

Awareness of current social issues like gender inequality, literacy, and environmental degradation.

Role of NSS in addressing these issues through service.

MODULE 5:

Disaster Management:

- **Introduction to disaster preparedness and management.**
- **Role of NSS volunteers in disaster relief activities.**

Volunteering and Community Service:

Planning and organizing community service projects. Participation in social campaigns like Swachh Bharat Abhiyan, blood donation drives, and health camps.

Fieldwork and Practical Engagement:

- **Attending fieldwork in community service.**
- **Participating in NSS special camps and events.**
- **Field visits to rural or urban areas to understand local issues.**

Course outcome At the end of the course the student will be able to:	
CO1.	Understand the importance of his / her responsibilities towards society.
CO2.	Analyse the environmental and societal problems/issues and will be able to design solutions for the same.
CO3.	Evaluate the existing system and to propose practical solutions for the same for sustainable development.
CO4.	Implement government or self-driven projects effectively in the field.
CO5.	Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.
Assessment Details (both CIE and SEE)	
Suggested Learning Resources: **Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)** 17. NSS MANUAL - https://nss.gov.in/sites/default/files/manualNss2006.pdf	
Web links and Video Lectures (e-Resources): [If any] https://nss.gov.in/sites/default/files/manualNss2006.pdf	
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning [If any]	

COs and POs Mapping (Individual teacher has to fill up)												
	PO											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3			1						1
CO2	3	2										1
CO3	3	3	3									1
CO4	3	2										1
CO5	3	2				2						1

Open Elective Course Title: Basic Drawing & Painting, Course Code: 22AEC16H
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2022)
Semester II

Course Code:	22AEC16H	CIE	50
Number of Lecture Hours/Week	10	SEE	50
	10		100
CREDITS-02			

Open Elective Course Title: Basic Drawing & Painting, Course Code: 22AEC16H

Unit_1:	Teaching Hours	RBT LEVEL
Drawings of objects with shade & light	02	

Unit_2:	Teaching Hours	RBT LEVEL
Drawings of human figures with shade & Light	02	

Unit_3:	Teaching Hours	RBT LEVEL
Nature, Birds & Animals	02	

Unit_4:	Teaching Hours	RBT LEVEL
Application of colors (Practical) Free Hand Drawing & Lettering	02	

Unit_5:	Teaching Hours	RBT LEVEL
Exhibition of work done (Practical)	02	

Outcome of the subject:
After successfully competition of the course, student will be able to

1. Understanding of basic drawings

2. The ability to synthesize the use of drawing, two dimensional design, drawing & color
3. Knowledge & skill in the use of basic tools & techniques including knowledge of paint & surface
4. The ability to explore the expressing possibilities of various media
5. The ability to make independently

Note: Only Practical