Government of Karnataka
Department of Technical Education

Diploma in Civil Engineering

C-25 Scheme of Studies

(Effect from the AY 2025-26)

Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Curriculum Structure

I Semester Scheme of Studies

Sl. No.	Teaching Department	Course Code	Course Name	Hours per week			Total Contact Hours/week	Credits	CIE Marks		Theory SEE Marks		Practice SEE Marks		Total Marks
				L	T	P			Max	Min	Max	Min	Max	Min	
Integrated Courses															
1	SC	25SC11I	Engineering Mathematics-I	4	0	4	8	6	50	20	50	20	-	-	100
2	ENG	25EG01I	Essential English Communication	4	0	4	8	6	50	20	-	-	50	20	100
3	CS	25CS01I	IT Skills	3	0	4	7	5	50	20	-	-	50	20	100
4	CE	25CE11I	Construction Materials	4	0	4	8	6	50	20	50	20	-	-	100
Audit Course															
5	CE	25CE12T	Environmental Sustainability	2	0	0	2	2	50	20	-	-	-	-	50
6	Personality Development		NCC/NSS/YOGA/SPORTS...	Students are expected to engage in any one of these activities from 1st semester to 6th semester(No Credits)											
Total				**17**	**0**	**16**	**33**	**25**	**250**	**-**	**100**	**-**	**100**	**-**	**450**

Government of Karnataka
Department of Technical Education

C-25 Diploma Curriculum

Engineering Mathematics For Engineering Programmes

First Semester

(Effect from the AY 2025-26)

Government of Karnataka

DEPARTMENT OF TECHNICAL EDUCATION

Curriculum Structure

I Semester Scheme of Studies- Diploma in _____Engineering

Sl. No.	Teaching Department	Course Code	Course Name	Hours per week			Total Contact Hours /week	Credits	CIE Marks		Theory SEE Marks		Practice SEE Marks		Total Marks
				L	T	P			Max	Min	Max	Min	Max	Min	
Integrated Courses															
1	SC	25SC11I	Engineering Mathematics-I	4	0	4	8	6	50	20	50	20	-	-	100

L: Lecture: T: Tutorial: P: Practice: SC-Science: T-Theory (Whole Class)::P-Practical(Batch wise)::I-Integrated (Both theory & Practice-Batch wise)

- *For Engineering Mathematics-I, Theory for whole class and Practice batch wise*

Integrated Course Template (T+P)

Government of Karnataka
DEPARTMENT OF TECHNICAL
EDUCATION

Program	Engineering	Semester	I
Course Name	Engineering Mathematics-I	Type of Course	Integrated
Course Code	25SC11I	Contact Hours	8 hours/week (104 hours/semester)
Teaching Scheme	L:T:P - 4:0:4	Credits	6
CIE Marks	50	SEE Marks	50

1. Rationale

The course is designed to give a comprehensive coverage at an introductory level to the subject of Matrices and Determinants, Vectors, Trigonometry, Complex numbers and Limits.

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

CO-01	Solve the system of linear equations using determinants and performs the same in MS Excel.
CO-02	Apply the knowledge extensively in finding product of two vectors and executes the same in GeoGebra graphing calculator tool..
CO-03	Able to solve physical problems using trigonometric ratios and visualize the graphs of trigonometric functions in GeoGebra graphing calculator.
CO-04	Able to solve problems on algebra of complex numbers and interpret the results graphically.
CO-05	Evaluate the limit of a single variable function and extract the limit values for discretized data of a one variable function in MS excel.

3. Course Content:

WEEK	CO	PO (L3-Highly mapped)	Theory (4 Hours per week)	Practice (4 Hours per week)
1	**1**	**1,4,7**	**MATRICES**: -Definition and order of matrices Types of matrices: Row matrix, Column matrix, Zero matrix (Null matrix), Square matrix, Diagonal matrix, Scalar matrix, Unit matrix (Identity matrix)	**Practice-1:** Introduction to MS Excel
	1	**1,4,7**	Algebra of matrices: Scalar multiplication and Transpose of a matrix	
	1	**1,4,7**	Addition and Subtraction of matrices (2x2 only)	**Practice-2:** Compute addition, subtraction, scalar multiplication of matrices in MS Excel.
	1	**1,4,7**	Product of two matrices (2x2 only) and Problems	
	1	**1,4,7**	Problems continued	

2	**1**	**1,4,7**	**DETERMINANTS:** Definition, Expansion of determinant of order 2 and Problems	**Practice-3:** Compute multiplication, transpose of matrices in MS Excel.
	1	**1,4,7**	Cramer's Rule (Determinant method): Solution of the system of linear equations with two unknowns and Problems	**Practice-4:** Compute determinant, and inverse of matrices in MS Excel.
	1	**1,4,7**	Minors, Co-factors, evaluating Adjoint of square matrices explicitely by finding minor and co-factors (2X2 only) and Problems	
3	**1**	**1,4,7**	Definition of Singular and non-singular matrices, Inverse of a matrix (2X2 only) and Problems	**Practice-5:** Solve the system of linear equations by Cramer's rule in MS Excel.
	1	**1,4,7**	Characteristic equation and characteristic roots of a matrix (2X2 only) and problems	
	2	**1,4,7**	**VECTORS:** Definition, notation and types of vectors [Null, Unit, Equal, Coplanar and Collinear vectors]	**Practice-6:** Installation and introduction to tools in GeoGebra.
	2	**1,4,7**	Position vector & its magnitude and problems	
4	**2**	**1,4,7**	Problems on equilateral, isosceles, right-angled triangle	**Practice-7:** Finding magnitude of a vector, sum and difference of two vector and visualize it in GeoGebra graph.
	2	**1,4,7**	Expression and formula for unit vector along the given vector and problems	
	2	**1,4,7**	Addition and Subtraction of two vectors (Algebraically) and problems	**Practice-8:** Verifying whether the given three position vectors are vertices of an equilateral triangle in MS excel.
	2	**1,4,7**	Scalar product (dot product) of two vectors and problems	
5	**2**	**1,4,7**	Applications of Scalar product: Cosine of an angle between two vectors and problems	**Practice-9:** Find the scalar product of two vectors also find the angle between two vectors degrees in GeoGebra. Visualize the dot product of two vectors and hence verify the property of orthogonality.
	2	**1,4,7**	Condition for two vectors to be orthogonal or perpendicular and problems	
	2	**1,4,7**	Projection of $\vec{a}$ on $\vec{b}$ and $\vec{b}$ on $\vec{a}$ and problems	**Practice-10**: Find the work done by the force applied at different angles on the body to move it from point A to B. Hence analyze the amount of work done and give the physical interpretation.
	2	**1,4,7**	Work done by the vector (force) and problems	
6	**3**	**1,4,7**	**TRIGONOMETRY:** Recapitulation of Trigonometric ratios and identities.	**Practice-11:** Plot the graphs of trigonometric functions for sinx, cosx and tanx in the interval $[-\pi, \pi]$ in GeoGebra.
	3	**1,4,7**	Define radian of an angle. Conversion of angles (Degree to Radian and Radian to Degree) and Problems	
	3	**1,4,7**	Allied angles: Definition of allied angle, ASTC Rule	**Practice-12:** Verify the ASTC rule of quadrants in GeoGebra.

	3	**1,4,7**	Rules of allied angles $(-\boldsymbol{\theta}, \mathbf{90^0} \pm \boldsymbol{\theta}$ & $\mathbf{270^0} \pm \boldsymbol{\theta}$) and simple Problems.	
7	**3**	**1,4,7**	Rules of allied angles $(\mathbf{180^0} \pm \boldsymbol{\theta}$ & $\mathbf{360^0} \pm \boldsymbol{\theta}$) and simple Problems.	**Practice-13:** Construction of clinometer for measurement of sides and angles of a triangle.
	3	**1,4,7**	Problems continued on Allied angles	
	3	**1,4,7**	Problems continued on Allied angles	**Practice-14:** Usage of clinometer **(DEMONSTRATION)**
	3	**1,4,7**	Compound Angles: Formulae for $\boldsymbol{sin(A \pm B)}$, $\boldsymbol{cos(A \pm B)}$ $\boldsymbol{and}$ $\boldsymbol{tan(A \pm B)}$(without proof) and T-functions of 15^0 ,75^0 and 105^0	
8	**3**	**1,4,7**	Multiple Angles: sin2A, cos2A, tan2A with proof	**Practice 15:** Using clinometer find the heights and distances of physical objects in the surroundings.
	3	**1,4,7**	Multiple Angles: sin3A and cos3A with proof	
	3	**1,4,7**	Applications of Trigonometry: Introduction to Heights and Distances	**Practice-16:** Using clinometer measure the heights and distances of objects in the surrounding.
	3	**1,4,7**	Problems based only on angle of inclination	
9	**4**	**1,4,7**	**COMPLEX NUMBERS:** - Definition, real and imaginary parts of a complex number $\boldsymbol{z = a + ib}$. Examples	**Practice-17:** Plot the Cartesian complex numbers z_1, z_2, z_3, z_4 and z_5. Also plot $z_1 + z_2$, $z_3 - z_4$, $2z_1$, z_3/z_4 and $z_4 \times z_5$ in the graph sheets
	4	**1,4,7**	Modulus and amplitude of a complex number and Problems	
	4	**1,4,7**	Conjugate of a complex number and Problems	**Practice-18:** Plot the polar complex numbers z_1, z_2, z_3, z_4 and z_5. Also plot $z_1 + z_2$ *and* $z_3 - z_4$ in the graph sheets
	4	**1,4,7**	Addition and subtraction of complex numbers and Problems	
10	**4**	**1,4,7**	Multiplication of complex numbers and Problems	**Practice-19:** Generate 50 random data, construct the frequency distribution table and plot Bar chart using MS Excel.
	4	**1,4,7**	Ratio of two complex numbers and Problems	
	4	**1,4,7**	Polar form of a complex number and Problems	**Practice-20:** Generate 50 random data, construct the frequency distribution table and plot Pie chart using MS Excel.
	4	**1,4,7**	Exponential form of a complex numbers and Problems	
11	**4**	**1,4,7**	Conversion of Cartesian form into polar and exponential forms and Problems	**Practice-21:** Generate 50 random data, construct the frequency distribution table and plot Line graph using MS Excel.
	4	**1,4,7**	Problems continued	
	5	**1,4,7**	**LIMIT OF FUNCTIONS:** Constants and variables, Definition of function. Concept of limits	**Practice-22:** Generate 50 random data, construct the frequency distribution table and scatter plot using MS Excel.
	5	**1,4,7**	Evaluation of limits by factorization method and problems	
12	**5**	**1,4,7**	Problems continued	**Practice-23:** Generate 50 random data, construct the frequency
	5	**1,4,7**	Evaluation of limits by rationalization method and problems	

				distribution table and plot Histogram using MS Excel.
	5	**1,4,7**	Problems continued	**Practice-24:** Plot the following functions in GeoGebra and visualize the graphs. i) Odd function ii) Even function iii) Algebraic function iv) Trigonometric functions v) Exponential functions vi) Logarithmic functions
	5	**1,4,7**	Evaluation of limit of a function of the type $\lim_{x\to\infty}\left(\frac{f(x)}{g(x)}\right)$ and Problems	
13	**5**	**1,4,7**	Problems continued	**Practice-25**: Using MS Excel, verify that, as x tends to zero the ratio $\frac{sinx}{x}$ tend to 1, for 20 discrete data in the interval [0.5, 0.1]. (**DEMONSTRATION**)
	5	**1,4,7**	Standard Limits (without proof): a)$\lim_{x\to a}\left(\frac{x^n-a^n}{x-a}\right)=$ na^{n-1},where n is rational b)$\lim_{\theta\to 0}\left(\frac{\sin\theta}{\theta}\right)=1$, where $\theta$is in radians c) $\lim_{\theta\to 0}\left(\frac{\tan\theta}{\theta}\right)=1$where θ is in radians d) $\lim_{x\to 0}\left(\frac{e^x-1}{x}\right)=1$	
	5	**1,4,7**	Problems on Standard Limits	**Practice-26:** Evaluation of limits of standard type in *wolfram alpha.* **(DEMONSTRATION)**
	5	**1,4,7**	Problems continued	

4. References:

1. NCERT Mathematics Books for Class XI and XII.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
3. G.B.Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
4. V.Sundaram, R.Balasubramanian, K.A.Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.
5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi.
6. Online resources (courtesy you tube)
   i) https://www.youtube.com/watch?v=wbJcJCkBcMg – Excel for beginners
   ii) https://www.youtube.com/watch?v=RDFb--em5Kg – construction of clinometer.
   iii) https://www.youtube.com/watch?v=tn6UoIz-1yM – using clinometer.
   iv) https://www.geogebra.org/download?lang=en- to download GeoGebra.
   v) https://www.youtube.com/watch?v=RYGBhRN9oHQ&list=PLqZ0eZtMcAlugmcomSSvjPBfewVbX35L7 - Basics of GeoGebra
   vi) https://www.youtube.com/@grantsander9529 – More videos on GeoGebra

5. CIE and SEE Assessment Methodologies:

Sl. No	Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1 Theory Test	4	90	50	Average of all CIE=50 Marks
2.	CIE-2 Practice Test	7	180	50	
3	CIE-3 Theory Test	10	90	50	
4.	CIE-4 Practice Test	13	180	50	
5	CIE-5 Portfolio evaluation of all the activities through Rubrics	1-13		50	
Total Continuous Internal Evaluation (CIE)					50 Marks
Semester End Examination (SEE) -Theory			180	100	50 marks (100 marks Scaled down to 50 marks)
				Total Marks	100 Marks
Minimum marks to pass in CIE & SEE is 40% individually					

6. CIE Theory Test Model question paper:

CIE 1(at the end of 4th week)

Program	**_____ Engineering**	**Semester**	**I**
CourseName	Engineering Mathematics-I	**Marks**	**50**
Course Code	**25SC11I**	**Duration**	**90 min**
Name of the Course Coordinator:			

	Section A (Answer any six questions, each question carries 5 marks)			
Q. No.	**Questions**	**CL**	**CO**	**PO**
1			1	
2			1	
3			1	
4			1	
5			1	
6			1	
7			1	
8			1	
9			1	
Section B (Answer any four questions, each question carries 5 marks)				
10			2	
11			2	
12			2	
13			2	
14			2	
15			2	

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

CIE 3(at the end of 10th week)

Program	_____ Engineering	Semester	I
CourseName	Engineering Mathematics-I	Marks	50
Course Code	25SC11I	Duration	90 min
Name of the Course Coordinator:			

Q. No.	Questions	CL	CO	PO
	Section A (Answer any one question, each question carries 5 marks)			
1			2	
2			2	
	Section B (Answer any six questions, each question carries 5 marks)			
3			3	
4			3	
5			3	
6			3	
7			3	
8			3	
9			3	
10			3	
	Section C (Answer any three questions, each question carries 5 marks)			
11			4	
12			4	
13			4	
14			4	
15			4	

7. CIE Practice Test:

Program	Engineering			Semester	I
CourseName	Engineering Mathematics-I			Test	II/IV
Course Code	25SC11I	Duration	3 Hrs	Marks	50
Name of the Course Coordinator:					
Questions				CO	Marks
a. **OR** b.					50
Scheme of assessment a) Observation b) Conduction c) Result and Output d) Viva					 10 20 10 10
II--CIE (ANY ONE QUESTION FROM PRACTICE 1 TO 12(Except 1 and 6) IV--CIE (ANY ONE QUESTION FROM PRACTICE 15 TO 24) Total Marks					50

Signature of the Course Coordinator Signature of the HOD Signature of the IQAC Chairman

8. Suggestive Activities:

The List is only shared as an Example and not inclusive of all possible activities of the course. Student and Faculty are encouraged to choose activities that are relevantto the topic and on the availability of such resources at their institution.
Note: Minimum 3 suggested activities should be done.

Sl. No.	Suggestive Activities
01	Application of matrices in coding and decoding.
02	Applications of vectors in dynamics
03	Applications of trigonometry in respective programme domains
04	Plotting circles of different radii($\|z - z_0\| = r$) , discs($\|z - z_0\| = r$) and annulus ($R_1 \leq \|z - z_0\| \leq R_2$) in complex plane and record the same in the a document.
05	Evaluation of limits using Wolfram alpha platform.

9. Sample Rubrics for Assessment of Activity (Qualitative Assessment)

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1	Knowledge	Poor knowledge About the subject	Normal knowledge about the subject	Good knowledge about the subject	Very good knowledge about the subject	Excellent knowledge about the subject	8
2	Problems solving ability	Solved minimum number of problems with maximum mistakes	Solved minimum number of Problems	Solved problems with few mistakes	Solved maximum number of problems	Solved all problems in neat manner	10
3	Strategies and Procedure	Hardly uses an effective strategy to solve problems.	Rarely uses an effective strategy to solve problems.	Sometimes uses an effective strategy to solve problems, but does not do it consistently.	Typically, uses an effective strategy to solve the problem(s).	Typically, uses an efficient and effective strategy to solve the problems	10
4	Completion	Several of the problem are not completed	Only 30% of the questions are answered correctly	Only 50% of the questions are answered correctly	Only 75% of the questions are answered correctly	All assignment questions are answered correctly	8
5	Neatness and Organization	The work appears sloppy and unorganized. It is hardly to know what information goes together.	The work appears sloppy and unorganized.	The work is presented in an organized fashion but may be hard to read at times.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in a neat, clear, organized fashion that is easy to read.	8
	Total marks=8+10+10+8+8=44						44

Equipment/software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
01	Computers	12th Generation, Intel Core i3, Graphic card, RAM 16GB, Storage:1TB	30
02	Operating System and software	Windows 10,MS Office, MS excel, GeoGebra	30
03	Internet	High Speed Internet	01
04	Printer	Wireless Multifunctioning printer	03
05	Projector	High resolution, Wi-fi enabled	02
06	UPS	As per standards	5KV

PROBLEMS FOR PRACTICE:

MATRICES AND DETERMINANTS

1. If $A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$, find the matrix 3A + 2B.
2. If $A = \begin{bmatrix} 4 & 5 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 4 & 1 \end{bmatrix}$, find the matrix A − 2B.
3. If $A = \begin{bmatrix} 3 & 2 \\ 2 & 0 \end{bmatrix}$ then find $A + A^T$ matrix.
4. If the matrix $A = \begin{bmatrix} x & 3 \\ 3 & x \end{bmatrix}$ is a singular matrix find the value of x.
5. If $A = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 \\ 4 & 1 \end{bmatrix}$ find AB matrix.
6. Solve the system of linear equations by applying Cramer's rule $3x + 2y = 8; 2x + 5y = 9$.
7. Solve the equations $x + y = 3; 2x + 3y = 8$ by Cramer's rule.
8. Solve the system equations $2x - y = 3; x + 2y = 4$ by determinant method.
9. Solve the system equations $2x + 3y = 5; x + 4y = 5$ by applying Cramer's rule.
10. If $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$ verify that $A(\text{adjA}) = |A|I$ where $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
11. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, find AB matrix and also find $(\text{AB})^T$ matrix.
12. If $\begin{vmatrix} x & 2 \\ 3 & 4 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 0 & x \end{vmatrix}$ find the value of x.
13. Find adjoint of the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
14. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$ then find the inverse of the matrix A if it exists
15. Find A^{-1} if $A = \begin{bmatrix} 5 & 5 \\ 1 & 2 \end{bmatrix}$
16. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$.
17. Find characteristic roots of the matrix $A = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$.
18. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$.
19. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 5 & 2 \\ 4 & 3 \end{bmatrix}$.

VECTORS

1. Find the magnitude of vector $i + 2j + k$.

2. If $\vec{a} = i + 2j - k, \vec{b} = 3i - 5j + 2k$ find the magnitude of $3\vec{a} - 2\vec{b}$.

3. If $\vec{a} = i + 2j + k$ and $\vec{b} = 2i + 4j - k$ then find $\left|2\vec{b} - 3\vec{a}\right|$.

4. If $\vec{a} = 2i + j + 2k, \vec{b} = i + 3j + k$ and $\vec{c} = 2i + 2j - k$, find $\left(\vec{a} + \vec{b}\right) \cdot \vec{c}$.

5. Find the projection of $\vec{a} = i + 2j + k$ on $\vec{b} = 2i - 3j + k$.

6. If the vectors $\lambda i + 5j - 6k$ and $7i + 2j + 4k$ are orthogonal find λ.

7. Find the unit vector of $\vec{a} = 2i + 3j - k$.

8. If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$, find $\vec{a} \cdot \vec{b}$.

9. If $A = (3, -4, 2)$, $B = (-6, 8, 4)$ then find the position vectors of A and B. Also find $\overrightarrow{AB}$ and $|\overrightarrow{AB}|$.

10. If $\vec{a} = i + 2j + 3k$ and $\vec{b} = 4i - j - 5k$, find $\vec{a} + \vec{b}$ and $|\vec{a} + \vec{b}|$.

11. If $\vec{a} = 2i - j + k$ and $\vec{b} = 3i + j - k$, find $\vec{a} \cdot \vec{b}$.

12. If $\vec{a} = i + j + 2k$ and $\vec{b} = 2i - j + k$, then show that $\vec{a} + \vec{b}$ is perpendicular to $\vec{a} - \vec{b}$.

13. Find the unit vector of $\vec{a}$ if $\vec{a} = 3i + 4j + k$.

14. If $\overrightarrow{OA} = 2i - 3j$ and $\overrightarrow{OB} = 8i + 5j$ then find $|\overrightarrow{AB}|$.

15. If $\vec{a} = 2i + 5j - 6k$, $\vec{b} = 5i - j + 2k$, find $\vec{a} \cdot \vec{b}$.

16. Find unit vector in the direction of $\vec{a} = 5i - j + 2k$.

17. If the vertices of a triangle have position vectors $4i + 5j + 6k$, $5i + 6j + 4k$and $6i + 4j + 5k$, then prove that triangle is an equilateral triangle.

18. Show that the position vectors of the points $2i + 3j + 5k$, $3i + 5j + 2k$ and $5i + 2j + 3k$ form an equilateral triangle.

19. If $\vec{a} = 3i - j + \lambda k$, $\vec{b} = 3i + 3j - 4k$ are orthogonal, find the value of λ.

20. Find the cosine of the angle between the vectors $\vec{a} = 2i + 3j - k$ and $\vec{b} = i + 2j + 2k$.

21. Find the cosine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.

22. Find the cosine of the angle between the vectors $i + j - 3k$ and $2i + j - k$.

23. Find $cos\,\theta$ if θ is the angle between the vectors $\vec{a} = 3i - 2j + 5k$ and $\vec{b} = 2i + 3j + k$.

24. Find the cosine of the angle between the two vectors $\vec{a} = 4i - 2j - 3k$ and $\vec{b} = 2i - 3j + 4k$.

25. Find the projection of the vector $\vec{b} = 3i + 5j + k$ on the vector $\vec{a} = 2i + j - 2k$.

26. Find the projection of the vector $\vec{a} = 2i + j - 2k$on the vector $\vec{b} = 3i + 5j + k$.

27. A particle is acted by constant forces $3i - j + 2k$, $-i + 3j + k$, $i + j - 2k$ and is displaced from the point $(-1,2,3)$ to $(2,-1,5)$. Calculate the total work done by the forces.

28. A force $\vec{F} = 2i + j - 2k$ acting on particle at $(3,2,2)$ displaces it to the point $(1,3,-1)$, find the work done.

29. Find the work done by the force $\vec{F} = 5i + 3j + 7k$ in moving a particle from the point $A(1,2,-1)$ to $B(3,1,-4)$.

TRIGONOMETRY

1. Convert 120^0 into radian and $\frac{3\pi}{2}$into degree.
2. Find the value of $i.\,sin\,3\,00^0$ $\quad ii.\,cot\,2\,25^0$
3. Prove that $tan(45^0 + A) = \frac{1+tan\,A}{1-tan\,A}$
4. Write the formula of $sin(A - B)$ then find the value of $sin\,1\,5^0$
5. Find the value of $sin120^0 cos330^0 - sin240^0\, cos390^0$
6. Simplify $\frac{cos(360^0-A)\,tan(360^0+A)}{cot(270^0-A)\,sin(90^0+A)}$
7. Simplify $\frac{sec(360^0-A)\,cot(90^0-A)}{tan(360^0+A)\,cos\,ec(90^0+A)}$
8. Prove that $sin2A = 2sinAcosA$
9. Prove that $cos2A = cos^2A - sin^2A$
10. Prove that $cos2A = 2cos^2A - 1$

11. Prove that $cos2A = 1 - 2sin^2A$
12. Prove that $sin3A = 3sinA - 4sin^3A$
13. Prove that $cos3A = 4cos^3A - 3cosA$.
14. From a point on the ground, the angle of elevation of the top of a building is 30^0. If the distance from the point to the base of the building is 50 meters, find the height of the building.
15. A tower is 30 meters high. The angle of elevation from a point on the ground to the top of the tower is 30^0. Find the distance of the point from the base of the tower.
16. A tower casts a shadow 20 meters long when the angle of elevation of the sun is 60^0. Find the height of the tower.

COMPLEX NUMBERS:

1. Find the value of $1+i^{10}+i^{20}+i^{30}$
2. Express $\sqrt{3}-i$ in polar form.
3. Express $-1-i$ in polar form.
4. Find the modulus and amplitude of $\sqrt{3}+i$.
5. Find the modulus and amplitude of $1-i$.
6. Find the modulus and amplitude of $1+i$.
7. Express $\frac{(1+3i)}{(1+i)}$ in $a+ib$ form.
8. Express $\frac{(1+3i)}{(1+i)}$ in $a+ib$ form.
9. Express $(1+2i)(3+i)$ in $a+ib$ form.
10. Express $\frac{(2-i)}{(1-i)(3+i)}$ in $a+ib$ form.
11. Find the conjugate of $\frac{(1+i)(1-2i)}{(3+i)}$.
12. Find the modulus and amplitude of $1+\sqrt{3}i$.
13. Find the real and imaginary parts of $(5+3i)(1-2i)$
14. Find the real and imaginary parts of $(5+3i)(1-2i)$

LIMITS

1. Find $\lim_{x\to 2}\left(\frac{x^4-16}{x-2}\right)$.

2. Find the value of $\lim_{x\to -2}\left[\frac{x^3+8}{x+2}\right]$.

3. Find $\lim_{x\to 0}\left(\frac{3x+tan\,2x}{sin\,3x-5x^2}\right)$.

4. Evaluate $\lim_{x\to\infty}\left(\frac{x^2+x+1}{2x^2-3x-4}\right)$.

5. Evaluate $\lim_{\theta\to 0}\frac{sin\,2\theta}{sin\,3\theta}$.

6. Evaluate $\lim_{\theta\to 0}\left[\frac{\theta}{tan\,5\theta}\right]$.

7. Evaluate $\lim_{x\to 0}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{x}\right)$.

8. Evaluate $\lim_{n\to\infty}\left[\frac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)}\right]$.

9. Evaluate $\lim_{x\to 1}\frac{x^2-2x+3}{x^2+x+1}$.

10. Evaluate $\lim_{x\to -3}\frac{x^2+4x+3}{x^2+5x+6}$.

11. Evaluate $\underset{\theta\to 0}{Lt}\left(\frac{1-cos\,2\theta}{\theta^2}\right)$.

12. Evaluate $\underset{x\to\infty}{Lt}\left(\frac{5x^2+3x}{7x^2+2x}\right)$.

13. Evaluate $\lim_{x\to 1}\frac{x^2+5x-6}{x^2-3x+2}$.

14. Evaluate $\lim_{\theta\to 0}\frac{\tan m\theta}{\tan n\theta}$.

15. Evaluate $\lim_{x\to 2}\frac{x^2-9x+14}{x^2-4}$.

16. Find $\lim_{\theta\to 0}\frac{\sin 4\theta}{\tan 5\theta}$.

17. Find $\lim_{x\to 2}\frac{x^2+5x-14}{x^2+x-6}$.

18. Find $\lim_{x\to 0}\frac{\sqrt{2+x}-\sqrt{2-x}}{x}$.

19. Evaluate $\lim_{x\to\infty}\frac{2x^2+3x+5}{6x^2-5x+2}$.

20. Evaluate $\lim_{\theta\to 0}\frac{\tan 2\theta}{\theta}$.

21. Evaluate: $\lim_{x\to 0}\frac{\sqrt{1+3x}-\sqrt{1-3x}}{x}$.

22. Evaluate $\lim_{x\to\infty}\left(\frac{x^2+x+1}{2x^2-3x-4}\right)$.

23. Evaluate $\lim_{x\to 1}\left(\frac{2x-2}{x^2-1}\right)$.

24. Evaluate $\lim_{x\to 2}\left[\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x+2}}\right]$.

25. Find the value of $\lim_{x\to -2}\left[\frac{x^3+8}{x+2}\right]$.

26. Evaluate $\lim_{x\to 1}\frac{x^2-2x+3}{x^2+x+1}$.

27. Evaluate $\lim_{x\to 0}\frac{\sin px}{\tan qx}$.

28. Evaluate $\lim_{x\to -3}\frac{x^2+4x+3}{x^2+5x+6}$.

29. Evaluate $\lim_{x\to\infty}\left(\frac{5x^2+3x}{7x^2+2x}\right)$

30. Evaluate $\lim_{x\to 1}\frac{x^2+5x-6}{x^2-3x+2}$.

31. Evaluate $\lim_{x\to 3}\frac{x^3-27}{x-3}$.

32. Evaluate $\lim_{x\to 2}\frac{x^2-9x+14}{x^2-4}$.

Government of Karnataka
Department of Collegiate and Technical Education

C-25
Diploma Curriculum
COMMON TO ALL ENGINEERING AND NON-ENGINEERING PROGRAMMES EXCEPT COMMERCIAL PRACTICE

(Effective from the AY 2025-26)

ESSENTIAL ENGLISH COMMUNICATION: 25EG01I

Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Curriculum Structure

I/II Semester Scheme of Studies - Common to all Engineering and Non Engineering Programmes except Commercial Practice

Sl. No	Teaching Department	Course Code	Course Name	Hours per week			Total Contact Hours /week	Credits	CIE Marks		Theory SEE Marks		Practice SEE Marks		Total Marks
				L	T	P			Max	Min	Max	Min	Max	Min	
Integrated Courses															
1	ENGLISH	25EG01I	Essential English Communication	4	0	4	8	6	50	20	-	-	50	20	100

L: Lecture: T: Tutorial: P: Practice: **I-Integrated (Theory, Tutorial & Practice-Batch wise classes mandatory)**

Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Program	**Common to all Engineering and Non Engineering Programmes Except Commercial Practice**	**Semester**	**I/II**
Course Name	Essential English Communication	**Type of Course**	Integrated
Course Code	**25EG01I**	**Contact Hours**	8 hours/week (104 hours/semester)
Teaching Scheme	L:T:P - 4:0:4	**Credits**	6
CIE Marks	50 (Practice + Theory Test)	**SEE Marks (Practice)**	50

1. Rationale:

Effective Communication is an important life skill. The process of exchange of information happens vocally (verbal exchanges), through written media (books, websites, and magazines), visually (using graphs, charts, videos and maps), non-verbally (body language, gestures, pitch of voice, and tone) or even electronically (mails, messages, posts). Awareness of, and expertise in basic communication tools, as well as the ability to make use of it in English, is a quality that is bound to open a plethora of doors for a serious learner looking to craft a successful career.

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

CO-01	Effectively read from a printed text, internet and other sources; understand and explain it in different written formats and contexts, adhering to the general rules of grammar and syntax
CO-02	Confidently listen to, perceive and comprehend audio-visual information and use verbal and nonverbal attributes to speak about them
CO-03	Persuasively present cogent, relevant and independent thought and analysis, using latest technological tools

VERY IMPORTANT

CO 1 is attained through learning and assessment of textual questions, composition and comprehension exercises.
CO 2 is accomplished through learning and assessment of listening and speaking skills. Use of audiovisual media is compulsory to fulfil this.
CO 3 is achieved through learning and assessment of presentation skills using modern technological tools. Use of computers, office tools and internet is mandatory.

3. Course Content (Based on the textbook **ESSENTIAL ENGLISH COMMUNICATION FOR POLYTECHNICS** prescribed by DTE; available on the department website**)**

WEEK	CO	PO	Lecture (Theory)	Methodology for Practice	Content for Practice
1	**1, 3**	**6, 7**	**THE INSPIRATIONAL STORY OF ELON MUSK**	Students will share their experiences on and expectations from their community leaders and model personalities	Use of Computers, Internet and Software as tools of Communication Online Newspaper Reading Individual Profile Creation and Resume Preparation using Word tools
2	**1, 3**	**6, 7**	**THE INSPIRATIONAL STORY OF ELON MUSK** Composition (Narrative Writing)	Students will sit in groups of five and discuss the difference between leaders and bosses. Each group shall note down ten points of difference based on the discussion	Building Social Media Profile (LinkedIn, X, Facebook/Instagram)
3	**1, 2, 3**	**6, 7**	**AN EXCERPT FROM OORU KERI**	**ACTIVITY No. 1 for Portfolio Evaluation** Shall be a group activity on topics related to basic English grammar: viz Parts of Speech,	Listening Skills (I Have a Dream - Martin Luther King Jr (https://www.youtube.com/wa

			Composition (Expository Writing) Composition (Descriptive Writing)	Auxiliary verbs and Tenses. Should involve Practical demonstration/ along with a written/printed report/portfolio.	tch?v=qHc3FY9il1s) Sachin Tendulkar's Retirement Speech (https://www.youtube.com/watch?v=joZZyUXU7Bg) Shashi Tharoor's words on anti-colonialism (https://www.youtube.com/watch?v=f7CW7S0zxv4&t=274s) The Great Dictator - Speech (https://www.youtube.com/watch?v=w8HdOHrc3OQ&t=98s) Dananjaya Hettiaracchi - I see something (https://www.youtube.com/watch?v=bbz2boNSeL0&t=169s) Srikanth Bolla (https://www.youtube.com/watch?v=hxS5He3KVEM) Tryst with Destiny https://youtu.be/lrEkYscgbqE?si=U4M_uOH3SXR_8Rf- Ted talk Shah Rukh Khan https://youtu.be/0NV1KdWRHck?si=WOcw6_aX_rvYLSGS Winston Churchill " We shall fight on the beaches." https://youtu.be/skrdyoabmgA?si=zlzVI-ZMTfnFAYw1 Greta Thunberg's speech made at UN Climate summithttps://youtu.be/u9KxE4Kv9A8?si=NSBAL6z7DX_eTWiF Gururaj Karjagi's Motivational speech https://youtu.be/Dzj6TGwwNhg?si=CIbQsDOlEqGisynq
4	**1, 2, 3**	**6, 7**	**AN EXCERPT FROM OORU KERI**	Students in groups of five will talk to the class about any three local festivities, fairs or traditional practices	Speaking Skills Story Narration, Self Introduction, Asking questions based on a given text or a demo video, Self Justification, Theme based arguments, group discussions, extempore speech, elocution.
5	**1, 2**	**6, 7**	**THE SECRET OF THE MACHINES**	Students will debate the pros and cons of mechanisation in the rural areas of India	Technical Jargon – Engineering and Non-Engineering based-subject specific product labels, user manuals, technical/product brochures, sales pamphlets Agile **Non Engineering:** CAFM, CMMS, Compliance, Hot Dealing, ITSM, Hybrid Office, SaaS, Invoice, Indent, Challan, USP, CMS, CMR, TOFU, MOFU, BOFU, Cash cow, Appraisal, Attrition, Sabbatical, Benchmark

6	**1, 3**	**6, 7**	**THE SECRET OF THE MACHINES** Concept Development Note making, Circulars, Announcements, Notifications, Minutes of Meeting etc	Students will bring a few sales brochures to the class and evaluate their effectiveness in communicating the intended message. They will discuss the pros and cons and suggest required changes.	Branch specific product/service pitches/campaigns using PPT tools. Online communication tools - etiquettes of online communication - Do's and Don't s. Use of google forms for data collection and analysis
7	**1, 3**	**6, 7**	**CYBERCRIME**	Students will go through the following links: ✕Most Common Mistakes | Spoken English Connection by Kanchan Ma'am - YouTube Kids Identify and discuss common mistakes in English usage. They will highlight funny and embarrassing situations that might arise due to such errors.	Use of Artificial Intelligence tools in imbibing communication skills, Identification of spam, phishing and Trojan mails Introduction to deep fakes
8	**1, 3**	**6, 7**	**CYBERCRIME** Concept Development using AI tools : Official Communication - Notices, Memo etc, Vocabulary Building	**ACTIVITY No. 2 for Portfolio Evaluation** Shall be a group activity based on topics related to basic English grammar viz: Subject-Verb Agreement, Voices, Homophones, Homonyms and Homographs. Should involve Practical demonstration/ along with a written/printed report/portfolio.	Technical/Professional Writing through Word and PowerPoint using AI Tools
9	**1, 3**	**6, 7**	**CLIMATE CHANGE – A CONVERSATION**	Students will watch the *Shovel scene* from *The Gold Rush* (https://www.youtube.com/watch?v=cMZy1rB8naw) and relate it to the climate variation being experienced in the last few years	Interview Skills (May use **Wadhwani Co-Pilot** or similar platforms) Role play
10	**1, 3**	**6, 7**	**CLIMATE CHANGE – A CONVERSATION** Comprehension - Unknown Passage/Story	After going through the trailer of *Gandhada Gudi* available at https://www.youtube.com/watch?v=cScfvBT6LGU and write a summary of the same. This shall also include their experiences of such naturally beautiful places in their vicinity.	Non Verbal Communication – Body Language, Gesture, Posture, Image, Tone, Pitch, Voice Modulation, Eye Contact, Space
11	**1, 3**	**6, 7**	**A PAGE FROM THE DIARY OF A YOUNG GIRL**	Students will search for information about the books *War and Peace* and *Train to Pakistan* and based on that, will debate the pros and cons of international wars	Professional Correspondence – CV Covering letter, Letters to the editor, higher officers, letters of complaint, business letters
12			**A PAGE FROM THE DIARY OF A YOUNG GIRL**	Students will start maintaining a journal of daily activities. They will record events and	Email Writing Personal and Official Correspondence

	1, 2	**6, 7**	**Punctuation Comprehension - Unknown Passage**	happenings around them and note down their own opinions about the same	Journal Keeping, Note Taking, Notices, Circulars, Announcements, Notifications, Government Orders, Office Memos, Minutes of Meeting, Offer/Appointment & Termination/Resolution Letters, DO Letters, UO Notes
13	**1, 2, 3**	**6, 7**	**Seminars on the textual topics covered from Week 1 to 12**	A set of students shall present a chosen topic from the text and the rest shall interact with them in turns and vice versa	Preparation of a comprehensive report on the topics covered till date, with student inputs and feedback recorded in writing. Content, Style, Format and Syntax of Report Writing to be made aware to and followed by students

EXAMPLES OF TUTORIAL QUESTIONS/LEADS:

The students shall be asked to mull over and articulate their thoughts about the following. These questions must be broad based and analytical, suitable for developing a deeper understanding of the subject through research, group-discussion, opinion sharing, critical analysis and synthesis.

1. Describe the leadership style of a chosen figure. How have their leadership qualities contributed to their successes and failures? Include examples of how their management approach has evolved over time.
2. How has a chosen figure addressed ethical considerations within their businesses and innovations? Discuss any notable instances where their decisions have led to ethical debates.
3. How has a chosen figure's personal life and public persona influenced their professional image? Discuss how they have managed public relations and personal challenges.
4. To what extent do you think luck played a role in the success of a chosen figure? Assess the balance between luck, skill, and determination in their career.

4. References:

Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press,1956. 2. James Hartman et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006. 3. Rajesh Kumar et al. English Language Communication Skills: Lab Manual cum Workbook. Cengage: Cengage Learning India Pvt. Ltd, 2019. 4. Kandula Nirupa Rani et al. Speak Well. Orient BlackSwan: Orient BlackSwan Private Limited, 2012. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980. 5. ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient BlackSwan: Orient BlackSwan Private

5. Suggested Activities: *The Course coordinator shall facilitate the learning of various attributes and attainment of course outcomes through active involvement in and proper stimulation of students' learning processes. Lecture, Tutorial and Practice as well as all assessment activities shall be carried out in batches, inside a well-equipped Language Laboratory. A* ***word a day*** *concept should be introduced and students encouraged to bolster their vocabulary.* ***Grammar exercises may be referenced from*** **Advanced English Lessons, available at https://www.englishpage.com.**

The following is just an indicative and not a comprehensive set of activities for the course. Students and Faculty are encouraged to choose activities that are relevant to the topics being discussed and based on the availability of resources/availability of implementation at their institutes.

Speaking Skills

1. **Role-plays**: Create role-playing scenarios that simulate real-life situations students may encounter in their future careers. For example, role-play scenarios could include job interviews, client consultations, or group project meetings. This activity allows students to practise speaking in different contexts and develop their communication skills
2. **Mock Interviews**: Conduct mock job interviews or admission interviews where students take turns playing the role of interviewer and interviewee. Provide feedback on communication skills, professionalism, and interview performance, helping students improve their speaking skills in professional settings.
3. **Storytelling**. Students can briefly summarise a tale or story they have listened to.They may create their own stories to tell to the class.
4. **Debates**. Holding **debates** is a great way for students to speak a lot in class, as you only act as the facilitator or judge during the activity.
5. **Instructions and Directions**: The student is asked to give directions or instructions, for example to the school library.

Listening Skills

1. **Listen and Summarise**: Provide students with recordings of academic lectures or TED Talks relevant to their field of study. After listening, ask them to summarise the main points, key ideas, and arguments presented in the talk. This activity not only hones listening skills but also reinforces comprehension and critical thinking.

2. **Dictations -** Vocabulary, syntax based
3. **Interactive Listening Games/Activities**: Introduce interactive listening games or activities such as "listen and draw" (where students listen to instructions and draw what they hear) or "listen and sequence" (where students listen to a series of events and arrange them in order). These activities make listening practise enjoyable and reinforce comprehension skills.
4. **Pairings/Group Listening Activities**: Organise pair or group listening exercises where students listen to audio clips or short speeches together. Afterward, encourage them to discuss and share their interpretations, ensuring active engagement and collaboration.
5. **Telephone.** In this activity, students are responsible for listening carefully to their peers in order to successfully relay a message.

Browsing and Presentation Skills

1. Browse KPSC website for the post of Assistant Civil Engineer, extract the details and create 5-6 slides using MS Powerpoint.
2. Browse through scholarship databases and funding opportunities available for you, extract the details and create a presentation using MS Powerpoint.
3. Browse any online collaboration tools and platforms to work on group projects with your classmates, extract the details and create a presentation using any MS Tools.
4. Browse websites and blogs offering professional development resources such as resume tips, interview advice, and career guidance, extract the information and create a presentation using any MS Tools.
5. Browse websites and resources offering skill development exercises, quizzes, and challenges related to your diploma program, extract the information and create a presentation using any MS Tools.

Unit	Concepts	Laboratory Activity
1	Composition, Documentation Elucidation, Presentation and Research	Use of Microsoft Word/Google Docs/Microsoft Powerpoint/Google Slides/WordUp, Memrise, Quizlet, Visuwords, Anki similar open source tools, use of internet to access various news portals and e-papers and magazines and LinkedIn, Facebook, Reddit profiles
2	Listening, Speaking, Verbal and Nonverbal skills	LingQ, FluentU, Speechling, YouTube, Spotify, Elsa Speak, Speechify, Speechnotes, Mozilla DeepSpeech, Descript etc for training students to practice simple conversational exercises.
3	Note taking, Official Communiques and presentation	Notepad, Microsoft OneNote, GoogleKeep, EverNote, Noteful, Obsidian, Gemini AI, Meta AI and ChatGPT for synthesis of various official communiques through input of bare points and Microsoft Powerpoint/Google Slides/similar open source presentation tools for effectively presenting official communication documents
4	Tools and etiquettes of Online Communication, Cyber crime	Google Meet, Microsoft Teams, WhatsApp, Telegram, YouTube
5	Interview Preparations, Body language	Wadhwani CoPilot, ChatGPT, Doulingo, Replika, YouTube,
6	Professional communication and correspondence	Emails, covering letters and notes of introduction, blogs, vlogs, podcasts using offline and online tools

6. *Model* Rubrics for Assessment of Activity (Qualitative Assessment)/ Portfolio Evaluation CIE-5

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Score
		2	4	6	8	10	
1	**CONTENT/ ORGANISATION**	Does not collect any information relating to the topic	Collects very limited information	Collects some information	Collects much information	Collects a great deal of information	**8**
2	**DURATION/ PACE**	Does not keep up time	Not up to the mark	Adequate	Above Average	Extremely good	**6**
3	**PRESENTATION**	Poor presentation	Scope for improvement	Average presentation skills	Presentation effective	Excellent Presentation	**2**
4	**LANGUAGE/ DELIVERY**	Poor Language skills	Scope for improvement	Average Language skills	Effective	Excellent Language	**4**
5	**WORD CHOICE**	Limited Vocabulary	Generally correct words	Experiments with figurative language	Effective and creative verbs	Powerful and engaging words. Accurate and precise	**2**
	Average Marks= (8+6+2+4+2)/5=4.4						**5**

Note: **Descriptors can be redefined by course coordinators as per classroom requirements.**

7. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Week	Duration	Max marks	
1.	**CIE-1 Theory Test**	4	90	50	Average of all 5 CIE=50 Marks Min Passing Marks: 40% in total (20/50)
2.	CIE-2 Practice Test	7	180	50	
3	**CIE-3 Theory Test**	10	90	50	
4.	CIE-4 Practice Test	13	180	50	
5	**CIE-5 Portfolio Evaluation** *(Students are expected to submit a comprehensive report on at least 2 activities executed/performed during the 3rd and 8th weeks of the semester. The same shall be submitted to the course coordinator in the form of a bound folio, with proper indexing and certificate. A maximum of 50 marks shall be awarded for each activity. The final score shall be the average of the marks scored in the three activities)*	1-13	NA	50	
Total Continuous Internal Evaluation (CIE)					50 Marks
Semester End Examination (SEE) -Theory					**NA**
Semester End Examination (SEE)-Practice		180		50	50 Marks
Total Marks: CIE+SEE (50+50)					**100 Marks**

CIE Theory Test 1 (Test No. 1)

Program	Common to all Engineering and Non Engineering Programmes			Semester I/II	
Course Name	ESSENTIAL ENGLISH COMMUNICATION			Test	I/III
Course Code	25EG01I	Duration	90 min	Marks	50

Name of the Course Coordinator:

Note to Course coordinators: This test shall assess learnings from the topics and exercises covered during the first four weeks of the semester, i.e from the texts: THE INSPIRATIONAL STORY OF ELON MUSK & An excerpt from OORU KERI. This shall include Question-Answer and Composition exercises. Each question may have one, two or three subdivisions. Optional questions (1:1 choice) in each section carry the same weightage of marks, cognitive level and course outcomes.

Answer any one full question from each section. Each full question carries equal marks.

Q. No	Questions	CL	Course Outcome	Marks
1	a) List any five of Elon Musk's achievements. Provide details about any one of them. b) Based on your reading of the excerpt from OORU KERI, elaborate the statement: "Nature is an integral part of life in the villages". **OR** c) Briefly define the working of any two of the following: *Tesla Cybertruck/The Boring Company/Tesla Superchargers/Tesla AutoPilot/NeuraLink.* d) Is the writer angry or amused about the societal practices in his village? Explain with examples.	L1 L3 L1 L3	1	10X2=20
2	a) Write a paragraph of not more than 200 words about your favourite personality? **OR** b) What are the qualities of a good leader? Explain with the help of an example?	L2 L2	1	10
3	a) Describe how Coronavirus affected your family. **OR** b) Write a short note about your recent visit to a tourist destination.	L1 L1	1	10
5	a) Draft a fresher Resume to apply for a suitable job? **OR** b) Create a Profile suitable for use in LinkedIn?	L5 L5	1	10

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

CIE Theory Test 2 (Test No. 3)

Program	Common to all Engineering and Non Engineering Programmes			Semester I/II	
Course Name	ESSENTIAL ENGLISH COMMUNICATION			Test	I/III
Course Code	25EG01I	Duration	90 min	Marks	50
Name of the Course Coordinator:					

Answer any one full question from each section. Each full question carries equal marks.

Note to Course coordinators:

This test shall assess the learnings from the topics and exercises covered between weeks 5-10 of the semester, i.e from the texts: THE SECRET OF MACHINES, CYBERCRIME, CLIMATE CHANGE – A CONVERSATION and A PAGE FROM THE DIARY OF A YOUNG GIRL. This shall include Question- Answer, Concept Development, Comprehension and Grammar. Each question may have one, two or three subdivisions. Optional questions (1:1 choice) in each section carry the same weightage of marks, cognitive level and course outcomes.

Q. No	Questions	CL	CO	Marks
1	a) Though the poem *The Secret of Machines* refrains from naming them explicitly, it is understood that there are clear references to many machines. Name any five such and explain their functions in simple words. b) From the reading of the text and your experience of using the internet on computers and phones, list ten good practices that will help you stay away and safe from the threats of cybercrimes. **or** c) What events/circumstances inspired Ms. Kangujam to take up climate activism? d) Jacques's matter of fact statement "I don't dare do anything anymore, 'cause I'm afraid it's not allowed"is a testament to the life of Jews during the II World war. Justify in light of your reading of Anne Frank's diary.	L1 L4 L1 L4	1	10X2=20
2	a) Write a letter to the Deputy Commissioner of your district requesting him to arrange for regular supply of potable water in your locality. Highlight the difficulties being faced by the residents in light of severe summer heat. **OR** b) The annual day function of your college is slated to be held on a certain date this month. Imagine the necessary details and prepare a detailed notice to be displayed for public information.	L3 L3	1	10
3	a) Develop a narrative using the following hints: Lion - sleeping in a forest - mouse - playing on it - angry lion - threatened to kill the mouse - mouse asked to forgive - promised to save him one day - lion laughed - let him off - another day - lion caught by hunter - in net - mouse heard the lion roar - mouse cut the net with his teeth - lion escaped - thanked the mouse. **OR** b) A poor woodcutter's axe slipped and fell into a river—-a God heard him cry and wanted to help him—–he dived brought a gold axe for him——the honest woodcutter did not take this axe——the god again went down into the river and brought up a silver axe, woodcutter refused to accept——the god was very pleased and gave him his own axe as well as the gold and silver axes	L5 L5	1	20

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

9. CIE Practical Test 1 (Test No. 2)

Program	**Common to all Engineering and Non Engineering Programmes**			**Semester**	**I/II**
Course Name	ESSENTIAL ENGLISH COMMUNICATION			**Test**	**IV**
Course Code	**25EG01I**	**Duration**	**3 Hrs**	**Marks**	**50**
Name of the Course Coordinator:					

Questions	**Course Outcome**	**Marks**
Note to Course coordinators: The questions shall concentrate on assessing students' listening and speaking skills, based mainly on audiovisual inputs provided in the classroom from week 1-7. The coordinator may choose one of the videos listed in the curriculum or may even use other audio clips/videos, based on viability.		
Answer any one full question. 1a. Listen to the audio clip being played. Based on your understanding of the audio, answer the following questions. i. ii. iii. iv. v. **OR** **1b.** Sit with a friend of your choice. Talk to him/her and find out about his personal life, achievements, goals and aspirations. Prepare a short writeup of not more than 200 words about the same.	**2**	**50**
Scheme of Valuation **1a & 1b:** Ten marks for each question. Grammatical and syntactical mistakes shall be penalised. The idea is to assess the listening skills of the student and his/her ability to transform the gleaned information into coherent, purpose-built answers.		
	Total Marks	**50**

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

CIE Practical Test 2 (Test No. 4)

Program	Common to all Engineering and Non Engineering Programmes			Semester	I/II
Course Name	ESSENTIAL ENGLISH COMMUNICATION			Test	IV
Course Code	25EG01I	Duration	3 Hrs	Marks	50
Name of the Course Coordinator:					

	Course Outcome	Marks
Note to Course coordinators: The questions shall concentrate on assessing students' presentation skills using modern tools of communication, based on the topics covered in the class between week 8-13.		
Answer any one full question. Grammatical and syntactical mistakes shall be penalised. **1.** a) You are Raghavan. Prepare a **resume** using *relevant details* from the information given below. Use your imagination to fill in details that are not provided. The resume is for seeking an internship at Cognizant/MI India/KPTCL. b) Type the same Resume in MS Age: 18, Height: 5.2, SSLC: 88%, Face resembles Salman Khan, Hobbies: playing PUBG, National Level Tennis Player, Favourite dessert: Ice-cream, Body Builder, Disco dancer, School Leader in 10^{Th} Std, Working part time in father's office, Zodiac sign: Libra. **OR** 2. a) List any five technical terms related to your branch. Explain their meanings in simple words. b) Prepare a PPT highlighting the meaning and importance of the above words.	**3** **3**	**25+25** **25+25**
Scheme of Valuation **1a.** Five marks for including all the essential components of resume; five marks for using only the relevant details; five marks for building up and using the missing details; five marks for relevance of purpose; five marks for presentation **1b.** Ten marks for error free recreation of the written resume in MS Word. Fifteen marks for proper use of formatting and stylistic tools. **OR** **2a.** Five marks for including all the essential components of resume; five marks for using only the relevant details; five marks for building up and using the missing details; five marks for relevance of purpose; five marks for presentation **2b.** Ten marks for error free recreation of the written resume in MS Word. Fifteen marks for proper use of formatting and stylistic tools.		
	Total Marks	**50**

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

10. SEE - Model Practical Question Paper

<table>
<tr><td>Program</td><td colspan="2">Common to all Engineering and Non Engineering Programmes</td><td>Semester</td><td>II</td></tr>
<tr><td>Course Name</td><td>ESSENTIAL ENGLISH COMMUNICATION</td><td>Course Code: 25EG01I</td><td>Duration</td><td>3 Hrs</td></tr>
<tr><td colspan="3">Note to paper setters: 15 marks for written answers - BTE answer script; 15 marks for demonstration using computers; 10 marks for activity based assessment (class notes and assignments); 10 marks for viva-voce questions
Questions on Email Writing, Personal and Official Correspondence, Notices, Circulars, Announcements, Journal Keeping, Note Taking, Notifications, Government Orders, Office Memos, Minutes of Meeting, Offer/Appointment & Termination/Resolution Letters, DO Letters, UO Notes, ,CV Covering letter, Letters to the editor, higher officers, letters of complaint, business letters, interview skills, Technical/Professional Writing, Individual Profile Creation and Resume Preparation, Non Verbal Communication – Body Language, Gesture, Posture, Image, Tone, Pitch, Voice Modulation, Eye Contact, Space can be included in this section.</td><td colspan="2">50 marks</td></tr>
<tr><td colspan="3">1. Question based on audiovisual inputs (Listening and Speaking skills)
2. Question based on presentation skills using technological tools (using computers)
3. Question based on Portfolio Evaluation/Activities
4. Viva-voce questions based on listening and speaking skills.</td><td>3 hours</td><td>15
15
10
10</td></tr>
<tr><td colspan="4">Total Marks</td><td>50</td></tr>
</table>

1) Signature of Examiner 1 **2) Signature of Examiner 2**

11. Equipment/Software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
1	Desktop Computers (All in ones preferred)	Core i7 and above 16GB RAM 1TB ROM Windows 11+	31
2	Headphones with mic	Sony MDR ZX110AP Wired Headset with In-line remote and mic for hands-free calls	31
3	Multimedia Speakers	Sony SA-D40 4.1 Channel Speaker, 80 Watts	1 Set
4	Ink Tank Colour Printer	HP 790 Ink Tank Multifunction Colour Wi-Fi Printer	1
5	UPS	As per the power needs for the above setup (10KV)	1
6	Digital Projector Ceiling-mounted with brackets and installation	Epson EB695Wi	1
7	LAN/WiFi with High Speed Internet connection		31
8	Language Lab Modules/Softwares Robotel/ SPEARS Language Lab/ iTell Digi Language Lab/ Digital Teacher OR similar		
9	**Books for Reference** 1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press,1956. 2. James Hartman et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006. 3. Rajesh Kumar et al. English Language Communication Skills: Lab Manual cum Workbook. Cengage: Cengage Learning India Pvt. Ltd, 2019. 4. Kandula Nirupa Rani et al. Speak Well. Orient BlackSwan: Orient BlackSwan Private Limited, 2012. 5. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980. 6. ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient BlackSwan: Orient BlackSwan Private		

CO-PO CORRELATION

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7
1	0	0	0	0	0	3	3
2	0	0	0	0	0	3	3
3	0	0	0	0	0	3	3
LEVEL 3- Highly Mapped, LEVEL 2-Moderately Mapped, LEVEL 1- Low Mapped, Level 0- Not Mapped							

CO	UNIT	PO	CL	HOURS	MARKS
1	1, 2, 3, 4, 5, 6	6, 7	L1, L2, L3, L4 L5	36	35
2	2, 5	6, 7	L2, L3, L5	32	30
3	1, 3, 4, 6	6, 7	L1, L2, L3, L4 L5	36	35
TOTAL HOURS/MARKS				**104**	**100**

x x x

Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Program	**Computer Science and Engineering**	**Semester**	1/2
Course Name	**IT Skills**	**Type of Course**	Integrated
Course Code	**25CS01I**	**Contact Hours**	7 per week
Teaching Scheme	3: 0:4	**Credits**	5
CIE Marks	50	**SEE Marks**	50 (Practice)

1. Rationale:

In today's fast-changing digital world, foundational IT skills are crucial for technical professionals. This course equips students with hands-on experience in key areas, including computer fundamentals, cybersecurity, problem-solving, **Cloud Computing**, IoT, Artificial Intelligence (AI), and prompt engineering. Additionally, it covers IT certifications to help students build industry-relevant expertise and enhance their job readiness.

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

CO-01	Demonstrate knowledge of computer hardware, software, networking, and internet services.
CO-02	Identify common cyber threats and implement security measures.
CO-03	Apply algorithmic thinking and block-based coding to create simple programs.
CO-04	Explain applications of digital technologies such as Cloud, IoT and AI.
CO-05	Apply AI tools and prompt engineering techniques to generate meaningful outputs.

3. Course Content

Week	**CO**	**PO**	**Lecture(3HRS) (Knowledge Criteria)**	**Practice(4HRS) (Performance Criteria)**
1	**1**	**1, 4**	**Introduction to Computers** ▪ Definition and basic understanding of a computer.	1. Identify the parts of a computer system.

			▪ Generations of Computers ▪ Classification of computer based on their size, purpose, functionality, and technology. ▪ Functional Block Diagram of a Digital Computer. **Memory Systems:** Types of Memory and Their Usage: Primary Memory, Secondary Memory: Input/output Systems **Software:** System software vs. application software	2. Identify the operating system and hardware specifications of a computer.. 3. Basic folder/ file operations (GUI based) 4. Install application software such as web browser, scratch. 5. Hardware scavenger hunt (students identify components in disassembled PC images). Case Study: Prepare a report on important factors to be considered while buying a computer (based on purpose and budget).
2	**1**	**1, 4**	**Internet skills:** ▪ What is Computer Networks? ▪ Types of Networks. Physical and Logical address, Protocols, Key Devices in a Network (Router, Switch, Modem, Access Point) ▪ What is Internet? Common Applications of the Internet; ▪ Browsers, Web Server, Client–Server Model, URL, Search Engine, Domain name and domain name system, websites. ▪ Personal website, website hosting.	1. Explore and list 3 real-world examples for each type of network (LAN, MAN, WAN). 2. Find your Physical (MAC) and Logical (IP) Address 3. Create an email account (e.g., Gmail, Outlook) and explore its security settings 4. Using a Search Engine Effectively : Search for "How does a Search Engine work?" 5. Design, develop and host a personal website using any free platform such as wix.com or worldpress.com 6. Test Internet speed
3	**2**	**1, 4, 7**	**Cybersecurity** ▪ Introduction to Cybersecurity ▪ What is Cybersecurity? ▪ CIA -triad ▪ Importance and Risks ▪ Common Threats: Malware, Phishing, Ransomware, Social Engineering ▪ Cybersecurity Best Practices	1. Identify different cyber threats using real-world examples 2. Install and run an antivirus scan 3. Create strong passwords using password managers 4. Enable and test multi-factor authentication (MFA) 5. Implement User Access Control (UAC) settings on a system 6. Identify safe vs. unsafe websites using browser security indicators

			Secure Authentication and Access Control ▪ Importance of Strong Passwords and ▪ Multi-Factor Authentication (MFA) ▪ Role of User Access Control and Privileged Accounts ▪ Password Management Tools **Safe Browsing and Data Protection** ▪ Secure Websites (HTTPS, SSL Certificates) ▪ Identifying Fake Websites and Links ▪ Basics of Encryption and Secure File Sharing ▪ Importance of Backups	7. Encrypt and decrypt a file using built-in OS tools 8. Set up and perform a basic data backup
4	**2**	**1, 4, 5, 7**	**Cyber security best practices** ▪ Awareness on cyber safety ▪ Do's and dont's w.r.t ▪ Password Management ▪ Safe Browsing and Email Habits ▪ Software and System Security ▪ Data Protection and Backup ▪ Social Engineering and Phishing Awareness ▪ Secure Mobile and IoT Devices ▪ Staying Safe from Online Predators, Cyberbullying and Cyber harassment, Using Social Networks Safely**.**	1. Spot Fake Websites and Phishing Emails 2. Analyze real vs. fake websites (check for HTTPS, domain names, security certificates). 3. Identify phishing emails (hover over links, check sender email, grammar errors). 4. Update and Patch Management a. Check if your OS and software are up to date (Windows Update, Linux apt upgrade). b. Test an antivirus scan and remove unnecessary apps. 5. Implement a Backup Strategy 6. Encrypt and Secure Sensitive Files 7. Recognizing Scam Calls and Messages
5	**3**	**1, 2, 3, 4, 7**	**Introduction to Problem Solving** ▪ What is problem-solving? ▪ Problem-solving cycle. ▪ Introduction to block-based coding (Scratch, Blockly, MIT App Inventor / Klaritree or similar tool).	1. Explore the interface of the block coding tool 2. Develop algorithms and draw flowchart ▪ for basic arithmetic operations. ▪ Metric conversions.

			▪ Understanding algorithms, flowcharts, and sequencing.	
6	**3**	**1, 2, 3, 4, 7**	What are variables? Storing and updating values. Using variables for score counters and timers. Basic Elements of Block-Based Coding: ▪ Motion Blocks ▪ Looks Blocks ▪ Events Blocks ▪ Control Blocks ▪ Operators Blocks ▪ Variables Blocks	1. Create a simple animated sequence (e.g., making a sprite move in Scratch). 2. Design a flowchart for a real-world task 3. Create a score counter for a simple game. 4. Develop an interactive greeting app that responds to user input.
7	**3**	**1, 2, 3, 4, 7**	**Decision Making** ▪ What are conditions? (if, if-else, nested if). ▪ Boolean logic (AND, OR, NOT). ▪ Applying conditional logic in games and applications.	1. Develop algorithms and draw flowchart to demonstrate comparison and logical operations (eg. Comparison of two number) 2. Create an interactive story with decision-making (yes/no choices). **3.** Build a traffic light simulator using conditional statements.
8	**3**	**1, 2, 3, 4, 7**	**Understanding Loops and Repetition** ▪ Importance of loops in coding. ▪ Types of loops (repeat, repeat until, forever). ▪ Practical use of loops in problem-solving.	1. Create a bouncing ball animation using loops. **2.** - Design a counting program that prints numbers from 1 to 20 using loops.
9	**4**	**1, 4, 7**	**Cloud Computing** ▪ What is **Cloud Computing**? ▪ **Cloud Computing** benefits and use cases ▪ Cloud service models (IaaS, PaaS, SaaS)	1. Create a free cloud account (AWS, Azure, or GCP) 2. Explore the cloud console and key services 3. Set up cloud storage and upload/download files 4. Create Online Forms and Surveys to capture data using cloud services
10	**4**	**1, 4, 7**	**Internet of Things (IoT)** ▪ What is IoT? ▪ Characteristics	1. Create a simple visual block code to blink LED in Arduino board using visual block code, upload code to Arduino board and demonstrate.

			▪ Components of IoT (Sensors, Actuators, Communication, Cloud, Analytics) ▪ Use Cases of IoT across various industries. ▪ Examples of IoT in everyday life	2. Create a Traffic signal controller with 3 LED (RED, YELLOW and GREEN), upload code to Arduino board and demonstrate. Note : Students and Teachers to use visual block code platform such as a. https://www.tinkercad.com/ b. https://mblock.cc for building IoT application and demonstration.
11	**4, 5**	**1, 4, 7**	**Artificial Intelligence** ▪ What is AI? ▪ Types of AI (Weak AI, Strong AI, General AI) ▪ AI in Everyday Life: Real-world applications ▪ AI Systems like prediction, recommendation ,etc. ▪ - AI Applications (Healthcare, Finance, Robotics, etc.)	Explore AI tools such as : ChatGPT, Deepseek, Gemini,Grok, Copilot, NapkinAI, Sora,etc
12	**5**	**1, 4, 7**	**Prompt Engineering** ▪ What is Prompt Engineering? ▪ Role of AI language models ▪ Types of AI prompts: Direct, Instructional, Conversational ▪ Understanding AI capabilities and limitations **Structuring Effective Prompts** ▪ Key principles of writing effective prompts ▪ Clarity, specificity, and context in prompts ▪ Role of tone, format, and constraints **Domain-Specific Prompting** ▪ Using AI for content creation (writing, marketing, coding) ▪ AI in education and research ▪ Customizing prompts for business applications	1. Exploring different AI models (ChatGPT, Claude, Bard) 2. Testing basic prompts and analyzing responses 3. Improving weak prompts 4. Experimenting with structured vs. unstructured prompts
13	**1, 2,**	**1, 7**	**IT Certifications and Career Paths**	**1.** Research and present a report on popular IT certifications.

	3, 4		▪ Overview of IT certifications (Entry-level to Expert) ▪ Importance of certifications in IT careers ▪ Choosing the right certification based on career goals (Networking, Security, Cloud, Development, etc.)	2. Identify career interests and match them with relevant certifications. 3. Develop a career roadmap with certification milestones.

4. References

Sl No	Description
1	*Computer Fundamentals* by P.K. Sinha (11th Ed.)
2	*Data Communications and Networking* by Behrouz Forouzan (5th Ed.)
3	*Cybersecurity for Beginners* by Raef Meeuwisse – Covers threats
4	*Coding for Kids: Scratch* by Jon Woodcock
5	***Cloud Computing** Basics* by Anders Lisdorf
6	*IoT for Beginners* by Adeel Javed
7	*Artificial Intelligence: A Guide for Thinking Humans* by Melanie Mitchell
8	*The Tech Career Guide* by Aki Ito
9	Learn Prompting
10	AI Playground
11	Tinkercad Circuits
12	Blockly Games
13	https://onlinecourses.swayam2.ac.in
14	https://www.geeksforgeeks.org
15	Essentials of Prompt Engineering | Coursera
16	https://www.ncerc.ac.in

5. Suggestive Online courses

Sl no	Topic Name	Reference Courses	Self Assessment Link	Source
1	**Cybersecurity**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014222737382490112870/overview		Coursera
2	**Security Attacks**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013842495231705088165 31_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/html/lex_auth_0138424974193704961598 2_shared?collectionId=lex_auth_0138424952317050881653 1_sharedandcollectionType=Course	IIHT
3	**Introduction to Problem Solving**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013114932072439808168 5_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_auth_013234465974222848743 2_shared?collectionId=lex_auth_013114932072439808168 5_sharedandcollectionType=Course	Infosys Wingspan
4	**Flowcharts**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013501555913695232790 9/overview		Skillsoft

5	**Block coding**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013177717283605708885_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/html/lex_auth_013165205899452416510_shared?collectionId=lex_auth_013177717283605708885_sharedandcollectionType=Course	IIHT
6	Block coding	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013094404668416000169 3_shared/overview		IIHT
7	**Cloud Computing**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_2924501508992264000 0_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_auth_01268242367501107260_shared?collectionId=lex_29245015089922640000_sharedandcollectionType=Course	Infosys Wingspan
8	Internet of Things	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_215536228825219970 00_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_12361814852557394000_shared?collectionId=lex_21553622882521997000_sharedandcollectionType=Course	Infosys Wingspan
9	Artificial Intelligence	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_8840337130015322000_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_261056189367467100002000_shared?collectionId=lex_8840337130015322000_sharedandcollectionType=Course	Infosys Wingspan

6. CIE Assessment Methodologies

Sl.No	CIE Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1Theory Test	4	90	50	Average of all CIE=50 Marks
2.	CIE-2Practice Test	7	180	50	
3	CIE-3Theory Test	10	90	50	
4.	CIE-4Practice Test	13	180	50	
5	CIE-5 ▪ Portfolio evaluation (20) ▪ Online Course/s of minimum 10 Hrs. in Infosys Spring Board/ Swayam/NPTEL/AWS /any other (30)	1-13		50	
				Total	**50 Marks**

Note:

Portfolio evaluation

Each laboratory exercise will be evaluated for a total of 20 marks. The evaluation will include the following components:

- Written description of the experiment in the observation book.
- The results obtained from the experiment.
- Corrections and evaluations of the experiment completed in the previous class, documented in the record book.

The average of all exercises shall be considered for the final assessment at the end of course.

Rubrics for the Mini Project (if included) should be defined by the course coordinator.

7. SEE – Practice Assessment Methodologies

Sl.No	SEE – Practice Assessment	Duration (minutes)	Max marks	Min marks to pass
1.	Semester End Examination-Practice	180	50	20

8. Theory Test model question paper

Program	**Computer Science and Engineering**			**Semester -1**	
Course Name	**IT Skills**			**Test**	**III**
Course Code	**25CS01I**	**Duration**	**90 min**	**Marks**	**50**
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					

Q.No	Questions	Cognitive Level	Course Outcome	Marks
	Section - 1			
1	a. Explain the significance of the functional block diagram of a digital computer with a neat diagram. (5) b. Explain the evolution of computers through different generations, highlighting key technological advancements in each generation. (10) c. Explain the different types of networks (LAN, MAN, WAN) with suitable real-world examples. How do they differ in terms of scale and application?(10)	L2	1	25
2	a. Classify computers based on size and purpose. Provide one real-world use case for each type. (5) b. **Explain** how advancements in computer generations (from	L2	1	

	vacuum tubes to AI) have impacted business productivity. (10) c. Describe the client-server model using the example of an online banking website. (10)			
Section – 2				
3	a. *A friend unknowingly clicks a phishing link and shares their bank credentials. Using the CIA triad, explain the potential risks. Then, outline steps they should take immediately to mitigate damage. (10)* b. What is Multi-Factor Authentication (MFA)? How does it improve authentication security? Provide an example (8) c. Define Cybersecurity and explain the CIA Triad model. Why is it essential in today's digital world? (7)	L2	2	25
4	a. Describe the importance of password management tools. How do they contribute to secure authentication? Illustrate with examples of popular tools. (10) b. Explain how HTTPS and SSL certificates ensure secure browsing. How can users verify a website's security? (8) c. Compare phishing and ransomware attacks in terms of intent, delivery method, and impact. (7)	L2	2	
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.				

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

9. CIE Practice Test model question paper

Program	**Computer Science and Engineering**			**Semester**	**1**
Course Name	**IT Skills**			**Test**	**II**
Course Code	**25CS01I**	**Duration**	**180 min**	**Marks**	**50**
Name of the Course Coordinator:					

Questions	**CO**	**Marks**
You have been hired as an IT Support Specialist in a company. Your first assignment is to set up a secure computer system, connect it to a network, and develop a simple automated task using block-based coding. You are required to: a. Set up a computer system by identifying its hardware and software specifications. ▪ Find and document system details like CPU, RAM, storage, and operating system. ▪ Identify whether the installed software is system software or application software. b. Configure network settings and verify the internet connection. ▪ Retrieve and document the IP address, MAC address, and default gateway. c. Ensure cybersecurity best practices to protect the system and online accounts. d. Develop a simple program using block-based coding (Scratch, Blockly, or MIT App Inventor) to automate a basic task. ▪ Create an interactive quiz that asks a user three questions and gives feedback on their answers. OR ▪ Develop a program where a sprite moves when arrow keys are pressed.	**2**	**50**
Scheme of assessment Computer System Setup - 10 Network Configuration and Internet Connectivity - 10 Cybersecurity Best Practices – 10 Block-Based Coding - 20		
	Total Marks	**50**

Sign of the Course Coordinator **Signature of the HOD**

10. SEE- Model Practice Question Paper

Program	Computer Science and Engineering		Semester	1
Course Name	IT Skills	Course Code : 25CS01I	Duration	180 min
Questions			**CO**	**Marks**
As an IT specialist, you are tasked with setting up a secure digital environment for a small business. You must: a. Configure and document the computer hardware and software specifications of a system. b. identify the IP and MAC addresses and enable basic security settings. c. identify phishing threats and implement Multi-Factor Authentication (MFA). d. Develop a simple interactive program using block-based coding that automates a basic business task of greeting customers e. Use AI tools to generate a business report and refine the output using effective prompt engineering techniques. i.			**1,2,3,5**	**50**
Scheme of assessment a. System setup - 10 b. Cybersecurity Measures - 10 c. Block-Based Coding and Algorithmic Thinking - 10 d. Report Submission and Presentation - 20				
			Total Marks	**50**

1.Signature of the Examiner **2. Signature of the Examiner**

11. Equipment/software list with Specification for a batch of 30 students

Sl.No.	Particulars	Specification	Quantity
01	Desktop/Laptop PC with Windows/Linux	Intel i3, 500GB Hard Disk/SSD, 8GB RAM, Monitor, Mouse, Keyboard or higher configuration	30
02	Internet Connection	100 Mbps speed or higher subscription	1
03	LAN connectivity/ High speed Wireless AP	32 Port Switch with LAN cabling/ Wifi Adapters (32 No.)	1
04	Online UPS	5KV with 3 -6 hours backup	1
05	Projector	Multimedia Projector	1

06	White Board	Plane white board / Smart Board/Smart TV	1
07	Audio Speakers	Multimedia, Two-way hybrid speaker system	2

Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Program	**CIVIL ENGINEERING**	**Semester**	**I**
Course Name	**CONSTRUCTION MATERIALS**	**Type of Course**	**Integrated**
Course Code	**25CE11I**	**Contact Hours**	**104 Hrs./Sem. 8 Hrs./Week**
Teaching Scheme	**L: P: :4: 4**	**Credits**	**6**
CIE Marks	**50**	**SEE Marks**	**50 (Theory)**

1. Rationale:

The studying construction materials at this level aims at helping the learner to supervise construction of various types of civil works involving use of various materials like stones, bricks and tiles, cement and cement-based products, lime, timber and wood-based products, paints and varnishes, metals, and other miscellaneous materials. This integrated course gives knowledge regarding characteristics, uses and availability of various building materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition, specifications of various materials should also be known for effective quality control.

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

CO-01	Identify the materials used for Civil Engineering construction.
CO-02	Select suitable construction material for various Civil Engineering Works.
CO-03	Identify and use suitable sustainable construction material.

3. Course Content

WEEK	CO	PO	Theory	Practice
1	**1 ,2**	**1, 5, 7**	**Basic Construction Materials Stones** • Geological Classification of Rocks • Properties and applications of different types of Rocks (Granite, Basalt, Sandstone, Limestone, Laterite, Marble, Quartzite, Gneiss, and Slate) • Requirements of good building stone • Methods of Quarrying (Wedging)	**Identification, Properties, and Applications of different Rocks** ✓ Granite ✓ Basalt ✓ Sandstone ✓ Limestone
2	**1, 2**	**1, 4, 5, 7**	**Basic Construction Materials Aggregates** ▪ Classification based on size ▪ Physical properties of aggregates ▪ Requirements of fine and Coarse aggregates • Applications of Manufactured Sand	**Identification, Properties, and Applications of different Rocks** ✓ Laterite ✓ Marble ✓ Quartzite ✓ Gneiss

			(M-Sand), River Sand, Plastering Sand (P-sand) and Filtered sand (F-sand) ▪ Comparison of River sand, M- Sand and Plastering Sand (P-sand)	✓ Slate ➢ River sand, M- Sand, P-sand and F-sand
3	**1, 2**	**1, 4, 5, 7**	**Basic Construction Materials Cement** • Definition of Cement • Composition/Ingredients of OPC • Functions of ingredients • Manufacturing process of Cement - Dry process (study only flow chart) • Storage of Cement • Properties and Uses of different types of cement (Ordinary Portland Cement 43 grade & 53 grade, Portland Pozzolana Cement (PPC), Portland Slag Cement (PSC), White Cement)	**Field tests on Cement** ✓ Colour ✓ Date of Manufacturing ✓ Temperature ✓ Smoothness ✓ Lumps ✓ Water Sinking
4	**1, 2**	**1, 4, 5, 7**	**Building Blocks** **Masonry Bricks and Blocks** • Composition of good brick earth • Requirements of good Bricks • Manufacturing process of bricks by Clamp and continuous kiln (Hoffman's)` • Classification of bricks based on quality (I, II, & III class)	**Field tests on bricks** ✓ Shape, Size and Colour ✓ Soundness ✓ Density ✓ Cracks ✓ Hardness ✓ Water absorption test.
5	**1, 2**	**1, 4, 5, 7**	**Building Blocks** **Masonry Bricks and Blocks** Identification, Properties and Uses/Advantages/Applications of • Flyash bricks • Fire/ Refractory Bricks • Masonry Concrete blocks (Solid & Hollow) • Autoclaved Aerated Concrete Blocks (AAC) • Interlocking Masonry solid blocks	**Field tests on Masonry blocks** ✓ Shape ✓ Size ✓ Texture ✓ Density ✓ Water absorption test
6	**1, 2**	**1, 4, 5, 7**	**Timber** • Classification of timber • Structure of an exogenous tree • Properties of good timber • Seasoning of Timber (Natural) • Defects in Timber (Lists only) • Objectives of Preservation of Timber	**Identification and Applications of** **1. Natural Timbers** (Teak, Rose, Honne, Jackfruit, Mango, Neem, Silver oak, Matti, Nandi, and Casuarina) **2. Industrial Timbers** Veneers, Plywood, Fibre board, Hardboard, Block board and Laminated sheets

7	**1, 2**	**1, 5, 7**	**Ferrous and Non-Ferrous materials** Properties and uses/applications of • Mild Steel • Cast iron • Rebar steel (TMT bars) • Stainless Steel • Galvanized Iron (GI) • Aluminium	**Identification and Applications of Roofing Materials** Mangalore tiles, Country tiles, Asbestos Cement sheet, Galvanized Iron sheets, Roof Shingles, PUF sandwiched roofing sheets, UPVC sheets, Poly-carbonate sheets, Meta Colour sheets and Proflex sheets,
8	**1, 2**	**1, 5, 7**	**Plastic and PVC materials** Properties and uses/applications of • Thermo-plastic • Thermo-setting Plastics • PVC • UPVC • CPVC • Fibre-Reinforced Plastic (FRP)	**Identification and Applications of Cladding Materials** Stone Cladding, UPVC Cladding, Tile Cladding, Glass Cladding, Composite Cladding, Aluminium Cladding, Brick Cladding, Wood Cladding and Metal Cladding
9	**1,2**	**1, 5, 7**	**Flooring materials** Properties and uses/applications of • Granite Slabs • Marble slabs • Ceramic Tiles • Vitrified Tiles ❖ FBVT ❖ PGVT ❖ GVT ❖ DCVT • Terra-cotta	**Identification and Applications of Flooring Materials** Marble, Granite, Vitrified Tiles, Ceramic tiles, Pressed Clay tiles, Cement concrete with red-oxide finish, Interlocking pavers, Wooden flooring, Shahabad stone flooring, Italian Marble, and Anti-skid tiles.
10	**1,2**	**1, 5, 7**	**Paints and Coats** • Objectives of paint • Characteristics of good paint • Ingredients of Paints Types of paints and its applications (Types of Paint as listed in Practical part)	**Identification and applications of Paints and Coats** Wall Putty, lime Distemper, Emulsion Paint, Enamel Paint, Cement paint, Aluminium Paint, Anti-Corrosive Paint, Water Proofing Paints, Thermoplastic paint. Primer (wall, metal, and wood) Varnish materials.
11	**1,2**	**1, 5, 7**	**Glass Materials** • General properties of glass • Properties and uses of different glasses ▪ Soda lime glass ▪ Potash-lime ▪ Potash-Lead glass ▪ Common glass.	**Identification and applications of Glass Materials** Glass panels- Plain, Dark cool, Brown cool, printed, Wired glass, Perforated glass, Float glass, Toughened glass, and Glass bricks.

12	**1,3**	**1, 5, 7**	**Sustainable Materials** Introduction, need, scope and Benefits of Sustainable Materials Uses/Advantages and Applications of • CSEB (Compressed Stabilized Earth Blocks) • Fly ash • GGBS • Bamboo • Certified wood (Wood Polymer composite) CRMB (Crumb Rubber Modified Bitumen)	**Identification and Applications of Sustainable Materials** Demolition wastes, Re-cycled materials, Bamboo, CSEB, Certified wood, Earth packed tyres, newspaper compressed wood, recycled glass, earth bags, Cob, Cork (brick & wood), Adobe brick, straw bale, and mycelium. *Note: In case of non-availability of Sustainable materials locally, they can be demonstrated through PPT*
13	**1,2**	**1, 5, 7**	**Miscellaneous Materials** Uses/Advantages and Applications of • Ferro-cement Products • Geo-synthetics materials • Plaster of Paris (POP) • Bitumen • Gypsum • HDPE & LDPE	**Identification and applications of Miscellaneous Materials** Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Tile joint filler material, Sealants, Tar felt sheets, expanded metal strips for joints, Adhesives (for PVC, UPVC, Timber), Gypsum boards, Structural Steel Forms, and Powder coated Aluminium Materials

4. References:

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- S.S. Bhavikatti "Building Materials," Vikas Publishing house. 2012
- N. Subramanian "Building Materials testing & Sustainability", Oxford University Press. 2019
- Duggal S.K. "Building Materials," New age International Publishers. 2019
- Gurucharan Singh "Building Construction & Materials," Standard book house. 2019
- P.C. Varghese "Building Materials" Prentice Hall India Pvt ltd. 2015
- Ravi Kumar Sharma "Testing of Construction Materials" Dreamtech press. 2019
- M.L. Gambir & Neha Jamwal "Building & Construction Materials" McGraw Hill Education. 2017
- "Engineering Materials" Manual by NITTTR, Chandigarh
- IS 383 (2016) Code of practice for "Specification for Coarse and Fine Aggregates from Natural Sources for Concrete".
- IS 269 (2015) Code of practice for "Requirements of Ordinary Portland Cement"
- IS 455 Code of practice for "specifications for PSC (Portland slag cement)"
- IS: 1489 Code of practice for "Specifications for PPC (Portland pozzolana cement)"
- IS 1077 Code of practice for "Common Burnt Clay Building Bricks - Specification" 1S: 2185 (Part 1) "Hollow and solid concrete blocks used as masonry units"

Learning Websites

- https://en.wikipedia.org/wiki/List_of_building_materials
- https://www.ultratechcement.com/for-homebuilders/products/overview-building-product
- https://www.ultratechcement.com/for-homebuilders/home-building-explained-

single/descriptive- articles/building-materials-used-in-construction

- https://www.nerolac.com/blog/types-of-paint
- https://www.asianpaints.com/blogs/types-of-paints-uses-and-applications-of-paints.html
- https://www.bigrentz.com/blog/sustainable-construction
- https://en.wikipedia.org/wiki/Glass
- https://in.saint-gobain-glass.com/knowledge-center/glass-and-windows#
- https://theconstructor.org/building/types-of-flooring-materials-uses-building/16992/
- https://mccoymart.com/post/upvc-vs-pvc-vs-cpvc/
- https://en.wikipedia.org/wiki/Geosynthetics
- https://mccoymart.com/post/cladding-materials-types/
- https://100pillars.in/types-of-roofing-materials-you-can-use-for-your-new-home/
- https://theconstructor.org/building/types-industrial-timber-uses-properties/17346/
- https://www.bbc.co.uk/bitesize/guides/z74bcj6/revision/2
- https://www.ultratechcement.com/for-homebuilders/home-building-explained-single/checklist-page-
  /bricks-vs-blocks
- https://www.jkcement.com/blog/basics-of-cement/types-of-cement/
- https://www.ultratechcement.com/for-homebuilders/home-building-explained-single/descriptive- articles/m-sand-vs-river-sand
- https://www.ultratechcement.com/for-homebuilders/home-building-explained-single/descriptive- articles/types-of-cement

5. CIE Assessment Methodologies

Sl.No	CIE Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1TheoryTest	4	90	50	Average of all CIE=50 Marks
2.	CIE-2Practice Test	7	180	50	
3	CIE-3TheoryTest	10	90	50	
4.	CIE-4Practice Test	13	180	50	
5	CIE-5 Portfolio evaluation of all the activities through Rubrics	1-13		50	
				Total	**50 Marks**

6. SEE - Theory Assessment Methodologies

Sl. No	SEE – Theory Assessment	Duration	Exam Paper Max marks	Exam Paper Max Marks scale down to (Conversion)	Min marks to pass
1.	Semester End Examination-Theory	3 Hours	100	50	20

7.CIE Theory Test model question paper

Program	Civil Engineering			Semester - I	
Course Name	Construction Materials			Test	I/III
Course Code	25CE11I	Duration	90 min	Marks	50
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					

Q.No	Questions	Cognitive Level	Course Outcome	Marks
	Section - 1			
1	a) List the requirements of good building stone. b) Write the properties and applications of i) Granite ii) Sandstone. c) Compare M-sand & River sand.	R R U	CO2	07 08 10
2	a) List any five applications of M-sand and River sand. b) List the requirements of fine aggregates. c) Explain the methods of Quarrying by wedging.	R R U	CO2	10 5 10
	Section - 2			
3	a) While selecting material for brick masonry for a building, water absorption test was conducted on the brick samples. The bricks absorbed 52% of water i.To which class does these bricks belong? ii. Can these bricks be used for construction ('Yes' or 'NO')? iii. If 'Yes' or 'NO' Give reasons b) Explain the manufacture process of bricks by Hoffman's Kiln	Ap U	CO2	15 10
4	a) As a site Engineer you are supposed to receive a cement bag delivered to the construction site (i) Mention the precautions taken during the storage of cement (ii) Explain the problems face due to improper storage (iii) Does the storage effects strength of the cement? Give reasons b) Draw the flow chart of Manufacturing process of Cement by Dry process.	Ap U	CO2	15 10

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

7. CIE Practice Test 1 model question paper

Program	Civil Engineering			Semester	I
Course Name	Construction Materials			Test	II
Course Code	25CE11I	Duration	180 min	Marks	50
Name of the Course Coordinator:					

Questions	CO	Marks
1.a) Identify the given construction material (any 5 materials) b) write any three properties of the given material. c) write any three uses/ applications of the given material.	CO 1	50
Scheme of assessment a) Identification-4marks each- 4x5materials =20marks b) Writing any three properties-3marks each- 3x5materials =15marks c) Writing any three uses/ applications-3marks each- 3x5materials =15marks		50
Total Marks		50

Signature of the Course Coordinator **Signature of the HOD**

7. CIE Practice Test 2 model question paper

Program	Civil Engineering			Semester	I
Course Name	Construction Materials			Test	IV
Course Code	25CE11I	Duration	180 min	Marks	50
Name of the Course Coordinator:					

Questions	CO	Marks
1.a) Identify the given construction material (any 5 materials) b) Write any three uses/ applications of the given material.	CO 1	30
2.a) Identify the given sustainable material (any 2 materials) b) Write any two advantages of the given material. c)Write any two applications of the given material.	CO 3	20
Scheme of assessment Q.1 a) Identification-4marks each- 4x3materials =12marks b) Writing any three properties-3marks each- 3x3materials =09marks c) Writing any three uses/ applications-3marks each- 3x3materials =09marks		30
Q.2 a) Identification-4marks each- 4x2materials =08marks b) Writing any two advantages-3marks each- 3x2materials =06marks c) Writing any three uses/ applications-3marks each- 3x2materials =06marks		20
Total Marks		50

Signature of the Course Coordinator **Signature of the HOD**

8. Suggestive Activities:

The List is an Example and not inclusive of all possible activities of the course. Student and Faculty are encouraged to choose activities that are relevant to the topic (Atleast one activity for each Course Outcome)

Sl. No.	Suggestive Activities
01	Visit nearby construction site, a) Identify any ten construction materials b) Collect samples of minimum five materials from site c) Conduct lab test or field test on the any three collected materials
02	Conduct market survey and collect information regarding varieties / Types, Quantity available and Cost a) Cement b) Structural steel forms c) PVC, UPVC, CPVC and other pipe materials d) Collect any two sustainable materials and list their applications
03	Visit any one of the nearby shop/Yards/Plants (Hardware shop, Timber yard/ Depot/ Sawmill, Paint shop, Tiles Gallery shop, Flooring Slabs yards, Aggregates yard/Stock piles, Stone crusher, Masonry blocks manufacture plant,) and collect information regarding a) Available market forms and quantity b) Cost analysis

9. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		10	20	30	40	50	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	20
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	30
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	40
	Average Marks=(20+30+40)/3=30						**30**

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

10. Equipment/software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
01	**Rock Specimens** (Granite, Basalt, Sandstone, Limestone, Laterite, Marble, Quartzite, Gneiss, and Slate)	Size of 10×6×4 cm	02 each
02	**Different types of cement** Ordinary Portland Cement 43 grade & 53 grade, Portland Pozzolana Cement (PPC), Portland Slag Cement (PSC), White Cement	50 kg bag 01 kg (white cement)	01 each
03	Fine aggregates of different sizes and M-sand	Sizes as per Market availability	
04	Coarse aggregates of different sizes		
05	**Ferrous and non-ferrous materials** Mild Steel, Cast iron, Rebar steel (TMT bars), Stainless Steel, Galvanized Iron (GI), Aluminium		02 each
06	**Plastic and PVC materials** Thermo-plastic, Thermo-setting Plastics, PVC, UPVC, CPVC, Fibre-Reinforced Plastic (FRP)		02 each
07	**Bricks and Concrete Blocks** Burnt Bricks, Flyash bricks, Fire/ Refractory Bricks Masonry Concrete blocks (Solid & Hollow) Autoclaved Aerated Concrete Blocks (AAC) Interlocking Masonry solid blocks	Sizes as per Market availability	02 each
08	**Different Timber Materials Natural Timbers** (Teak, Rose, Honne, Jackfruit, Mango, Neem, Silver oak, Matti, Nandi, and Casuarina) **Industrial Timbers** Veneers, Plywood, Fibre board, Hardboard, Block board and Laminated sheets	Size of 15 × 10 × 6 cm	02 each
09	**Different Roofing Materials** Mangalore tiles, Country tiles, Asbestos Cement sheet, Galvanized Iron sheets, Roof Shingles, PUF sandwiched roofing sheets, UPVC sheets, Poly-carbonate sheets, Meta Colour sheets and Proflex sheets,	Sizes as per Market availability	02 each
10	**Different Flooring Materials** Marble, Granite, Vitrified Tiles, Ceramic tiles, Pressed Clay tiles, Cement concrete with red-oxide finish, Interlocking pavers, Wooden flooring, Shahabad stone flooring, Italian Marble, and Anti- skid tiles.	2 × 2 feet or 1 × 1 feet	02 each
11	**Paints and Coating Materials** Wall Putty, lime Distemper, Emulsion Paint, Enamel Paint, Cement paint, Aluminium Paint, Anti-Corrosive Paint, Water Proofing Paints, Thermoplastic paint. Primer (wall, metal, and wood) Varnish materials.	Sizes as per Market availability	02 each

12	**Different Glass Materials** Glass panels- Plain, Dark cool, Brown cool, printed, Wired glass, Perforated glass, Float glass, Toughened glass, and Glass bricks.	6 × 4 inch	02 each
13	**Different Cladding Materials** Stone Cladding, UPVC Cladding, Tile Cladding, Glass Cladding, Composite Cladding, Aluminium Cladding, Brick Cladding, Wood Cladding and Metal Cladding	2 × 2 feet	02 each
14	**Different Sustainable materials** Demolition wastes, Re-cycled materials, Bamboo, CSEB, Certified wood, Earth packed tyres, newspaper compressed wood, recycled glass, earth bags, Cob, Cork (brick & wood), Adobe brick, straw bale, and mycelium.	Sizes as per Market availability	02 each
15	**Miscellaneous Materials** (Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Tile joint filler material, Sealants, Tar felt sheets, expanded metal strips for joints, Adhesives (for PVC, UPVC, Timber), Gypsum boards, Structural Steel Forms, and Powder coated Aluminium Materials)	Sizes as per Market availability	02 each

Government of Karnataka
Department of Technical Education

Course Code	Programme Specific	**Semester**	I
Course Title	**ENVIRONMENTAL SUSTAINABILITY**	**Course Group**	Audit
No. of Credits	2	**Type of Course**	Lecture
Course Category	AU	**Total Contact Hours**	2Hrs Per Week
			26Hrs Per Semester
Prerequisites	Basic Environmental Science	**Teaching Scheme**	(L: T:P) = 2:0:0
CIE Marks	50	**SEE Marks**	-

COURSE OBJECTIVES:

Technicians working in industries or elsewhere essentially require the knowledge of environmental science so as to enable them to work and produce most efficient, economical and eco-friendly finished products.

1. Solve various engineering problems applying ecosystem to produce eco – friendly products.
2. Use relevant air and noise control methods to solve domestic and industrial problems.
3. Use relevant water and soil control methods to solve domestic and industrial problems.
4. To recognize relevant energy sources required for domestic and industrial applications.
5. Solve local solid and e-waste problems.

COURSE OUTCOMES:

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

CO1	Importance of ecosystem and terminology.
CO2	The extent of air pollution, effects, control measures and acts.
CO3	The extent of noise pollution, effects, control measures and acts.
CO4	The water and soil pollution, effects, control measures and acts
CO5	Different renewable energy resources and efficient process of harvesting.
CO6	Solid Waste Management and Environmental acts.

COURSE CONTENT:

Unit-1 Ecosystem	*Allotted Hrs: 03*
Structure of ecosystem, Biotic & Abiotic components, Aquatic (Lentic and Lotic) and terrestrial ecosystem. Global warming - Causes, effects, Green House Effect, Ozone depletion.	
Unit-2Air Pollution	*Allotted Hrs: 03*
Air pollution, Natural and manmade sources of air pollution, Effects of air pollution. Air Pollutants and Types. Control of air pollutants by Cyclone separator and Electrostatic Precipitator, Air (prevention and control of pollution) act 1981	
Unit-3 Noise Pollution:	*Allotted Hrs: 02*
Noise pollution: sources of pollution, measurement of pollution level, Effects and Control of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000	
Unit- 4Water and Soil Pollution:	*Allotted Hrs: 06*
Water pollution and Sources of water pollution, Types of water pollutants, Characteristics of water pollutants, control measures of water pollution. Definition and list unit operations in water and Wastewater Treatment process, Water (prevention and control of pollution) act 1974, Water conservation – Importance of Rainwater Harvesting. Soil pollution, Causes, Effects and Preventive measures of Soil Pollution due to Excessive use of Fertilizers, Pesticides and Insecticides	
Unit-5 Renewable sources of Energy	*Allotted Hrs: 07*
Solar Energy: Basics of Solar energy. Definition and advantages of advanced solar collectors. Solar water heater and Solar stills and their uses. *Biomass:* Overview of biomass as energy source. Thermal characteristics of biomass as fuel. *Wind energy:* Current status and future prospects of wind energy. Wind energy in India. Need of new Energy sources, Different type's new energy sources. Environmental benefits of New Energy Sources-Hydrogen energy, Ocean energy resources, Tidal energy conversion.	

Unit-6 Solid Waste Management and Environmental Acts	*Allotted Hrs: 05*
Solid waste generation, Sources and characteristics of Municipal solid waste, Solid Waste Management rules 2016- 3R in SWM. E- Waste generation, Sources and characteristics, E waste management rules 2016 Plastic Waste generation, Sources and characteristics, Recycled plastic rules 2016 Importance of Environment (protection) act 1986 Occupational health and safety measures.	

Unit No & Name	**Detailed Course Content**	**Contact Hrs**
1. Ecosystem	Structure of ecosystem, Biotic & Abiotic components, Aquatic (Lentic and Lotic) and terrestrial ecosystem.	1
	Global warming - Causes, effects.	2
	Green House Effect, Ozone depletion - Causes, effects	3
2. Air and Pollution	Air pollution, Natural sources of air pollution, Man Made sources of air pollution	4
	Air pollutants and Types, Effects of Particulate Pollutants and control by Cyclone separator	5
	Effects of Particulate Pollutants and control by Electrostatic Precipitator, Air (prevention and control of pollution) act 1981.	6
3. Noise Pollution	Noise pollution: sources of pollution, Measurement of Noise pollution level.	7
	Effects and Control of Noise pollution. Noise pollution (Regulation and Control) Rules, 2000	8
4. Water and Soil Pollution:	Sources of water pollution. Types of water pollutants, Characteristics of water pollutants.	9
	Control measures of water pollution.	10
	Definition and list unit operations in water and Wastewater Treatment process, Water (prevention and control of pollution) act 1974.	11
	Water conservation – Importance of Rainwater Harvesting	12
	Soil pollution, Causes and Effects due to Fertilizers, Pesticides and Insecticides	13
	Preventive measures of Soil Pollution due to Excessive use of Fertilizers, Pesticides and Insecticides.	14
5. Renewable sources of Energy	Solar Energy: Basics of Solar energy. Solar collectors and advantages of Advanced solar collectors.	15
	Solar water heater, Solar stills and their uses.	16
	Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel.	17
	Wind energy: Current status and future prospects of wind	18

	energy. Wind energy in India.	
	Need of new Energy sources, Different type's new energy sources. Environmental benefits of New Energy Sources-Hydrogen energy	19
	Environmental benefits of New Energy Sources- Ocean energy resources	20
	Environmental benefits of New Energy Sources-Tidal energy conversion.	21
6. Solid Waste Management and Environmental Acts	Solid waste generation, Sources, Characteristics of solid waste Solid Waste Management rules 2016	22
	E- Waste generation Sources and characteristics, E waste management rules 2016	23
	Plastic Waste generation Sources and characteristics, Plastic Waste Sources and characteristics	24
	Recycled plastic rules 2016, Importance of Environment (protection) act 1986,	25
	Occupational health and safety measures.	26

References:

(a) Suggested Learning Resources:

Books:

1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,New Delhi
2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
3. Arceivala, Soli Asolekar, Shyam, Wastewater Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099.
4. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000, ISBN 10: 0471144940.
5. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
6. Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication, 2007, ISBN: 81-224-1835-X.
1. Rao, M. N.Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New Delhi, 1988, ISBN: 0-07- 451871-8.
2. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978, ISBN: 9780070354760.
7. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.
3. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6
4. Metcalf & Eddy, Wastewater Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.
5. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

(b) Open source software and website address:

1) www.eco-prayer.org
2) www.teriin.org
3) www.cpcp.nic.in
4) www.cpcp.gov.in
5) www.indiaenvironmentportal.org.in
6) www.whatis.techtarget.com
7) www.sustainabledevelopment.un.org
8) www.conserve-energy-future.com

Teachers should use the following strategies to achieve the various outcomes of the course.

• Different methods of teaching and media to be used to attain classroom attention.
• Massive open online courses (MOOCs) may be used to teach various topics/subtopics.
• 15-20% of the topics which are relatively simpler or descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
• Micro-projects may be given to group of students for hand-on experiences
• Encouraging students to visit sites such as Railway station and research establishment around the institution.

Course Assessment and Evaluation Chart

Sl. No	**Assessment**	**Test Week**	**Duration** In minutes	**Max marks**	**Conversion**
1.	CIE-1 Written Test (Theory)	7	90	50	Average of three tests 50
2.	CIE-2 Written Test (Theory)	10	90	50	
3	CIE-3 Written Test (Theory)	13	90	50	
Total CIE Marks					50
Total Marks					**50**

CIE Theory Test model question paper

Programme Name				**Semester -1**	
Course Name	**Environmental Sustainability**			**Test**	**I/II/III**
Course Code	**Programme Specific**	**Duration**	**90 min**	**Marks**	**50**
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					
Q.No	**Questions**				**Marks**
Section - 1					
1					25
2					
Section - 2					
3					25
4					
Note for the Course coordinator: Each question may have one, two, three, four or five sub divisions. Optional questions in each section carry the same weightage of marks.					