



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	II				
Course Title	:	Engineering Mathematics – II for ME & CE Stream				
Course Code	:	BMATM/V201				
Course Type (Theory/ Practical/ Integrated)	:	Theory				
Course Category	:	ASC				
Stream	:	ME & CE		CIE	:	50 Marks
Teaching hour/week (L: T:P:S)	:	3:2:0:0		SEE	:	50 Marks
Total Hours	:	50 Hrs		SEE Duration	:	3 Hours
Credits	:	4				

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Acquire basic knowledge of mathematical concepts for understanding engineering problems
2	Use concepts of Differential equations and Laplace Transforms in solving problems
3	Analyze problems using concepts of Differential equations and Laplace Transforms
4	Use MATLAB to obtain solutions of various mathematical problems

Teaching-Learning Process Pedagogy (General Instructions):

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

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



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Ordinary Differential Equations of first order: Linear differential equation, exact differential equation, reducible to exact differential equation, Newton's law of cooling, LR circuits, flow problems.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
2	Ordinary Differential Equations of second and higher order: Second and higher order differential equations, inverse differential operator, Cauchy's differential equations, method of variation of parameters, LCR circuits, Vibration problems.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
3	Numerical solution of Ordinary Differential Equations: Taylor's series method, Runge-Kutta method of fourth order, Milne's predictor and corrector method, Milne's predictor and corrector method for second order ODE.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
4	Partial differential equations: Formation of partial differential equation by eliminating arbitrary constants, solution of PDE by direct method, numerical solution of Laplace equation using standard five-point formula, numerical solution of heat equation by Schmidt explicit formula, numerical solution of the wave equation.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
5	Laplace transform and Inverse Laplace transform: Definition, transforms of elementary functions, properties of Laplace transform- Laplace transform of $e^{at} f(t)$, $t f(t)$, $f(t)/t$, inverse Laplace transform using partial fractions, convolution theorem, solution of linear differential equations using Laplace transform.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

Text Books

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

1	Differential Equations, Richard Bronson, Gabriel B Costa, Schaum's outline series, McGraw Hill Publications, 3 rd Edition
2	Numerical Methods, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age Publications, 6 th Edition
3	Higher Engineering Mathematics, B. S. Grewal, Khanna Publications, 44 th Edition, 2022.

Reference Books

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

1	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 10 th Edition
2	Advanced mathematics for Engineers and Scientists, Murray R Spiegel, Schaum's outline series, McGraw Hill publications.
3	Higher Engineering Mathematics, H. K. Dass and Er. Rajnish Verma, S. Chand Publication, 3 rd Edition

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of differential equations and Laplace transforms	Understand	L2
CO2	Apply techniques of differential equations and Laplace transforms to solve engineering problems	Apply	L3
CO3	Analyze engineering problems using differential equations and Laplace transforms	Analyse	L4
CO4	Develop mathematical solutions to various real time problems using MATLAB.	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://archive.nptel.ac.in/courses/111/106/111106100/
2	https://nptel.ac.in/courses/111106101
3	https://archive.nptel.ac.in/courses/111/106/111106139/

Assessment Pattern (both CIE and SEE)

Applied Science Courses								
3 credits - Theory								
Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1, 2 & 3(half module)	50	(50+50) / 2	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3(half module), 4 & 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	25	10	
		CCA-2- Pedagogical Initiatives		50				
	Total CIE Theory						50	

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Two Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 7th week of the semester (syllabus completion of 50%)
- Second test after 14th week of semester (syllabus completion of 100%)

The average score of two tests is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **50 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember			30		
Understand	10	10	20		
Apply	30	30			
Analyse	10	10			
Evaluate				50	
Create					

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module-3	Module-3	Module-4	Module-5		
CO1	5	5	5		5	5	25	25%
CO2	10	10	5	5	10	10	50	50%
CO3	5	5		5	5	5	25	25%
CO4								
CO5								
CO6								
Total	20	20	10	10	20	20	100	

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	
Understand	5
Apply	35
Analyse	10
Evaluate	
Create	

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5					5	10%
CO2	5	5	10	5	10	35	70%
CO3		5			5	10	20%
CO4							
CO5							
CO6							
Total	10	10	10	10	10	50	

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Linear differential equations of first order and first degree	1
1	Problems continued on the above	1
1	Exact equations	1
1	Problems continued on the above	1
1	Equations reducible to exact	1
1	Problems continued on the above	1
1	Newton's law of cooling and problems	1
1	Problems continued on the above	1
1	LR Circuits	1
1	Flow problems	1
2	Second and higher order differential equations	1
2	Homogeneous differential equations	1
2	Problems continued on the above	1
2	Inverse differential operator, three types	1

2	Problems continued on type-I	1
2	Problems continued on type-II	1
2	Problems continued on type-III	1
2	Cauchy's differential equation and problems	1
2	LCR Circuit	1
2	Vibration problems	1
3	Numerical solution of ODE by Taylor's series method	1
3	Problems continued on the above	1
3	Problems continued on the above	1
3	Runge-Kutta method of fourth order	1
3	Problems continued on the above	1
3	Problems continued on the above	1
3	Milne's predictor and corrector method	1
3	Problems continued on the above	1
3	Milne's predictor and corrector method of second order	1
3	Problems continued on the above	1
4	Method of elimination of arbitrary constants	1
4	Solution of PDE by direct integration	1
4	Problems continued on the above	1
4	Solution of one-dimensional heat equation	1
4	Solution of one-dimensional wave equation	1
4	Numerical solution of Laplace equation	1
4	Numerical solution of heat equation	1
4	Problems continued on the above	1
4	Numerical solution of wave equation	1
4	Problems continued on the above	1
5	Introduction and definition of Laplace transform	1
5	Laplace transform of some standard functions	1
5	Basic properties of Laplace transforms	1
5	Problems on the above	1
5	Inverse Laplace transforms	1
5	Inverse Laplace Transforms by Partial fractions	1
5	Problems on the above	1
5	Convolution theorem	1
5	Solution of LDE using Laplace transform	1
5	Problems on the above	1
		50 hrs



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Semester	:	I			
Course Title	:	Engineering Mathematics – I for ME & CE Stream			
Course Code	:	BMATM/V101			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	ASC			
Stream	:	ME & CE	CIE	:	50 Marks
Teaching hour/week (L: T:P:S)	:	3:2:0:0	SEE	:	50 Marks
Total Hours	:	50 Hrs	SEE Duration	:	3 Hours
Credits	:	4			

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Acquire basic knowledge of mathematical concepts for understanding engineering problems
2	Use concepts of Calculus, Linear Algebra and Numerical methods in solving problems
3	Analyze problems using concepts of Calculus, Linear Algebra and Numerical methods
4	Use MATLAB to obtain solutions of various mathematical problems

Teaching-Learning Process Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
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DSATM

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Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Linear Algebra Elementary transformations on a matrix, echelon form & rank of a matrix, Gauss elimination, eigen values and eigen vectors of a matrix, Rayleigh power method, application of linear algebra to balance chemical equations.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
2	Numerical methods Solution of equations - Newton-Raphson method, finite differences, interpolation/extrapolation using Newton's forward and backward difference formulae, Newton's divided difference, numerical integration- Simpson's one-third rule and Simpson's three-eighth rule and application problems.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
3	Polar curves Cartesian and polar coordinates, polar curves, angle between polar curves, pedal equations, radius of curvature in cartesian and polar form.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
4	Partial differentiation Partial derivatives, total derivatives-differentiation of composite functions, Jacobians, application: maxima and minima for a function two variables.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
5	Vector Calculus Derivative of a vector, scalar and vector fields, gradient, directional derivative, curl and divergence-physical interpretation, solenoidal and irrotational vector fields, application: velocity and acceleration of a moving particle.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

Text Books

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

1	Linear Algebra, Seymour Lipschutz, Marc Lipson, Schaum's Outlines, Mc Graw Hill Publications, 4 th Edition
2	Numerical Methods, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age Publications, 6 th Edition
3	Theory and problems of Differential and integral calculus, Frank Ayres and Elliott Mendelson, Schaum's outline series, McGraw Hill publications, 3 rd Edition
4	Higher Engineering Mathematics, B. S. Grewal, Khanna Publications, 44 th Edition

Reference Books

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

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2	Advanced mathematics for Engineers and Scientists, Murray R Spiegel, Schaum's outline series, McGraw Hill publications.
3	Higher Engineering Mathematics, H. K. Dass and Er. Rajnish Verma, S. Chand Publication, 3 rd Edition.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of calculus, Linear Algebra and Numerical methods	Understand	L2
CO2	Apply techniques of Calculus, Linear Algebra and Numerical methods to solve Engineering Problems	Apply	L3
CO3	Analyze Engineering problems using Calculus, Linear Algebra and Numerical methods	Analyse	L4
CO4	Develop mathematical solutions to various real time problems using MATLAB	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/111105122
2	https://nptel.ac.in/courses/111103021
3	https://nptel.ac.in/courses/111106101

Assessment Pattern (both CIE and SEE)

Applied Science Courses								
4 credits - Theory								
Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1, 2 & 3(half module)	50	(50+50) / 2	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3(half module), 4 & 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	25	10	
		CCA-2- Pedagogical Initiatives		50				
	Total CIE Theory						50	

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Two Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 7th week of the semester (syllabus completion of 50%)
- Second test after 14th week of semester (syllabus completion of 100%)

The average score of two tests is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **50 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember			30		
Understand	10	10	20		
Apply	30	30			
Analyse	10	10			
Evaluate				50	
Create					

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module-3	Module-3	Module-4	Module-5		
CO1	5	5	5		5	5	25	25%
CO2	10	10	5	5	10	10	50	50%
CO3	5	5		5	5	5	25	25%
CO4								
CO5								
CO6								
Total	20	20	10	10	20	20	100	

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	
Understand	5
Apply	35
Analyse	10
Evaluate	
Create	

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5					5	10%
CO2	5	5	10	5	10	35	70%
CO3		5			5	10	20%
CO4							
CO5							
CO6							
Total	10	10	10	10	10	50	

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Elementary transformations on a matrix	1
1	Echelon form of a matrix	1
1	Rank of a matrix	1
1	Gauss – elimination method to solve system of linear equations	1
1	Problems continued on the above	1
1	Eigen values and eigen vectors of a matrix	1
1	Problems continued on the above	1
1	Problems continued on the above	1
1	Rayleigh power method to determine the dominant eigen value of a matrix	1
1	Problems continued on the above	1
2	Introduction, Numerical solution of algebraic and transcendental equations	1
2	Newton - Raphson method and problems	1
2	Problems continued on the above	1
2	Finite differences	1

2	Interpolation: Newton's forward and backward interpolation formulae	1
2	Problems continued on the above	1
2	Newton's divided difference formula	1
2	Problems continued on the above	1
2	Numerical integration: Simpson's one-third, three-eighth	1
2	Problems on the above rules	1
3	Cartesian and Polar coordinates	1
3	Polar Curves	1
3	Angle between two curves	1
3	Problems continued on the above	1
3	Pedal equations	1
3	Problems continued on the above	1
3	Radius of curvature in cartesian form	1
3	Problems continued on the above	1
3	Radius of curvature in polar form	1
3	Problems continued on the above	1
4	Partial derivatives- Definition and problems	1
4	Problems continued on above	1
4	Total Derivatives- problems	1
4	Partial Differentiation of Composite functions	1
4	Problems continued on above	1
4	Jacobians – Definition and problems	1
4	Problems continued on above	1
4	Maxima and Minima for a function of two variables	1
4	Problems continued on above	1
4	Problems continued on above	1
5	Scalar and vector fields	1
5	Gradient of a scalar and problems	1
5	Problems continued on above	1
5	Directional derivative and problems	1
5	Problems continued on above	1
5	Curl and divergence; physical interpretation	1
5	Problems continued on above	1
5	Solenoidal and irrotational vectors	1
5	Problems continued on above	1
5	Problems continued on above	1
		50 hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st /2 nd			
Course Title	:	Applied Physics for Civil Stream			
Course Code	:	23PHYV12 / 23PHYV22			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	ASC			
Stream	:	Common to Civil and Mech branches	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	(2:2:2:0)	SEE	:	50 Marks
Total Hours	:	40 Hrs L+ (20) Hrs P	SEE Duration	:	3 Hours
Credits	:	04			

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	To explain the fundamental concepts of physics
2	To familiarize the students with various applications of physics that are relevant to the syllabus
3	To analyse given numericals and apply the theoretical concepts of physics for solving the same
4	To enlighten the concepts of physics for properties of different materials
5	To develop scientific temper among students and encourage them to do projects

Teaching-Learning Process

Pedagogy (General Instructions):

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

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



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
 (Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<p>Oscillations and Shock waves:</p> <p>Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Springs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Theory of Damped oscillations (Derivation), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems.</p> <p>Shock waves: Mach number and Mach Angle, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems.</p> <p>Pre-requisites: Basics of Oscillations</p> <p>Self-learning: Simple Harmonic motion, Differential equation for SHM</p>	8
Pedagogy	<p>Chalk and talk: Expression for damped Oscillations</p> <p>PPT: Resonance,</p> <p>Videos: Reddy shock tube</p> <p>Group Discussion</p> <p>Seminar</p>	
2	<p>Electrical Properties of Materials and Applications</p> <p>Electrical Conductivity in metals, Resistivity and Mobility, Concept of Phonon, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory, Fermi Energy, Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy. Numerical Problems.</p> <p>Superconductivity</p> <p>Introduction to Super Conductors, Temperature dependence of resistivity, Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Applications: Maglev vehicle, Numerical problems.</p> <p>Pre requisites: Basic electrical Properties</p> <p>Self-learning: Resistivity and Mobility</p>	8
Pedagogy	<p>Chalk and talk: Matheissen;s rule</p> <p>PPT: Classical free electron theory, Quantum free electron theory, Superconductivity</p> <p>Videos: Types of superconductors and quantum tunnelling</p> <p>Group Discussion</p> <p>Seminar</p>	
3	<p>Quantum Mechanics:</p> <p>de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation,</p>	8

	<p>Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Quantization of Energy States,</p> <p>Pre requisites: Basics of Quantum mechanics Self-learning: wave - particle duality</p>	
Pedagogy	<p>Chalk and talk: One dimensional infinite potential well, Time independent Schrodinger wave equation PPT: de Broglie wavelength, Wave function Videos: : Quantization of energy states Group Discussion Seminar</p>	
4	<p>LASER and Optical Fiber LASER Einstein's coefficient, Expression for energy density, Population Inversion, Metastable State, Requisites of a LASER System, Types of laser, CO₂ LASER, Applications: LIDAR, Bridge Deflection, Measurement of pollutants in the environment, Numerical Problems. Optical Fiber Propagation of light in optical fiber, Acceptance angle and Numerical Aperture (NA), Expression for NA, Modes of Propagation, types of fiber, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Measurement of pollutants, Numerical Problems Pre requisite: Properties of light Self-learning: Total Internal Reflection, Properties of a LASER Beam, Principle and Construction of Optical Fibers,</p>	8
Pedagogy	<p>Chalk and talk: Expression for Energy Density (Derivation), Expression for NA PPT: Semiconductor Diode Laser Videos: Applications of Lasers and Optical Fibers Group Discussion Seminar</p>	
5	<p>Material Characterization and Instrumentation Techniques: Introduction to Nanomaterial and nanocomposites. Materials Characterization: X-ray Diffractometer (XRD), Crystallite size determination by Scherrer equation, Atomic Force Microscopy (AFM), X-ray photoelectron spectroscopy(XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Numerical Problems. Pre requisites: Fundamentals of Crystal Self-learning: Crystal structures</p>	8
Pedagogy	<p>Chalk and talk: Nanomaterial and nanocomposites PPT: All Materials characterization Videos: All Materials characterization Group Discussion Seminar</p>	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
1	Determination of Magnetic Flux Density at any point along the axis of a circular coil	6
2	Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.	6
3	Study of Forced Mechanical Oscillations and Resonance.	6
4	Study of the frequency response of Series & Parallel LCR circuits.	6
5	Determination of Fermi Energy of the given Conductor.	6
6	Determination of effective spring constant of the given springs in series and parallel combinations.	6
7	Determination of dielectric constant of the material of capacitor by Charging and Discharging method.	6
8	Study the Characteristics of a Photo-Diode and to determine the power responsivity / Verification of Inverse Square Law of Intensity of Light.	6
9	Determination of Wavelength of Laser using Diffraction Grating	6
10	Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.	6
11	GNU Step Interactive Simulations	4
12	PHET Interactive Simulations	4

Reference Books

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

1	Vibrations and Waves (MIT introductory Physics Series), A P French, CBS, 2003 Edition .
2	Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd, Delhi, 2014
3	Heat and Thermodynamics, Brijlal & Subramanyam, S. Chand & Company Ltd., New-Delhi.
4	Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.
5	Lasers and Non Linear Optics – B.B. Laud, 3rd Ed, New Age International Publishers 2011

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the various fundamental concepts in Applied Physics	Remember/Understand	L1/L2
CO2	Apply the basic principles of physics in diverse engineering applications	Apply	L3
CO3	Analyse the given numerical and find the solutions	Analyse	L4
CO4	Design the simulations with the applications of physics	Evaluate	L5
CO5	Create scientific models, reports and posters in teams on applied physics themes	Create	L6
CO6	Conduct experiments in physics and perform precise and accurate measurements	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C02	3	--	--	--	--	--	--	--	--	--	--	--	--	--
C03	--	2	--	--	--	--	--	--	--	--	--	--	--	--
C04	--	--	2		2	--	--	--	--	--	--	--	--	--
C05	--	--	--	--	--	--	--	--	2	2	--	1	--	--
C06	--	--	--	--	2	--	--	--	2	2	--	2	--	--

Weblinks and Video Lectures (e-Resources)

1	Laser: https://www.britannica.com/technology/laser,k
2	Laser: https://nptel.ac.in/courses/115/102/115102124/
3	Physics: http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
4	Numerical Aperture of fiber: https://bop-iitk.vlabs.ac.in/exp/numerical-aperture-measurement

Assessment Pattern (both CIE and SEE)

Applied Science Courses

4 credits – (IPCC) - Theory and Practical

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						25	10	Scale down Marks of IAT and CCA to 25

CIE	Practical	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	10	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05	10				
			Observation book	05					
		Practical Test	Write up	15	50	---	10	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	---	5	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		Total CIE Practical						25	10

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	10	10	10			
Understand	24	24	24			10
Apply	8	8	8			
Analyse	8	8	8			5
Evaluate				50	50	35
Create						

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1		Test-2		Test-3			
	Module-1	Module-2	Module-2	Module-3	Module-4	Module-5		
CO1	6	4	4	6	6	4	30	20
CO2	16	8	8	16	10	14	72	48
CO3	4	4	4	4	4	4	24	16
CO4	4	4	4	4	4	4	24	16
CO5								
CO6								
Total	30	20	20	30	24	26	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	16
Understand	40
Apply	16
Analyse	28
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	25	25	22	20	20	112	56
CO2	6	6	8	6	6	32	16
CO3	10	10	10	12	14	56	28
CO4	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	41	41	40	38	40	200	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Simple Harmonic motion - Only definition, examples, mention of differential equation, mention of natural frequency and time period expression	1
1	Hooke's law, Stiffness Factor and its Physical Significance, series and parallel combination of springs(Derivation), (Only Compression springs and their use in shock absorber and suspensions, leaf spring and its use in railway/truck suspension)	1
1	Definition, Various forces acting on the system, Set up of the Differential equation, Assuming the expression for displacement explanation for variation of amplitude, Mention of three different cases and Graphical Explanation	1
1	Qualitative discussion of applications such as automatic door closures, automobile suspension system, Definition of forced oscillation, Various forces acting on the system, Set up of the Differential equation, Assuming the expression for Amplitude and Phase, Explanation of variation of amplitude with frequency (Three Cases)	1
1	Qualitative explanation of resonance and sharpness of resonance (without derivation), Definition of Mach number, Mach Angle, Mach Regimes, characteristics of Shock waves	2
1	Construction and working of Reddy shock tube, Mention of applications such as aerodynamics study, chemical kinetic study etc	1
1	Numerical problems on SHM, Springs: Stiffness Factor, series and parallel combination of springs, damped oscillations, forced oscillations, Resonance and Mach number	1
2	Assumptions of Quantum Free Electron Theory of Metals, Fermi-energy, Fermi factor, Variation of Fermi Factor with Temperature and Energy. Mention of expression for electrical conductivity	1
2	Fundamentals of dielectrics. Polar and non- polar dielectrics, Polarization, Mention of relation between dielectric constant and polarization. Electrical polarization Mechanisms (Electronic, Ionic, Orientation and Space charge).	1
2	Definition of internal field in case of solids and mention of its expression for one dimensional case. Mention of expressions for internal field for three dimensional cases and Lorentz field. Derivation of Clausius-Mossotti equation.	1
2	Description of solid, liquid and gaseous dielectrics with one example each. Qualitative explanation of applications of dielectrics in transformers, Capacitors, Electrical Insulation.	1
2	General Introduction about Superconductivity, Graphical approach of Temperature dependence of resistivity in metals, Mathiessen's rule [$\rho = \rho_0 + \rho(T)$],	1
2	Temperature dependence of resistivity in superconductors, Definition of superconductivity & Critical temperature. Meissner's Effect, Critical field, Temperature dependence of Critical field,	1

2	Detailed explanation of Type I & Type-II Superconductors. BCS Theory: Phonon & Phonon field, Cooper pairs, High Temperature Superconductors (qualitative). Brief explanation of SQUID & mention its applications,	1
2	Numerical Problems : Fermi factor, Electrical Conductivity, Polarization, Clausius-Mossotti relation, Variation critical field with temperature	1
3	Statement of de-Broglie Hypothesis, Derivation of expression for de Broglie wavelength (λ) by analogy and different forms of expression for (λ)	1
3	Heisenberg's Uncertainty Principle, Non existence of electron inside the nucleus (Non-relativistic),	1
3	Principle of Complementarity, Correlation between de Broglie Wavelength, Heisenberg's Uncertainty principle and wave packet, Wave Function, Explanation, General Mathematical Form (Exponential),	1
3	Physical Significance of a wave function (Probability Density) and Born Interpretation, Expectation value, Eigen functions and Eigen Values,	1
3	Schrödinger Time Independent wave definition, Setting up of Time independent Schrodinger wave equation in 1D (derivation) and extension to 3D (mention)	1
3	One Dimensional Potential Well Explanation and Boundary conditions, Schrödinger Wave equation for a particle in 1 D infinite potential well, General Solution, Applying Boundary Conditions, Energy Eigen Values (Quantization of Energy States), Normalization and Eigen Function, Variation of wave functions and probability density distributions for $n = 1, 2, 3$ states	1
3	Numerical Problems on de Broglie Hypothesis, Heisenberg's Uncertainty Principle, Energy Eigen Values for a particle in 1D infinite potential well	1
4	Characteristics of LASER, Interaction of radiation with matter (induced absorption, spontaneous and stimulated emission in terms of Einstein Coefficients), Derivation of expression for energy density equation and its significance	1
4	Requisites of a Laser system (Excitation source, Active media and laser cavity) and pumping, Conditions for laser action (population inversion & meta stable state)	1
4	Principle, Construction and working of CO ₂ Laser with energy level diagram, Application of Lasers in LIDAR and Bridge Deflection	2
4	Propagation mechanism, Angle of Acceptance, Numerical Aperture (NA), derivation of expression for NA, Fractional Index Change (Δ), Relation between NA & Δ . Modes of propagation , mention of expression for number of modes and V number. Types of optical fibers.	1
4	Types of attenuation, Mention of Expression for Attenuation coefficient, and Attenuation spectrum of an optical fiber with communication windows. Mention of expression for attenuation coefficient,	1
4	Discussion of block diagram of point to point communication. Optical fiber sensors- Intensity based displacement sensor Merits and demerits of optical fibers.	1
4	Numerical Problems : Ratio of Population, Number of photons / sec in a LASER beam of certain power output, Numerical Aperture, Acceptance angle and Attenuation Co-efficient	1
5	Introduction to materials: Nanomaterials and Nano composites.	1
5	Principle, construction and working of X-ray Diffractometer, crystal size determination by Scherrer equation	1
5	Principle, construction, working and applications of Atomic Force Microscopy (AFM)	1
5	Principle, construction, working and applications of X-ray photoelectron spectroscopy (XPS)	1
5	Principle, construction, working and applications of Scanning electron microscopy (SEM),	1
5	Principle, construction, working and applications of Transmission electron microscopy (TEM),	1
5	Numericals on X-Ray diffraction and Scherrer equation	2
Total		40 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st and 2 nd		
Course Title	:	Applied Chemistry for Civil Stream		
Course Code	:	23CHEV12 /23CHEV22		
Course Type (Theory/ Practical/ Integrated)	:	Integrated		
Category	:	ASC		
Stream	:	CIVIL	CIE	: 50 Marks
Teaching hours/ week (L:T:P:S)	:	(2:2:2:0)	SEE	: 50 Marks
Total Hours	:	60 Hrs	SEE Duration	: 3 Hours
Credits	:	04		

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	To enable students to acquire knowledge on electrochemistry, water technology and corrosion chemistry.
2	To understand the mechanism of corrosion, thermodynamics, kinetics and polymers to solve societal problems.
3	To learn significance of polymers, factors affecting corrosion, water analysis and purification techniques.
4	To provide in-depth knowledge of Engineering materials.

Teaching-Learning Process Pedagogy (General Instructions):

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

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



Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<p>ELECTROCHEMISTRY AND ENERGY STORAGE SYSTEMS</p> <p>Electrochemistry: Basic concepts of electrochemistry; Electrode system: types of electrodes, Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode: Construction, working and applications of Calomel electrode. Concentration cells and Numerical problems.</p> <p>Energy Storage Systems: Introduction, Classification of batteries. Battery characteristics (Energy density, Shelf life, Life cycle) Construction, working and applications of: Sodium-Ion battery, vanadium redox flow battery.</p> <p>Fuel Cells- Introduction, Classification of fuel cells based on the type of fuel, electrolyte and temperature. Differences between the Conventional cell and fuel cell, Construction, working and applications of CH₃OH-O₂ fuel cell.</p>	8
Pedagogy	Animated videos on battery and fuel cells, PPT on reference electrodes, Student's presentation on fuel cells and numerical problems.	
2	<p>CORROSION AND ITS CONTROL</p> <p>Corrosion: Introduction, Electrochemical theory, types: differential aeration (waterline and pitting), differential metal and stress corrosion. Factors affecting rate of corrosion (Anodic to cathodic area ratio, Nature of corrosion product, Nature of medium-PH, temperature, conductance). Corrosion control: Metal coating-galvanization and tinning, surface conversion coating - anodizing. Cathodic protection - sacrificial anode method and impressed current method. Corrosion penetration rate (CPR), numerical problems.</p> <p>Metal finishing: Introduction, Technological importance. Electroplating: Introduction, Conditions for electroplating, electroplating of chromium, Electroless plating: Introduction, electroless plating of copper, distinction between electroplating and electroless plating processes.</p>	8
Pedagogy	Field visit to identify different types of corrosion, Animated videos and PPTs on electroplating and electroless plating, PPT on reference electrodes, Student's presentation on corrosion control and numerical problems.	

3	<p>WATER TECHNOLOGY</p> <p>Water Chemistry and Sewage Water Treatment: Introduction, different sources of water, Water characteristics, Hardness, Types of hardness- Temporary and Permanent - Disadvantages of hard water, Units of hardness, Estimation of hardness-EDTA method (Numerical).</p> <p>Water Softening Methods: Principle, procedure and advantages of Ion exchange process (Types of membranes), Reverse osmosis. Dissolved oxygen (DO) -Estimation (Winkler's method), BOD and COD-definition, estimation and significance (Numerical). Sewage water treatment - Primary, Secondary and Tertiary - Flow diagram. Municipal water treatment: Disinfection methods - chlorination, ozone and UV irradiation.</p>	8
Pedagogy	Experiments determining the hardness of water sample from different sources, PPT on water purification methods, Student's group discussion on sewage water treatment.	
4	<p>POLYMERS AND FUELS</p> <p>Polymer chemistry: Introduction to polymers, Glass transition temperature (T_g), factors affecting T_g and its significance. Preparation, properties and applications of Kevlar, and Epoxy resin; Determination of molecular weight of polymers by number average and weight average method-numerical problems.</p> <p>Biodegradable polymer: Introduction, synthesis, properties, and application of polylactic acid (PLA). Conducting polymers: Mechanism of conduction in polyacetylene and applications</p> <p>Fuels: Definition, classification of fuels and characteristics of good fuels; Solid fuels: Coal, analysis of coal- proximate and ultimate analysis; Liquid fuels: Petroleum and its refining; Cracking: Fixed bed catalytic cracking; Knocking: Octane and cetane numbers; Combustion: Calorific value-Gross calorific value (GCV) and Net calorific value (NCV)-numerical problems</p>	8
Pedagogy	Animated videos on polymer synthesis, PPT on biodegradable and conducting polymers, Assignment to collect different types of polymers with applications.	
5	<p>THERMODYNAMICS AND CHEMICAL KINETICS:</p> <p>Thermodynamics: I and II Laws of thermodynamics – spontaneous and non-spontaneous processes, entropy, Free energy and chemical equilibrium – significance of entropy. Electrochemical Equilibrium, Application of thermodynamics to real world problems.</p> <p>Chemical Kinetics: Rate of a chemical reaction, factors affecting rate of reaction, Law of mass action – Le Chatelier's principle. Rate expression, order, and molecularity of reactions, zero order, first order and pseudo first order reaction – half-life period. Determination of rate constant and order of reaction. Temperature dependence of rate constant – Arrhenius equation, activation energy and its calculation; elementary concept of collision theory of bimolecular gaseous reactions.</p>	8
Pedagogy	PPT on thermodynamics, videos on chemical Kinetics. Presentation on Free energy.	

List of Experiments or Programs

Expt. No.	Volumetric Experiments (Any 4)
1	Estimation of total hardness of water by EDTA method
2	Determination of COD of waste water.
3	Estimation of Iron in steel using standard $K_2Cr_2O_7$ solution by using external indicator method
4	Determination of percentage of copper in brass using standard sodium thiosulphate solution
5	Determination of amount of chlorine present in Bleaching powder (Iodometry)
6	Kinetic study of the reaction of KI with $K_2S_2O_8$
Instrumental Experiments (Any 4)	
1	Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
2	Conductometric estimation of acid mixture using strong base.
3	Determination of viscosity of given organic liquid using Oswald's Viscometer.
4	Determination of pKa of the given weak acid using pH meter.
5	Colorimetric estimation of copper.
Demonstration Experiments (Any 2)	
1	Estimation of Sodium present in soil/effluent sample using flame photometry
2	Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch
3	Synthesis of Iron oxide nanomaterials
4	Estimation of CaO present in the given cement sample by EDTA method

Reference Books

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

1	Chemistry for Engineers, Teh Fu Yen, Imperial college press, 2008, ISBN: 97818609747742.
2	Advances in corrosion science and technology, M.G. Fontana, R.W. Staettle, Springer publications, 2012, ISBN: 9781461590620.
3	Fundamentals of analytical chemistry, Douglas A. Skoog et.al., 8th edition, 2004, Thomson Asia pvt Ltd. ISBN: 978-0-495-55828-6
4	Engineering chemistry, Shubha Ramesh et.al., Wiley India, 1 st Edition, 2011, ISBN: 9788126519880.
5	Energy storage and conversion devices, Anurag Gaur, A. L. Sharma, Anil Arya, 2021, CRC Press, Taylor and Francis Group, 1 st Edition, ISBN: 9781003141761.
6	P. Atkins and J. de Paula, Atkins Physical Chemistry, Oxford University Press, 8th edition, 2006

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of chemistry to explain the scientific engineering concepts.	L1	Understand
CO2	Apply the concepts of chemistry to describe various engineering processes.	L2	Apply
CO3	Analyse chemical processes and instrumentation techniques to explain the properties and applications of engineering materials.	L2	Analyse
CO4	Design different types of engineering materials based on the concepts of chemistry.	L3	Design
CO5	Evaluate the concepts of chemistry for energy production and multidisciplinary application.	L4	Evaluate
CO6	Conduct/Perform the quantitative analysis of a given substance using various experimental techniques.	L4	Conduct

Mapping of Course Outcomes to Program Outcomes: --

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	--	--	--	2	--	--	--	--	1	--	--
CO2	3	2	2	--	--	--	2	--	--	--	--	--	--	--
CO3	3	2	2	--	--	--	2	--	--	--	--	1	--	--
CO4	3	2	1	--	--	--	2	--	--	--	--	--	--	--
CO5	3	2	--	--	--	--	2	--	--	--	--	--	--	--
CO6	3	3					2							

Weblinks and Video Lectures (e-Resources)

1	https://archive.nptel.ac.in/courses/113/104/113104082/ , https://ehs.stanford.edu/topic/hazardous-materials/nanomaterials
2	https://www.youtube.com/watch?v=EoE_NkF8N8k , https://www.youtube.com/watch?v=EZ8P5Dp1j2g
3	https://www.youtube.com/watch?v=3XpuoVVzT1A , https://chemistnotes.com/all-nanochemistry-notes/
4	https://www.youtube.com/watch?v=T4pSufIO9fk , https://www.youtube.com/watch?v=4HCsBMI7nSg

Assessment Pattern (both CIE and SEE)

Applied Science Courses

4 credits – (IPCC) - Theory and Practical

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment
		CCA-2- Pedagogical Initiatives		50				

									method may be adopted
	Total CIE Theory						25	10	Scale down Marks of IAT and CCA to 25
CIE	Practical	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	10	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05	10				
			Observation book	05					
		Practical Test	Write up	15	50	---	10	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
	Execution		25						
	Viva-voce		10						
Open Ended Experiment	Write up	05	20	---	5	2	One experiment for 20 marks.		
	Execution	10							

			Viva-voce	05				20 marks reduced to 05 marks	
	Total CIE Practical						25	10	Scale down Marks of Experiments, Record, Observation, Practical Test and Open-Ended Experiment
SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks	
CIE + SEE				100	---	---	40		
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 					

4 Credit Course – IPCC

The Minimum Marks to be secured in CIE to appear for SEE shall be 10marks (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC

Internal Assessment Test (IAT):

The IA test questions are to be framed to map the Course Outcomes(COs), Program Outcomes(POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks.**

- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

3 Credit Course – Theory

Note: A few of the Courses of 3 Credit are Integrated Course Type, for such courses the method suggested for 4 Credit IPCC shall be followed.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Group Problem Solving, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student must answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. **Marks scored out of 100 shall proportionally be reduced to 50 Marks.**

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	15	15	15	--	--	--
Understand	25	20	20	--	--	--
Apply	5	10	10	20	20	20
Analyse	5	5	5	10	10	10
Evaluate	--	--	--	20	20	20
Create	--	--	--	--	--	--

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1		Test-2		Test-3			
	Module-1	Module-2	Module-3	Module-4	Module-4	Module-5		
CO1	8	8	6	4	6	6	38	26%
CO2	10	10	16	8	8	16	68	46%
CO3	4	2	4	4	4	4	22	14%
CO4	4	4	4	4	2	4	22	14%
CO5	--	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--	--
Total	26	24	30	20	20	30	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	16
Understand	28
Apply	32
Analyse	24
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	4	4	4	2	2	16	16%
CO2	8	8	4	4	4	28	28%
CO3	4	4	8	8	8	32	32%
CO4	4	4	4	6	6	24	24%
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	20	20	20	20	20	100	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
01	Basic concepts of electrochemistry: Electrode system: Introduction, types of electrodes,	01
	Ion selective electrode – definition, construction, working and applications of glass electrode.	01
	Determination of pH using glass electrode. Reference electrode: Introduction, calomel electrode – construction, working and applications of calomel electrode.	01
	Concentration cell – Definition, construction and Numerical problems.	01
	Energy Storage Systems: Classification of batteries, with examples. Battery characteristics, cycle life and shelf life. Basic requirements for commercial batteries.	01
	Construction, working and applications of: Lithium-ion battery, Sodium-Ion battery, vanadium redox flow battery	01
	Fuel Cells- Introduction, Classification of fuel cells based on the type of fuel, electrolyte and temperature. Differences between the Conventional cell and fuel cell.	01
	Construction, working and applications of methanol -oxygen.	01
02	Corrosion: Electrochemical theory, types: differential aeration (waterline and pitting), differential metal and stress corrosion (Boiler problems- scale and sludge problems).	01
	Factors affecting rate of corrosion. Corrosion control: Metal coating-galvanization and tinning.	01
	surface conversion coating - anodizing and phosphating. Cathodic protection - sacrificial anode method and impressed current method.	01
	corrosion penetration rate (CPR), numerical problems.	01
	Metal finishing: Introduction, Technological importance. Electroplating: Introduction, principles governing electroplating-Polarization.	
	Decomposition potential and overvoltage. Electroplating of chromium.	01
	Electroless plating: Introduction, electroless plating of copper.	01
	Distinction between electroplating and electroless plating processes.	01
03	Water Chemistry and Sewage Water Treatment: Introduction, different sources of water, Water characteristics	01
	Hardness, Types of hardness- Temporary and Permanent - Disadvantages of hard water, Units of hardness	01
	Estimation of hardness-EDTA method (Numerical).	01
	Water softening methods: Principle, procedure and advantages of Ion exchange process (Types of membranes),	01
	Principle, procedure and advantages of reverse osmosis	01
	Dissolved oxygen (DO) -Estimation (Winkler's method), BOD and COD-definition, estimation and significance (Numerical)	01
	Sewage water treatment - Primary, Secondary and Tertiary - Flow diagram.	01
	Municipal water treatment: Disinfection methods - chlorination, ozone and UV irradiation.	01
Polymer chemistry: Introduction to polymers and Glass transition temperature	01	

04	Glass transition temperature (T _g), factors affecting T _g (crystallinity, effect of side groups, molecular weight & plasticizers) and significance	01
	Preparation, properties and applications of Kevlar and Epoxy resin	01
	Determination of molecular weight of polymers by number average and weight average method-numerical problems	01
	Biodegradable polymer: Introduction, synthesis, properties, and application of polylactic acid (PLA). Conducting polymers: Mechanism of conduction in polyacetylene and applications	01
	Fuels: Definition, classification of fuels and characteristics of good fuels; Solid fuels: Coal, analysis of coal- proximate and ultimate analysis; Liquid fuels: Petroleum and its refining	01
	Cracking: Fixed bed catalytic cracking; Knocking: Octane and cetane numbers	01
	Combustion: Calorific value-Gross calorific value (GCV) and Net calorific value (NCV)	01
05	THERMODYNAMICS AND CHEMICAL KINETICS:	
	Thermodynamics: I and II Laws of thermodynamics – spontaneous and non-spontaneous processes.	01
	Entropy, Free energy (Gibbs free energy – Standard Gibbs free energy change) and chemical equilibrium – significance of entropy.	01
	Electrochemical Equilibrium. Application of thermodynamics to real world problems.	01
	Chemical Kinetics: Rate of a chemical reaction, factors affecting rates of reaction,	01
	Law of mass action – Le Chatelier's principle. Rate expression, order, and molecularity of reactions, zero order, first order reactions.	01
	Pseudo first order reaction – half-life period. Determination of rate constant and order of reaction.	01
	Temperature dependence of rate constant – Arrhenius equation, activation energy and its calculation;	01
Elementary concept of collision theory of bimolecular gaseous reactions.	01	
Total	40 Hrs	



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

CIVIL ENGINEERING STREAM



Dayananda Sagar Academy of Technology & Management

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Applied Science Course: ASC

1st Semester -Physics Cycle

Applied Science Course: ASC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23MATC11	Engineering Mathematics-1	3	2	0	0	4
23PHYV12	Applied Physics for Civil Stream	2	2	2	0	4

1st Semester - Chemistry Cycle

Applied Science Course: ASC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23MATC11	Engineering Mathematics-1	3	2	0	0	4
23CHEV12	Applied Chemistry for Civil Stream	2	2	2	0	4

2nd Semester – Physics Cycle

Applied Science Course: ASC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23MATC21	Engineering Mathematics-2	3	2	0	0	4
23PHYV22	Applied Physics for Civil Stream	2	2	2	0	4

2nd Semester - Chemistry Cycle

Applied Science Course: ASC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23MATC21	Engineering Mathematics-2	3	2	0	0	4
23CHEV22	Applied Chemistry for Civil Stream	2	2	2	0	4



Dayananda Sagar Academy of Technology & Management (Autonomous Institute under VTU)

Core Engineering Courses (CEC)

1st Semester - Physics Cycle

Core Engineering Courses: CEC-1						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23CECV11	Introduction To Civil Engineering	3	0	0	0	3
23CECV12	Engineering Mechanics	3	0	0	0	3
23CECE13	Introduction to Electrical Engineering	2	2	0	0	3
23CECE14	Elements of Electrical Engineering	2	2	0	0	3
23CECE15	Introduction to Electronics Engineering	3	0	0	0	3
23CECE16	Basic Electronics	2	0	2	0	3
23CECM17	Introduction to Mechanical Engineering	3	0	0	0	3
23CECM18	Elements of Mechanical Engineering	3	0	0	0	3

2nd Semester – Chemistry Cycle

Core Engineering Courses: CEC-2						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23CECV21	Introduction To Civil Engineering	3	0	0	0	3
23CECV22	Engineering Mechanics	3	0	0	0	3
23CECE23	Introduction to Electrical Engineering	2	2	0	0	3
23CECE24	Elements of Electrical Engineering	2	2	0	0	3
23CECE25	Introduction to Electronics Engineering	3	0	0	0	3
23CECE26	Basic Electronics	2	0	2	0	3
23CECM27	Introduction to Mechanical Engineering	3	0	0	0	3
23CECM28	Elements of Mechanical Engineering	3	0	0	0	3



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Engineering Science Course: ESC

1st Semester -Physics Cycle

Engineering Science Course: ESC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credits
23ESCS11	Principles of Programming using C	2	0	2	0	3
23ESCM12	Computer Aided Engineering Drawing	2	0	2	0	3

2nd Semester – Chemistry Cycle

Engineering Science Course: ESC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credit
23ESCM22	Computer Aided Engineering Drawing	2	0	2	0	3



Dayananda Sagar Academy of Technology & Management (Autonomous Institute under VTU)

Emerging Technology Course: ETC

1st Semester -Physics Cycle

Emerging Technology Course: ETC						
	Title	Lecture	Tutorial	Practical	Project	Credit
23ETCV11	Smart Materials and Systems	3	0	0	0	3
23ETCE12	Introduction to Embedded Systems	2	0	2	0	3
23ETCS13	Introduction to IOT	2	0	0	2	3
23ETCS14	Introduction to Cyber Security	3	0	0	0	3

2nd Semester – Chemistry Cycle

Emerging Technology Course: ETC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23ETCV21	Smart Materials and Systems	3	0	0	0	3
23ETCE22	Introduction to Embedded Systems	2	0	2	0	3
23ETCS23	Introduction to IOT	2	0	0	2	3
23ETCS24	Introduction to Cyber Security	3	0	0	0	3



Dayananda Sagar Academy of Technology & Management (Autonomous Institute under VTU)

Programming Language Courses: PLC

1st Semester -Physics Cycle

Programming Language Courses: PLC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23PLCS11	Introduction to Python Programming	2	0	2	0	3
23PLCS12	Basics of Java Programming	2	0	2	0	3
23PLCS13	Object Oriented Programming using C++	2	0	2	0	3

1st Semester – Chemistry Cycle

Programming Language Courses: PLC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23PLCS11	Introduction to Python Programming	2	0	2	0	3
23PLCS12	Basics of Java Programming	2	0	2	0	3
23PLCS13	Object Oriented Programming using C++	2	0	2	0	3

2nd Semester -Physics Cycle

Programming Language Courses: PLC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23PLCS21	Introduction to Python Programming	2	0	2	0	3
23PLCS22	Basics of Java Programming	2	0	2	0	3
23PLCS23	Object Oriented Programming using C++	2	0	2	0	3

2nd Semester – Chemistry Cycle

Programming Language Courses: PLC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23PLCS21	Introduction to Python Programming	2	0	2	0	3
23PLCS22	Basics of Java Programming	2	0	2	0	3
23PLCS23	Object Oriented Programming using C++	2	0	2	0	3



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Ability Enhancement Course (AEC) / Skill Development Course (SDC)

1st Semester Physics Cycle & Chemistry Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23IDTC18	Innovation Design & Thinking	1	0	0	0	1

2nd Semester Physics Cycle & Chemistry Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23EEXC28	Engineering Exploration	0	0	0	2	1



Dayananda Sagar Academy of Technology & Management (Autonomous Institute under VTU)

Humanity and Social Science Course: HSSC

1st Semester Physics Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23CENC16	Communicative English	1	0	0	0	1
23ICNC17	Indian Constitution	1	0	0	0	1

1st Semester Chemistry Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23CENC16	Communicative English	1	0	0	0	1
23SBKC17	Samskruthika Kannada	1	0	0	0	1

2nd Semester Physics Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23CENC26	Professional writing skills in English	1	0	0	0	1
23ICNC27	Indian Constitution	1	0	0	0	1

2nd Semester Chemistry Cycle

Humanity and Social Science Course: HSSC						
	Title	Lecture	Tutorial	Practical	Project	Credits
23CENC26	Professional writing skills in English	1	0	0	0	1
23SBKC27	Samskruthika Kannada	1	0	0	0	1

- The student has to select one course from the Core Engineering Course (CEC) group.
- Civil Students shall opt for any one of the courses from the ESC-I group except, 23CECV11 - Introduction to Civil Engineering
- The students have to opt for the courses from CEC group without repeating the course in either 1st or 2nd semester
- The students must select one course from either ETC-I or PLC-I group.
- 23ESCS11 course is mandatory in First Semester



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Affiliated to **VTU**
 Approved by **AICTE**
 Accredited by **NAAC** with **A+** Grade
 6 Programs Accredited by **NBA**
 (CSE, ISE, ECE, EEE, MECH, CIVIL)

Scheme of Teaching and Examinations – 2023 Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Effective from 2023-24)

1st SEMESTER: CHEMISTRY CYCLE – (Civil Engineering Stream) - Civil Engineering (CE)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MATC11	Engineering Mathematics-1	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	23CHEV12	Applied Chemistry for Civil Engineering Stream	ASC(IC)	CHE	CHE	2	2	2	0	6	4	3	50	50	100
3	23CECV12	Engineering Mechanics	CEC-1	CED	CED	3	0	0	0	3	3	3	50	50	100
4	23ESCS11	Principles of Programming in C	ESC	ISE	CSE	2	0	2	0	4	3	3	50	50	100
5	23ESCM12	Computer Aided Engineering Drawing	ESC	MED	MED	2	0	2	0	4	3	3	50	50	100
6	23CENC16	Communicative English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	23ICNC17	Indian Constitution	HSSC	MED	MED	1	0	0	0	1	1	2	50	50	100
8	23IDTC18	Innovation Design and Thinking	AEC/SDC	ALD	ALD	1	0	0	0	1	1	2	50	50	100
Total						15	4	6	0	25	20	21	400	400	800

2nd SEMESTER: PHYSICS CYCLE – (Civil Engineering Stream) - Civil Engineering (CE)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MATC21	Engineering Mathematics-2	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	23PHYV22	Applied Physics for Civil Engineering Stream	ASC(IC)	PHY	PHY	2	2	2	0	6	4	3	50	50	100
3	23CECE23	Introduction to Electrical Engineering	CEC-2	EEE	EEE	2	2	0	0	4	3	3	50	50	100
4	23ETCV21	Smart Materials & Systems	ETC	ECE	ECE	3	0	0	0	3	3	3	50	50	100
5	23PLCS21	Introduction to Python Programming	PLC	ISE	ISE	2	0	2	0	4	3	3	50	50	100
6	23CENC26	Professional writing skills in English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	23SBKC27	Samskruthika Kannada	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
8	23EEXC28	Engineering Exploration	AEC/SDC	ALD	ALD	0	0	0	2	2	1	2	50	50	100
Total						14	6	4	2	26	20	21	400	400	800



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st			
Course Title	:	Communicative English			
Course Code	:	23CENC16			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	HSSC			
Stream	:	Common to All Branches	CIE	:	50 Marks
Credits (L:T:P:S)	:	1:0:0:0	SEE	:	50 Marks
Total Hours	:	15 Hrs	SEE Duration	:	2 Hours
Credits	:	1			

Course Learning Objectives: Students will be taught.

Sl.No	Course Objectives
1	To know about Fundamentals of Communicative English and Communication Skills in general.
2	To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills.
3	To impart basic English grammar and essentials of important language skills.
4	To enhance with English vocabulary and language proficiency for better communication skills.
5	To learn about Techniques of Information Transfer through presentation.

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

**Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)**

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Introduction to Communicative English: Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation-based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
2	Introduction to Phonetics: Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation-based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
3	Basic English Communicative Grammar and Vocabulary PART- I: Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation-based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	

4	Basic English Communicative Grammar and Vocabulary PART - II: Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation-based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
5	Communication Skills for Employment: Information Transfer: Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation-based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
2	A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.
3	Technical Communication: Principals & Practice (Third edition) Meenakshi Raman & Sangeeta Sharma Oxford University Press
4	Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
5	English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
6	A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.
7	Practical English Usage by Michael Swan, Oxford University Press – 2016.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.	Understand	L-2
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.	Remember	L-1
CO3	To impart basic English grammar and essentials of language skills as per present requirement.	Understand	L-2
CO4	Understand and use all types of English vocabulary and language proficiency.	Understand	L-2
CO5	Adopt the Techniques of Information Transfer through presentation.	Remember	L-1

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://drive.google.com/drive/folders/1rqloQbY2HWu7xbFSmaGU3YAc7Tbhc3b1
2	https://drive.google.com/file/d/1UbpxJBcZNFyCxMEK0KqpR6NjpNfd4e1n/view?usp=drive_link
3	https://drive.google.com/file/d/11GUI1amPCq75n8mHoGnc9qzv_OJFzCHM/view?usp=drive_link
4	https://drive.google.com/file/d/1RbPsNDA_ATiTXP_Tn8y2Udpc2NZTcvoy/view?usp=drive_link
5	https://drive.google.com/file/d/1brLXNdwbFugdZJ1B4_TtzN43_KhhZvZI/view?usp=drive_link

Assessment Pattern (both CIE and SEE)

Constitution of India / Samskruthika Kannada / Communicative English / Professional writing skills in English

1 Credit Courses – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory								

						25	10	Scale down Marks of IAT and CCA to 25
SEE		Theory exam – (MCQ Type)	Entire syllabus	50	---	50	18	SEE Exam is theory Exam with MCQ type Question Papers of 50 Questions with each question 1 Mark each. Examination duration is 1 Hour
CIE + SEE				100	---	---	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

1 Credit Course – Theory

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Crossword, Maize, Debate, Role Play, Community Service, Mind Map, Concept Map, Case Study, Group Discussions, Ideations

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels.

Three Tests (MCQ) each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 to be conducted after 4th week
- CCA2 to be conducted after 9th week.
- The evaluation of CCAs includes either through quiz or rubrics

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject .
- The question paper shall be set for 50 Marks. The medium of the question paper shall be English. **The duration of SEE is 01 hours.**
- The question paper will have 50 MCQs **covering all modules**. The questions shall map with the course outcome, program outcome and Blooms RBT level.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	18	17	18	17	18
Understand	16	15	13	15	17
Apply	8	10	9	8	7
Analyse	8	8	10	10	8
Evaluate	--	--	--	--	--
Create	--	--	--	--	--

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	18	6	--	--	2	26	20%
CO2	7	19	--	--	2	28	25%
CO3	--	--	17	7	8	32	20%
CO4	--	--	8	18	8	34	20%
CO5	--	--	--	--	30	30	15%
Total	25	25	25	25	50	--	--

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	35%
Understand	30%
Apply	20%
Analyse	15%
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	3	2	2	2	1	10	20%
CO2	4	3	2	3	3	15	30%
CO3	2	1	2	3	2	10	20%
CO4	2	3	2	1	2	10	20%
CO5	2	1	1	1	0	5	10%
Total	13	10	09	10	8	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Communicative English, Fundamentals of Communicative English, Process of Communication	1
1	Barriers to Effective Communicative English,	1
1	Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	1
2	Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels	1
2	Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent	1
2	Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation	1
3	Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition	1
3	Question Tags, One Word Substitutes,	1
3	Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary– Exercises on it	1
4	Words formation - Prefixes and Suffixes	1
4	Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises,	1
4	Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.	1
5	Information Transfer: Oral Presentation and its Practice. Difference between Extempore/Public Speaking	1
5	Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence	1
5	Reading and Listening Comprehensions – Exercises	1
	Revision	
Total		15 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st			
Course Title	:	COMPUTER AIDED ENGINEERING DRAWING			
Course Code	:	23ESCM12			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	ESC			
Stream	:	Common to all Branches	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	2:0:2:0	SEE	:	50 Marks
Total Hours	:	40 Hrs Theory	SEE Duration	:	03 Hours
Credits	:	03			

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	To understand the basic principles and conventions of engineering drawing
2	To visualize and generate pictorial views of engineering components using CAD software
3	To employ drawing as a communication mode

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can devise innovative pedagogy to improve teaching-learning.



DSATM

**Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)**

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<p>Introduction to Computer Aided Sketching: Significance of Engineering drawing, Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP.</p> <p>Orthographic Projections of points, Straight lines: Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants. Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems)</p>	8
Pedagogy	Chalk & Talk Use of Models and Software	
2	<p>Orthographic Projections of Planes (First Angle of Projection only): Introduction, Definitions – projections of plane surfaces–triangle, square, rectangle, square, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on side views)</p>	8
Pedagogy	Chalk & Talk Use of Models and Software	
3	<p>Projections of Solids (First Angle of Projection only): Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on freely suspended solids and combination of solids)</p>	8
Pedagogy	Chalk & Talk Use of Models and Software	
4	<p>Isometric Projections (Using Isometric Scale Only): Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, hemispheres and combination of two simple solids</p>	8
Pedagogy	Chalk & Talk Use of Models and Software	
5	<p>Development of Lateral surfaces: Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces)</p>	8
Pedagogy	Chalk & Talk Use of Models and Software	

Reference Books

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

1	K. R. Gopalakrishna, & Sudhir Gopalakrishna: Textbook of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017
2	Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd edition, Charotar Publishing House Pvt. Limited, 2019.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Develop the Orthographic Projections of points, Straight lines and Planes using concepts of First Angle of Projections	C	L6
CO2	Develop the Orthographic Projections of various solids using concepts of First Angle of Projections	C	L6
CO3	Develop the Isometric Projections of solids, development drawings of lateral surfaces of solids	C	L6
CO4	Develop the Orthographic projections of solids by manual sketching	C	L6
CO5	Develop the isometric projections of solids by manual sketching	C	L6

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://youtu.be/1gDmNDJ9SHc
2	https://youtu.be/cQHDAfrptUc
3	https://youtu.be/GFulyqgB5g0

Assessment Pattern (both CIE and SEE)

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3	50				
		Internal Assessment Test (IAT) - III	Module - 4 & 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						50	20	Scale down Marks of IAT and CCA to 50

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

4 Credit Course – IPCC

The Minimum Marks to be secured in CIE to appear for SEE shall be 10marks (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC

Internal Assessment Test (IAT):

The IA test questions are to be framed to map the Course Outcomes(COs), Program Outcomes(POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of 50 Marks

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

3 Credit Course – Theory

Note: A few of the Courses of 3 Credit are Integrated Course Type, for such courses the method suggested for 4 Credit IPCC shall be followed.

Assessment Details (both CIE and SEE)

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

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

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Group Problem Solving, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student must answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. **Marks scored out of 100 shall proportionally be reduced to 50 Marks.**

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	-	-	-	-	-	-
Understand	-	-	-	-	-	-
Apply	-	-	-	-	-	-
Analyse	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-
Create	50	50	50	50	50	-

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2	Test-3			
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	50	50	-	-	-	50	33.33
CO2	-	-	50	-	-	50	33.33
CO3	-	-	-	50	50	50	33.33
CO4	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-
Total	50	50	50	50	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (in % Questions)
Remember	--
Understand	--
Apply	--
Analyse	--
Evaluate	--
Create	100

Note: Full marks can be awarded for computer printouts provide student answers all the questions completely

Scheme of Evaluation for SEE

Question No.	Module	Marks
1	Module 1 or Module 2	30
2	Module 3	40
3	Module 4 or Module 5	30
Note: SEE marks will be reduced to 50 marks		

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	30	30	-	-	-	30	30
CO2	-	-	40	-	-	40	40
CO3	-	-	-	30	30	30	30
CO4	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-
Total	30	30	40	30	30	100	100

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Introduction: Significance of Engineering drawing, Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment.	2
1	Orthographic Projections of Points, Straight Lines: Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants	2
1	Orthographic projections of lines (Placed in First quadrant only)	2
2	Orthographic Projections of Planes (First Angle of Projection only): Understanding Orthographic projections of planes viz triangle, square (Placed in First quadrant only)	2
2	Orthographic projections of planes viz rectangle, pentagon (Placed in First quadrant only)	2
2	Orthographic projections of planes viz pentagon, hexagon, and circular laminae (Placed in First quadrant only)	2
2	Orthographic projections of planes viz pentagon, hexagon, and circular laminae (Placed in First quadrant only)	2
3	Projections of Solids (First Angle of Projection only): Orthographic projection of right regular solids (Solids Resting on HP only)	2
3	Prisms & Pyramids (triangle, square)	2
3	Prisms & Pyramids (rectangle, pentagon)	2
3	Prisms & Pyramids (hexagon & cylinders)	2
3	Cones, Cubes & Tetrahedron.	2
3	Development of Solid models –A Group work	2
4	Isometric Projections: Isometric scale, Isometric projection of hexahedron, right regular prisms	2

4	Isometric projection of hexahedron, right regular prisms	2
4	Isometric projection of pyramids, cylinders	2
4	Isometric projection of cones, spheres and combination of two simple solids	2
5	Development of lateral surfaces: Development of lateral surfaces of right regular pyramids and cones resting with base on HP only.	2
5	Development of their frustums and truncations.	2
5	Development of their frustums and truncations.	2
Total		40 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	2nd			
Course Title	:	Engineering Exploration Course			
Course Code	:	23EEXC28			
Course Type (Theory/ Practical/Integrated)	:	Practical			
Course Category	:	AEC/SDC			
Stream	:	Common to all streams	CIE	:	50 Marks
Teaching hr/week (L: T: P:S)	:	0:0:0:2	SEE	:	50 Marks
Total Hours	:	30 Hrs	SEE Duration	:	03 Hours
Credits	:	01			

Course Learning Objectives: Students will be taught

Sl. No	Course Objectives
1	Introduce Students to different engineering disciplines, creative and innovative thinking, design and develop solution through brainstorming.
2	Identify required constraints and gaps, provide critical analysis, visualization, programming, hardware interfacing.
3	Involve students in experimental hands-on project-based learning using modern software tools and hardware components, with prominence on community problems in engineering domains.
4	Enable students to work in a team, collaborative learning and develop communication and presentation skills and technical report writing
5	Encourage lifelong learning and infusing interdisciplinary mindset creating social values and ethical implications of their creative work.

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies which teachers can use to accelerate the attainment of the various

Course Outcomes.

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



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Introduction to Engineering Exploration, Workplace Readiness Skills Engineering Projects in Community Service, Exploration and design thinking Process-Empathize, Define, Ideate, Prototype, Test. Importance of Interdisciplinary team work, effective participation in teamwork and leadership roles. critical thinking and problem-solving skills, professional work ethics, importance of project life cycle, project management, importance of communication. Embrace, Learn, and Adapt to Failure as a Way to Success.	02
Pedagogy	Understand the course objective and explore the project ideas through brainstorming.	
2	Problem Identification, Specification Development - Clear and measurable requirements, identifying relevant benchmarks, identifying the gap between the available and required products, requirements documentation.	02
Pedagogy	Demonstrate existing projects – video/website/hands-on [Demonstration Phase]	
3	Platform Based Development- Introduction to sensors, transducers and actuators and their usage in real time applications. Networking Fundamentals, Web Development/App Development, Nano materials – preparation methods and applications, Electric Vehicles, Robotics and Drones Platform based development -Arduino, electronic circuit simulations and programming concepts.	04
Pedagogy	Handson Session - Tinkercad, Wireshark tool, CryptTool, Kali Linux-fundamental commands, HTML, CSS commands,3D Printing Simulator Model, Altair software, Arduino IDE [Exploration Phase]	
4	Design and Develop Solution, Testing. Prototype—Start to Create Your Solution	20
Pedagogy	Experiential Project Based Learning [Open Ended Phase]	
5	Report Writing, Project Demonstration and Presentation	02
Pedagogy	Demonstration and Presentation	

List of Experiments or Programs

Sl. No	Experiments/Programs	COs
1	Write a program to Blink an LED (light emitting diode) using Arduino's digital output	CO1 CO2 CO3 CO4 CO5
2	Develop a Gas Detecting Alarm system with Arduino	
3	Create a Wikipedia page.	
4	Create an event website, Community-Based Disaster Preparedness Platform	
5	Develop a simple Calculator Application.	
6	3D printing of real structures and machines	
7	Micro magnetic simulation	
8	Basic Circuit Simulations using Pspice	
9	Affordable Housing with Sustainable Materials, Renewable Energy Microgrid for Rural Communities.	
10	Smart Water Distribution and Conservation Network, Solar-Powered Mobile Charging Stations	

Sl. No	Open Ended Phase
1	Project Stream 1: Electronics, Robotics, IOT and Sensors
2	Project Stream 2: Computer Science and IT Applications
3	Project Stream 3: Mechanical and Electrical tools
4	Project Stream 4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

Reference Books

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

1	Exploring Engineering An Introduction to Engineering and Design 5th Edition - April 30, 2020 Authors: Robert Balmer, William Keat Paperback ISBN: 9780128150733 eBook ISBN: 9780128150740
2	Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (2009) Esra Gonen Izmir University of Economics
3	Arduino Project Handbook: Volume One: Complete Guide to Creating with the Arduino by Mark Geddes [ISBN-10 0992952603, Publisher: Sketch Publishing]
4	Exploring Arduino: Tools and Techniques for Engineering Wizardry by Jeremy Blum [ISBN-10 1119405378, Publisher: Wiley]
5	Practical Python Programming for IoT: Build advanced IoT projects using a Raspberry Pi 4, MQTT, RESTful APIs, WebSocket's, and Python 3 Paperback – Import, 15 May 2020

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Apply the domain knowledge to solve the problem statement with multidisciplinary approach.	L3	Apply
CO2	Identify the performance parameter, components, algorithm/logic/design to solve the defined real-time problem.	L4	Analyse
CO3	Design and Develop solution to the proposed problem statement and test the hypothesis wherever applicable using modern tools	L3	Apply
CO4	Analyse the result and synthesize the project findings as project report.	L4	Evaluate
CO5	Demonstrate technical skills and competency through their project with ethics, effective presentation and communication skills as an individual and in a team.	L5	Evaluate

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	2	-	-	-	-	-
CO3	-	-	3	-	3	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	2
CO5	-	-	-	-	-	2	-	2	3	3	3	2

Weblinks and Video Lectures (e-Resources)

1	https://www.electronicsforu.com/mini-projects-ideas?utm_source=google&utm_medium=cpc&utm_campaign=Ele.com+-+traffic+Dynamic+Search+-22-12-2021&gclid=EAlaIQobChMIsf3N4bD3_wlVHAyDAX1a5wkrEAAAYASAAEgJNe_D_BwE
2	https://www.mooc-list.com/tags/design-thinking?__cf_chl__tk=OiyDIM1QC0P7pJVSWWWpKKITaJH2pBsQoyI9laeWj.U-1688552822-0-gaNycGzNC5A
3	https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-problem-statement
4	https://www.3dsourced.com/rigid-ink/best-3d-printing-books/#3D%20Printing%20Courses
5	https://youtu.be/nE1C4ghfvac
6	https://youtu.be/ebO38bbq0_4
7	https://youtu.be/qUEbxTkPIWI
8	https://youtu.be/5zAQot4pKgU
9	https://youtu.be/QQZ6EGf0Ju8
10	https://youtu.be/UgtjRob5qMg

Assessment Pattern (both CIE and SEE)

Engineering Exploration Course

1 Credit Courses – Project

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Project				50	----	----	20	
CIE	Project Based Learning	Review – 1	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three reviews each of 50 Marks scale down the marks to 25 Marks
		Review – 2	Module - 3 & 4	50				
		Review – 3	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment
		CCA-2- Pedagogical Initiatives		50				

								method may be adopted
	Total CIE Project					50	20	Scale down Marks of IAT and CCA to 25
SEE		Project Based Evaluation	Entire syllabus	50	-	50	18	Writeup (10) Conduction and Results (30) Viva Voce (10), Duration 03 hours
CIE + SEE				100	-	-	40	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Continuous Internal Evaluation (CIE):

The CIE will constitute of three reviews and two continuous and comprehensive assessment

The CIE Marks for the internal assessment test shall be **50 Marks each** for review 1, review 2 and review – 3 (project demo/participation in project competitions/paper publications). The scored Marks are scaled down to **25 Marks**.

The phases of evaluating the project:

- Review 1 is evaluated for 50 Marks after 5th week of the semester.
- Review 2 is evaluated for 50 Marks after 10th week of the semester.
- Review 3 is evaluated for 50 Marks after 13th week of the semester

Rubrics for Review 1:

Ideating the problem definition	20% of max. Marks
Identifying the objectives and methodology	20% of max. Marks
Design of the project	40% of max. Marks
Presentation (oral and written) and preparation of review 1 report	20% of max. Marks

Rubrics for Review 2:

Implementation of the design	40% of max. Marks
Validate the result with various scenarios	30% of max. Marks
Presentation (oral and written)	30% of max. Marks

Rubrics for Review 3:

Demonstration of the project	40% of max. Marks
Viva-voce	20% of max. Marks
Report evaluation	20% of max. Marks
Paper presentation/participation in project competitions	20% of max. Marks

Continuous and Comprehensive Assessment (CCA):

CCA1 and CCA2 are evaluated for 50 marks each.

CCA 1 is the assessment of the laboratory sessions scaled to 15 marks and CCA 2 is the quiz scaled 10 marks

Semester End Examination (SEE):

- The SEE as project exam will be conducted as per the scheduled timetable, for the **duration 03 hours**.
- SEE as project work will be conducted by two examiners appointed by the chief controller, examination.

SEE Marks for the project work shall be awarded using appropriate rubrics with the ratio of 50:25:25 for quality work and report, viva-voce and presentation skills

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Project					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	Review-1	Review-2	Review-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	-	-	-	-	-	-
Understand	-	-	-	-	05	-
Apply	30	10	-	20	15	-
Analyse	20	20	20	20	20	-
Evaluate	-	20	30	10	10	-
Create	-	-	-	-	-	-

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage (%)
	Review-1		Review-2		Review-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	05	10	-	-	-	15	10
CO2	10	10	-	-	-	20	14
CO3	05	10	05	05	20	45	30
CO4	-	-	10	10	20	40	26
CO5	-	-	10	10	10	30	20
Total	20	30	25	25	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (80% Project Demonstration+20%Report)
Remember	-
Understand	-
Apply	40%

Analyse	30%
Evaluate	10%
Create	-

SEE Course Plan

CO's	Marks Distribution			Total Marks	Weightage
	Empathize, Define, Ideate (Writeup)	Design and Analyse the result. (Project Demo)	Report Evaluation		
CO1	05	-	10	15	30%
CO2	05	-	-	05	10%
CO3	-	15	-	15	30%
CO4	-	10	-	10	20%
CO5	-	05	-	05	10%
Total	10	30	10	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Engineering Projects in Community Service, Exploration and design thinking Process- Empathize, Define, Ideate, Prototype, Test. Importance of Interdisciplinary team work, effective participation in teamwork and leadership roles. critical thinking and problem-solving skills, professional work ethics, importance of project life cycle, project management, importance of communication. Embrace, Learn, and Adapt to Failure as a Way to Success.	01
1	Understand the course objective and explore the project ideas through brainstorming.	01
2	Problem Identification, Specification Development - Clear and measurable requirements, identifying relevant benchmarks, identifying the gap between the available and required products, requirements documentation.	01
2	Demonstrate existing projects – video/website/hands-on	01
3	Introduction to sensors, transducers and actuators and their usage in real time applications- Tinkercad Tool, Arduino IDE	01
3	Networking Fundamentals, Web Development/App Development	01
3	Nano materials – preparation methods and applications, Electric Vehicles	01
3	Robotics and Drones-3D Printing Simulator Model, Altair software	01
4	Design and Develop Solution, Testing. Prototype—Start to Create Your Solution	20
5	Report Writing, Project Demonstration and Presentation	02
Total		30



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st			
Course Title	:	Engineering Mathematics - I			
Course Code	:	23MATC11			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	ASC			
Stream	:	Common to all branches	CIE	:	50 Marks
Teaching hour/week (L:T:P:S)	:	3:2:0:0	SEE	:	50 Marks
Total Hours	:	50 Hrs	SEE Duration	:	3 Hours
Credits:	:	4			

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Acquire basic knowledge of Mathematical concepts for understanding Engineering problems
2	Use concepts of multivariate calculus, differential equations and numerical methods in solving problems
3	Analyze problems using concepts of multivariate calculus, differential equations and numerical methods
4	Analysis of various real time problems using the skills acquired

Teaching-Learning Process

Pedagogy (General Instructions):

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

- Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
- Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
- Encourage collaborative (Group) Learning in the class.
- Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
- Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- Topics will be introduced in multiple representations.
- Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
- Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
- Individual teachers can devise innovative pedagogy to improve teaching-learning.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	MODULE – I: Partial differentiation Partial derivatives, Total derivatives-differentiation of composite functions, Maxima and minima for a function two variables, Jacobians, Hessian matrix.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
2	MODULE-II: Ordinary Differential Equations of first order Linear Differential equation, Bernoulli's equation, exact differential equation, reducible to exact differential equation, solvable for p, Clairaut's equation, equations reducible to Clairaut's form, Newton's law of cooling- problems.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
3	MODULE-III: Ordinary Differential Equations of second and higher order Second and higher order differential equations, inverse differential operator, Cauchy's and Legendre's differential equations, method of variation of parameters.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
4	MODULE-IV: Numerical solution of Ordinary Differential Equations Introduction to Taylor's series, Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order, Milne's predictor and corrector method, Runge-Kutta method for second order differential equations, Milne's method for second order differential equations.	10
Pedagogy	Chalk and board, group discussion, ppt, videos	
5	MODULE-V: Partial differential equations Formation of Partial Differential Equation, solution of PDE by direct integration, solution of Lagrange's Linear PDE, solution of one-dimensional heat and wave equations by variable separable method, solution of two-dimensional Laplace equation, numerical solution of	10

	Laplace equation using standard five-point formula, numerical solution of heat equation by Schmidt explicit formula, numerical solution of the wave equation.	
Pedagogy	Chalk and board, group discussion, ppt, videos	

List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

Reference Books

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

1	Erwin Kreyzig, "Advanced Engineering Mathematics", 10 th Edition, Wiley Publications, 2018.
2	Theory and problems of Differential and integral calculus by Frank Ayres and Elliott Mendelson, Schaum's outline series, third edition, McGraw Hill publications.
3	Numerical Methods for Scientific and Engg. Computation, M K Jain, S R K Iyengar, R K Jain, 6th edition, New Age, 2012.
4	Advanced mathematics for Engineers and Scientists by Murray R Spiegel, Schaum's outline series, edition, McGraw Hill publications.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of multivariate calculus and differential equations	Understand	L2
CO2	Apply techniques of multivariate calculus, differential equations and numerical methods to solve Engineering Problems	Apply	L3
CO3	Analyze Engineering problems using multivariate calculus and differential equations.	Analyse	L4
CO4	Investigate problems arising in real life using the overall knowledge acquired	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://youtube.com/playlist?list=PLKS7ZMKnbPrQukeSraYiel-cNtwscFtlQ
2	https://youtube.com/playlist?list=PLNKD1qB9ppttgKvBIC0cpPbBBL0CgLT1g
3	https://youtube.com/playlist?list=PLKS7ZMKnbPrRvROmpyKXIBRQusRx_fw_L
4	https://youtu.be/MAAXfC5nfXs
5	https://youtu.be/SrDyuEH3rHA
6	https://youtu.be/io8-qdx1gic

Assessment Pattern (both CIE and SEE)

Applied Science Courses

4 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						50	20	Scale down Marks of IAT and CCA to 50

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	--	--	--	30	--	--
Understand	10	10	10	20	--	--
Apply	30	30	30	--	--	--
Analyse	10	10	10	--	--	--
Evaluate	--	--	--	--	50	--
Create	--	--	--	--	--	--

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5	5	5	10	30	20%
CO2	15	15	15	15	30	90	60%
CO3	5	5	5	5	10	30	20%
CO4	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	25	25	25	25	50	150	

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	5
Apply	35
Analyse	10
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	--	--	--	--	5	10%
CO2	5	5	10	5	10	35	70%
CO3	--	5	--	5	--	10	20%
CO4	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--
Total	10	10	10	10	10	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Partial derivatives- Definition and problems	1
1	Problems continued on above	1
1	Total Derivatives- problems	1
1	Partial Differentiation of Composite functions	1
1	Problems continued on above	1
1	Jacobians – Definition and problems	1
1	Problems on Implicit functions	1
1	Maxima and Minima for a function of two variables	1
1	Problems continued on above	1
1	Hessian matrix and problems	1
2	Linear differential equations of first order and first degree and problems	1
2	Problems continued on the above	1
2	Bernoulli's equation and problems	1
2	Exact equations and reducible to exact	1
2	Problems continued on the above	1
2	Equations solvable for p	1
2	Problems continued on the above	1
2	Clairaut's equation and problems	1
2	Equations reducible to Clairaut's form	1
2	Newton's law of cooling and problems	1
3	Second and higher order differential equations	1
3	Problems continued on the above	1
3	Problems continued on the above	1
3	Inverse differential operator, three types	1
3	Problems continued on the above	1
3	Problems continued on the above	1

3	Problems continued on the above	1
3	Cauchy's differential equation and problems	1
3	Legendre's differential equation and problems	1
3	Method of variation of parameters	1
4	Formation of PDE	1
4	Method of elimination of arbitrary constants and functions	1
4	Solution of PDE by direct integration	1
4	Solution of Lagrange's linear PDE and problems	1
4	Solution of one-dimensional heat equation	1
4	Solution of one-dimensional wave equation	1
4	Solution of two-dimensional Laplace equation	1
4	Numerical solution of Laplace equation	1
4	Numerical solution of heat equation	1
4	Numerical solution of wave equation	1
5	Introduction to Taylor's series	1
5	Numerical solution of ODE by Taylor's series method	1
5	Modified Euler's method and problems	1
5	Problems continued on the above	1
5	Runge-Kutta method of fourth order	1
5	Problems continued on the above	1
5	Milne's predictor and corrector method and problems	1
5	Runge-Kutta method for second order differential equations	1
5	Problems continued on the above	1
5	Milne's method for second order differential equations	1
	Total	50 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st			
Course Title	:	Engineering Mechanics			
Course Code	:	23CECV12			
Course Type (Theory / Practical / Integrated)	:	Theory			
Category	:	CEC			
Stream	:	Civil	CIE	:	50 Marks
Credits (L: T:P:PJ)	:	2:2:0:0	SEE	:	50 Marks
Total Hours	:	40Hrs	SEE Duration	:	3 Hours

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	To develop intuitive skills to find resultant of force system through principles of rigid body mechanics
2	Making students understand static equilibrium equations for variety of structural elements using support reactions And building analytical skills to asses, designate & calculate forces in truss members
3	Keeping the students aware of 'centroid' and 'moment of inertia' as a part of keeping structure in equilibrium; Importance in deciding geometry of strl member
4	Apply relationship between displacement velocity and acceleration of different motion and force causing this motion
5	Initiating students to assess forces on a given structure, Type of transportation system being used for commute,

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.

7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can devise innovative pedagogy to improve teaching-learning.

**Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)**

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Resultant of coplanar force system: Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force, Resultant of coplanar non-concurrent force system, Numerical examples.	08
Pedagogy	Use of proto type models to replicate application problems to develop intuitive skills and taking examples of structural members inside classroom to create problems to solve	
2	Equilibrium of coplanar force system: Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system Equilibrium of coplanar non-concurrent force system, Numerical problems on spheres in a channel, and connected cables supporting weights	08
Pedagogy	Use of proto type models to replicate application problems to develop intuitive skills and taking examples of structural members inside classroom to create problems to solve	
3	Beams Loads and Supports: Types of beams, types of loadings, types of supports, Support reactions of statically determinate beams subjected to various types of loads, Numerical examples Analysis of Truss: Introduction, Classification of truss, Analysis of plane perfect truss by the method of joints only and related Numerical	08
Pedagogy	Site visits to residential commercial and industrial buildings to appreciate the application and analysis of beams and truss	
4	Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built-up sections and related Numerical examples. Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas of simple	08

	built up I, L & H sections and related Numerical examples.	
Pedagogy	Collaborative and problem based learning by making groups and finding all important geometrical property of cross sections	
5	Kinematics: Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity, Numerical examples on linear motion Projectiles: Introduction, numerical examples on projectiles. Kinetics: Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys, Numerical problems	08
Pedagogy	Video lectures with animations to connect dynamic quantities to strengthen basics of solid and fluid mechanics	

List of Experiments or Programs:

Sl.No	Experiments/Programs	COs
1	NIL	

Reference Books:

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

1	Bhavikatti S S, Engineering Mechanics, 2019, New Age International
2	TimoshenkoS, YoungD. H EngineeringMechanics, 5thEdition, 2017, PearsonPress.
3	BeerF.P.andJohnstonE.R.,Mechanicsfor Engineers,StaticsandDynamics,1987,McGrawHill.
4	IrvingH.Shames,EngineeringMechanics, 2019,Prentice-Hall.
5	HibblerR.C., EngineeringMechanics:Principles ofStatics andDynamics,2017, PearsonPress.

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

CO	Course Outcomes	RBT Level Indicator
CO1	Remember and Understand idealizations and characteristics of forces; To compute resultants and equilibrium of force Systems on different structural systems.	L1 & L2
CO2	Apply the principles of rigid body mechanics to derive expressions to analyze variety of forces acting on structures	L3
CO3	Analyse beams and trusses to find reactions using equilibrium equations to get stress & resultants for design	L4
CO4	Design and draw beams and trusses using structural software to visualize basic concepts of mechanics	L5
CO5	Evaluate existing beams and trusses for accessing balance of actions and reactions to control translations and rotations	L6

Mapping of Course Outcomes to Program Outcomes:

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

Web links and Video Lectures (e-Resources):

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

Assessment Pattern (both CIE and SEE)

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 Credits & 2 Credits Courses – Theory (if Integrated)

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						25	10	Scale down Marks of IAT and CCA to 25

CIE	Practical	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	10	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05	10				
			Observation book	05					
		Practical Test	Write up	15	50	----	10	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	5	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		Total CIE Practical						25	10

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed

4 Credit Course – IPCC

The Minimum Marks to be secured in CIE to appear for SEE shall be 10marks (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes(COs), Program Outcomes(POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **15 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks and conduction for 10Marks. Marks of all experiments' write-ups and conduction are added and averaged to 15 Marks.
- The laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for 50 Marks and scaled down to **05 Marks**.
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IPCC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

3 Credit Course – Theory

Note: A few of the Courses of 3 Credit are Integrated Course Type, for such courses the method suggested for 4 Credit IPCC shall be followed.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Group Problem Solving, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	20
Apply	80
Analyse	--
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	20	20	20	20	20	20	20%
CO2	80	80	80	80	80	80	80%
CO3	--	--	--	--	--	--	
CO4	--	--	--	--	--	--	
CO5	--	--	--	--	--	--	
CO6	--	--	--	--	--	--	
Total	--	--	--	--	--	--	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Introduction to engineering mechanics-solid mechanics and fluid mechanics	1
1	Dimensions and units of physical quantities Laws of motion	1
1	Principles of mechanics, idealizations, System of forces and laws of forces	1
1	Moment and equivalent force-couple system	1
1	Composition and resolution of force system, resultant of concurrent forces	1
1	Numerical problems	1
1	Resultant of non-concurrent forces	1
1	Numerical problems	1
1	Numerical problems	1
1	Numerical problems	1
2	Concepts of equilibrium of concurrent forces	1
2	Lami's theorem and numerical problems on single sphere	1
2	Numerical problems on single sphere	1
2	Numerical problems on single sphere	1

2	Numerical problems on double sphere	1
2	Numerical problems on double sphere	1
2	Numerical problems on double spheres	1
2	Numerical problems on three spheres	1
2	Numerical problems on three spheres	1
2	Numerical problems on three spheres	1
3	Types of beams, loads and supports	1
3	Types of beams, loads and supports	1
3	Concept of finding reaction developed by supports	1
3	Numerical problems to find reactions using equations of static equilibrium	1
3	Numerical problems to find reactions using equations of static equilibrium	1
3	Types of truss and relationship between members and joints	1
3	Method of joints to find member forces	1
3	Method of joints to find member forces	1
3	Method of sections to find member forces	1
3	Method of sections to find member forces	1
4	Concepts of centre of gravity and centroid	1
4	Deriving expression for different shapes	1
4	Deriving expression for different shapes	1
4	Numerical problems	1
4	Moment of inertia and related concepts and radius of gyration	1
4	Parallel axes theorem Perpendicular axis theorem	1
4	Numerical problems	1
4	Numerical problems	1
4	Numerical problems	1
4	Numerical problems	1
5	Basic terms in kinematics of motion	1
5	Rectilinear motion with uniform acceleration and numerical problems	1
5	Acceleration due to gravity and numerical problems	1
5	Curvilinear motion-vertical plane projectiles-horizontal and inclined projection	1
5	Numerical problems	1
5	Curvilinear motion-Horizontal plane	1
5	Banking and superelevation -numerical problems	1
5	Kinetics-D'Alembert's principle of dynamic equilibrium	1
5	Numerical problems	1
5	Numerical problems	1
Total		50 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1st			
Course Title	:	Indian Constitution			
Course Code	:	23ICNC17			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	HSSC			
Stream	:	Common to all	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	1:0:0:0	SEE	:	50 Marks
Total Hours	:	15 Hrs	SEE Duration	:	2 Hours
Credits	:	01			

Course Learning Objectives: Students will be taught

Sl. No	Course Objectives
1	To know about the basic structure of Indian Constitution.
2	To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3	To know about our Union Government, political structure & codes, procedures.
4	To know the State Executive & Elections system of India.
5	To learn about Amendments, Emergency Provisions and other important provisions given by the constitution.

Teaching-Learning Process

Pedagogy (General Instructions):

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

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



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Introduction to the Indian constitution, importance of Indian Constitution, drafting of the Constitution, Salient features of India Constitution. Preamble of Indian Constitution, structure of the Indian Constitution	03
Pedagogy	Direct instructional method (Low/Old Technology) Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students	
2	Fundamental Rights (FR's) and its Restriction and limitations, Directive Principles of State Policy (DPSP's) and its present relevance in Indian society, Fundamental Duties and its Scope and significance in Nation	03
Pedagogy	Flipped classrooms (High/advanced Technological tools) Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students	
3	Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India, Judges of Supreme Court	03
Pedagogy	Blended learning (Combination of Low/Old Technology and High/advanced Technological tools) Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students	
4	State Executive: State Legislature System, State Executive – Governor, Chief Minister, State Cabinet, State Legislature – Vidhana Sabha and Vidhana Parishad, Judicial System of state, High Court of State, Judges of High Court	03
Pedagogy	Enquiry and evaluation-based learning Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students	

5	Election Commission of India, Elections & Electoral Process, Emergency Provisions, types of emergencies, effects of emergency, Amendment to Constitution, and Important Constitutional Amendments till today, Special Provisions for certain classes.	03
Pedagogy	Personalized learning Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students	

Reference Books

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

1	“Constitution of India” (for Competitive Exams) - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2	“Introduction to the Constitution of India”, (Students Edition.) by Durga Das Basu (DD Basu): Prentice –Hall, 2008.
3	“Constitution of India, Professional Ethics and Human Rights” by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition – 2019.
4	“The Constitution of India” by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
5	“Samvidhana Odu” - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the making of the constitution, its structure and Functioning	Understand	L2
CO2	Understand the importance of Fundamental Rights (FR's), Directive Principles of State Policy (DPSP's) and Fundamental Duties.	Understand	L2
CO3	Understand the structure and functioning of Union Executive	Understand	L2
CO4	Understand the structure and functioning of State Executive	Understand	L2
CO5	Understand the importance of Election Commission of India, Emergency Provisions, Amendment to Constitution, and Special Provisions under the constitution of India.	Understand	L2

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	--	--	--	--	--	3	--	--	--	--	--	--	--	--
C02	--	--	--	--	--	3	--	--	--	--	--	--	--	--
C03	--	--	--	--	--	3	--	--	--	--	--	--	--	--
C04	--	--	--	--	--	3	--	--	--	--	--	--	--	--
C05	--	--	--	--	--	3	--	--	--	--	--	--	--	--

Weblinks and Video Lectures (e-Resources)

1	https://archive.nptel.ac.in/courses/129/106/129106003/
2	https://web.iitd.ac.in/~burra/teaching/burra19aud-lectures-contents.pdf

Assessment Pattern (both CIE and SEE)

Constitution of India / Samskruthika Kannada / Communicative English / Professional writing skills in English/ Innovation Design & Thinking

1 Credit Courses – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	(50+50+50) / 3	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
	Total CIE Theory						50	20

SEE		Theory exam – (MCQ Type)	Entire syllabus	50	----	50	18	SEE Exam is theory Exam with MCQ type Question Papers of 50 Questions with each question 1 Mark each. Examination duration is 1 Hour
CIE + SEE				100	----	----	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

1 Credit Course - Theory

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Crossword, Maize, Debate, Role Play, Community Service, Mind Map, Concept Map, Case Study, Group Discussions, Ideathon

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests (MCQ) each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 to be conducted after 4th week
- CCA2 to be conducted after 9th week.
- The evaluation of CCAs includes either through quiz or rubrics

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject .
- The question paper shall be set for 50 Marks. The medium of the question paper shall be English. **The duration of SEE is 01 hours.**
- The question paper will have 50 MCQs **covering all modules**. The questions shall map with the course outcome, program outcome and Blooms RBT level.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	-	-	-	-	-	-
Understand	50	50	50	50	50	-
Apply	-	-	-	-	-	-
Analyse	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-
Create	-	-	-	-	-	-

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	-	-	-	-	-	-	-
CO2	25	25	25	25	50	150	100
CO3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-
Total	25	25	25	25	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	50
Apply	--
Analyse	--
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	--	--	--	--	10	20%
CO2	--	10	--	--	--	10	20%
CO3	--	--	10	--	--	10	20%
CO4	--	--	--	10	--	10	20%
CO5	--	--	--	--	10	10	20%
Total	10	10	10	10	10	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Introduction to the Indian constitution, importance of Indian Constitution	1
1	Drafting of the Constitution, Salient features of India Constitution	1
1	Preamble of Indian Constitution, structure of the Indian Constitution	1
2	Fundamental Rights (FR's) and its Restriction and limitations,	1
2	Directive Principles of State Policy (DPSP's) and its present relevance in Indian society	1
2	Fundamental Duties and its Scope and significance in Nation	1
3	Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet	1
3	Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies	1
3	Judicial System of India, Supreme Court of India, Judges of Supreme Court	1
4	State Executive: State Legislature System, State Executive – Governor, Chief Minister, State Cabinet	1
4	State Legislature – Vidhana Sabha and Vidhana Parishad	1
4	Judicial System of state, High Court of State, Judges of High Court	1
5	Election Commission of India, Elections & Electoral Process	1
5	Emergency Provisions, types of emergencies, effects of emergency	1
5	Amendment to Constitution, and Important Constitutional Amendments till today, Special Provisions for certain classes.	1
Total		15 Hrs



Dayananda Sagar Academy of Technology & Management

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Semester	:	1 st			
Course Title	:	INNOVATION and DESIGN THINKING			
Course Code	:	23IDTC18			
Course Type (Theory/Practical/Integrated)	:	Theory			
Course Category	:	AEC/SDC			
Stream	:	Common to all Branches	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	1:0:0:0	SEE	:	50 Marks
Total Hours	:	15 Hrs T	SEE	:	01 Hour
Credits	:	01	Duration	:	

Course Learning Objectives: Students will be taught

CLO's	Course Objectives
CLO1	Inculcate the fundamental concepts of design thinking.
CLO2	Enable students as a good designer by imparting creativity and problem-solving ability.
CLO3	Involve students to conceive, conceptualize, design and demonstrate their innovative ideas.
CLO4	Emphasize project-based learning for real time applications.

Teaching-Learning Process

Pedagogy (General Instructions):

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

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



DSATM

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Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Design process: Traditional design, Design thinking, Existing sample design projects, Study on designs around us, Compositions/structure of a design, Innovative design: Breaking of patterns, reframe existing design problems, Principles of creativity Empathy: Customer Needs, Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping	3
Pedagogy	Lecture: Introduction to design thinking process. Presentation and Videos.	
2	Idea generation and Conceptualization: Visual thinking, Drawing/sketching, new concept thinking, Concept Generation Methodologies, Concept Selection, Concept Testing, Opportunity identification, Empathy for design – Collaboration in distributed Design	3
Pedagogy	Ideate the problem and analysis through Journey mapping, customer mapping	
3	Analyze Phase: 5-Whys and 1How Recognize the difference between symptoms and root cause, overcoming common challenges during “5Whys” process. Understanding the purpose “1How” technique. Connecting 1How to the insights from the 5Whys analysis. Creating a problem-solving framework using both techniques, align problem solving with user needs and empathy	3
Pedagogy	Group Activity: Conducting a collaborative activity “5Whys Analysis” on the Identified problem. Brainstorming potential solution using “1How” approach.	
4	Project Management Fundamentals and Prototyping Project management terms, Approaches: Waterfall, Agile, Hybrid. Roles and Responsibilities and competencies of project manager, phases of project-Initiate and plan, execute, close. Rapid prototyping, Strategy and Organization – Business Model design.	3
Pedagogy	Design a solution combining insights from “5Whys and 1How” technique and project Canva for the identified problem.	
5	Finding Solution Through IDEATION Apply ideation, critical thinking and problem-solving skills, to real-world problems and overcome barriers and find innovative solutions.	3
Pedagogy	Presentation by Team	

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
2	Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3	Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013
4	Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011..
5	Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers..
6	Gavin Ambrose, Paul Harris, "Basics Design - 8: Design Thinking", illustrated, reprint, AVA Publishing, 2010
7	Christian Müller-Roterberg, "Handbook of Design Thinking", Kindle Direct Publishing ISBN: 978-1790435371, November 2018
8	Stuart Pugh, Total Design: Integrated Methods for Successful Product Engineering, Bjarki Hallgrimsson, Prototyping and model making for product design, 2012, Laurence King Publishing Ltd.
9	Kevin Henry, Drawing for Product designers, 2012, Laurence King Publishing Ltd

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the different methods employed in design thinking and establish a framework to use in their practices	Understand	L2
CO2	Apply the different steps of design thinking to ideate the problem.	Apply	L3
CO3	Develop creative solution using the tools/model-based approach and strategies of design thinking.	Apply	L3
CO4	Analyse and validate the devised solution for real time problem	Analyse	L4

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)	
1	What is design thinking, Daylight design firm https://www.youtube.com/watch?v=Ee4CKIPkIik&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=3
2	Design thinking, 3 major stages HBR https://www.youtube.com/watch?v=z3IbHLfcyWo&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=23
3	The Importance of Empathy https://www.youtube.com/watch?v=UzPMMSKfKZQ&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=21
4	How to create a customer journey map https://www.youtube.com/watch?v=mSxpVRo3BLg&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=6
5	Personas - Design Thinking Book https://www.youtube.com/watch?v=W1kw5xK1C30&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=8
6	How to build your creative confidence, David Kelley https://www.youtube.com/watch?v=16p9YRF0l-g&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=20
7	Apply Design Thinking in Your Work https://www.youtube.com/watch?v=U499U4TcyY8&list=PLo2Y_6-IlgFXbyOjTcTg_IJQ0fZghjjQw&index=4
8	Brainstorming https://www.mindtools.com/acv0de1/brainstorming
9	Design Thinking 101 https://www.nngroup.com/articles/design-thinking/
10	The 5 Stages in the Design Thinking Process https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process
11	Tools for taking action https://dschool.stanford.edu/resources
12	Design Thinking - A Primer https://onlinecourses.nptel.ac.in/noc19_mg60/preview

Assessment Pattern (both CIE and SEE)

Constitution of India / Samskruthika Kannada / Communicative English / Professional writing skills in English/Innovation and Design Thinking

1 Credit Courses – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	(50+50+50) / 3	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (MCQ)	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				

	Total CIE Theory				50	20	Scale down Marks of IAT and CCA to 25	
SEE		Theory exam – (MCQ Type)	Entire syllabus	50	----	50	18	SEE Exam is theory Exam with MCQ type Question Papers of 50 Questions with each question 1 Mark each. Examination duration is 1 Hour
CIE + SEE				100	----	----	40	

Assessment Details (both CIE and SEE)

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

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

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Crossword, Maize, Debate, Role Play, Community Service, Mind Map, Concept Map, Case Study, Group Discussions, Ideathon

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests (MCQ) each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of two test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 to be conducted after 4th week
- CCA2 to be conducted after 9th week.
- The evaluation of CCAs includes either through quiz or rubrics

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 50 Marks. The medium of the question paper shall be English. The duration of SEE is 01 hours.
The question paper will have 50 MCQs **covering all modules**. The questions should map with the course outcome, program outcome and Blooms RBT level.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	-	-	-	-	-	-
Understand	20	20	10	20	-	-
Apply	30	30	20	20	20	-
Analyse	-	-	20	10	20	-
Evaluate	-	-	-	-	10	-
Create	-	-	-	-	-	-

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage (%)
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	10	10	10	50	33
CO2	10	10	10	10	10	50	33
CO3	-	10	-	10	10	30	20
CO4	-	-	-	-	20	20	14
Total	20	30	20	30	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (100% Theory)
Remember	-
Understand	20%
Apply	60%
Analyse	20%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage (%)
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	05	-	05	-	-	10	20
CO2	05	05	05	-	-	15	30
CO3	-	05	-	05	05	15	30
CO4	-	-	-	05	05	10	20
Total	10	10	10	10	10	50	100

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Design process: Traditional design, Design thinking, Existing sample design projects, Study on designs around us, Compositions/structure of a design.	1
1	Innovative design: Breaking of patterns, reframe existing design problems, Principles of creativity Empathy.	1
1	Customer Needs, Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping	1
2	Idea generation and Conceptualization: Visual thinking, Drawing/sketching, new concept thinking.	1
2	Patents and Intellectual Property, Concept Generation Methodologies.	1
2	Concept Selection, Concept Testing, Opportunity identification, Empathy for design – Collaboration in distributed Design	1
3	Analyze Phase: 5-Whys and 1How Recognize the difference between symptoms and root cause, overcoming common challenges during “5Whys” process.	1
3	Understanding the purpose “1How” technique. Connecting 1How to the insights from the 5Whys analysis.	1
3	Creating a problem-solving framework using both techniques, align problem solving with user needs and empathy	1
4	Project Management Fundamentals and Prototyping Project management terms, Approaches: Waterfall, Agile, Hybrid.	1
4	Roles and Responsibilities and competencies of project manager, phases of project-Initiate and plan, execute, close.	1
4	Rapid prototyping, Strategy and Organization – Business Model design..	1
5	Finding Solution Through IDEATION Apply ideation, critical thinking and problem-solving skills, to real-world problems and overcome barriers and find innovative solutions.	3
Total		15 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st / 2 nd		
Course Title	:	Introduction to Electrical Engineering		
Course Code	:	23CECE13 / 23CECE 23		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Category	:	CEC-1/CEC-2		
Stream	:	Non-Electrical Branches	CIE	: 50 Marks
Teaching hours/ week (L:T:P:S)	:	2:2:0:0	SEE	: 50 Marks
Total Hours	:	40 Hrs	SEE Duration	: 3 Hours
Credits	:	03		

Course Learning Objectives: Students will be taught

Sl. No.	Course Objectives
1	To provide the knowledge on the basic concepts, working principle and operation of different power systems electrical machines, and electrical installations.
2	To introduce the basic laws and theorems to solve the basic electrical engineering problems.
3	To explain the analysis of DC & AC circuit.

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<p>Power Generation, Transmission ,Distribution and D.C. Circuits:</p> <p>Power Generation: Conventional and non-conventional energy resources. Hydel, Nuclear, Thermal, Solar & wind power generation. Introduction to Green H2</p> <p>Transmission & Distribution : Types of transmission lines, Power transmission and Distribution system using single line diagram approach</p> <p>DC Circuits: Active and passive elements, Ohm's Law. KCL & KVL, series, parallel, series-parallel circuits. Mesh analysis and nodal analysis. Superposition and Thevenin's theorem (resistive load). Time domain analysis of first order R-L and R-C circuits. Numerical examples</p>	08
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning	
2	<p>A.C Circuits:</p> <p>Single phase: Study and representation of sinusoidal waveform, analysis of single phase AC circuits (R,L,C,R-L, R-C, R-L-C Series), Concepts of Power & Power factor , Numerical examples.</p> <p>Three Phase: Analysis of three phase Balanced circuit, Voltage and current relation in star and delta connection, Numerical examples.</p>	08
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning 5. Demonstration	
3	<p>AC Machines:</p> <p>Transformers: Electromagnetism, Types of transformers, Construction and principle of operation, EMF equation of transformer, regulation, efficiency calculations, working of single-phase Auto transformer, Applications of transformers, Numerical examples on EMF & efficiency of transformer.</p> <p>Single phase and Three phase Induction Motor: Types of 3-phase Induction Motors, Construction and working principle of three phase Induction Motor, Slip and its significance. applications of 3-phase induction motors.</p> <p>Types of 1-phase induction motors, Constructional, working, principle of operation of single-phase induction motor and applications of 1-phase induction motors.</p>	08
Pedagogy		

	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning 5. Cut sections	
4	<p>DC Motors and Special Motors:</p> <p>DC Motors: Types of DC motors, Construction and working principle of DC motor, concept of back EMF, characteristics and applications of DC motors</p> <p>Special motors- Constructional features, working and applications of stepper motor, BLDC, PMSM and servo motor.</p>	08
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning 5. Cut sections.	
5	<p>Switchgears & Electrical Installation:</p> <p>Components of LT switch gear-switch fuse unit, MCB, ELCB, RCCB. Types of wiring, house/building wiring and its estimation, types and ratings of Cables Two way and three-way control of load. Electric Shock, earthing and its types, Safety Precautions to avoid shock,. Demonstration of Energy meter and Smart meter, Elementary calculation of energy consumption and power factor improvement</p>	08
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Demonstration 4. Experiential Learning	

Reference Books

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

1.	D. P. Kothari and I. J. Nagarth "Basic Electrical Engineering", 3 rd edition Tata Mc Graw Hill 2017
2.	Allen R Hambley, "Electrical Engineering Principles & Applications", 2019 6 th edition Pearson Education
3.	D. C. Kulshreshtha, "Basic Electrical Engineering" , First Edition 2019.Tata McGraw Hill,
4.	B.L. Theraja, , " A text book of Electrical Technology" reprint edition 2014. S Chand and Company

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the concept, working principle operation of different power systems, electrical machines, and the electrical installations.	Remember and Understand	L1, L2
CO2	Apply the basic laws and theorems to the solve basic electrical engineering problems.	Apply	L3
CO3	To analyse the basic DC & AC circuits	Analyse	L4
CO4	Solve the different electrical circuit problems using modern tools.	Evaluate	L5 & L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C02	3	--	--	--	--	--	--	--	--	--	--	--	--	--
C03	--	3	--	--	--	--	--	--	--	--	--	--	--	--
C04	--	--	3	3	3	--	--	--	2	2	--	--	2	2

Assessment Pattern (both CIE and SEE)

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & half of module-4. (1 ½ Module)	50				
		Internal Assessment Test (IAT) - III	Half of module-4 & Module - 5. (1 ½ Module)	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				

	Total CIE Theory				50	20	Scale down Marks of IAT and CCA to 50	
SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

4 Credit Course - IPCC

The Minimum Marks to be secured in CIE to appear for SEE shall be 10marks (40% of Maximum Marks - 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

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

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

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes(COs), Program Outcomes(POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of 50 Marks

- First test after 6th week of the semester (syllabus completion of 35 - 40%)
- Second test after 10th week of semester (syllabus completion of 65 - 70%)
- Third test after 14th week of semester (syllabus completion of 90 - 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **15 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks and conduction for 10Marks. Marks of all experiments' write-ups and conduction are added and averaged to 15 Marks.
- The laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for 50 Marks and scaled down to **05 Marks**.
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IPCC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. **Marks scored out of 100 shall proportionally be reduced to 50 Marks.**
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

3 Credit Course - Theory

Note: A few of the Courses of 3 Credit are Integrated Course Type, for such courses the method suggested for 4 Credit IPCC shall be followed.

Assessment Details (both CIE and SEE)

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

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

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Group Problem Solving, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student must answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. **Marks scored out of 100 shall proportionally be reduced to 50 Marks.**

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	10	10	20	-	-	NA
Understand	15	15	20	-	-	NA
Apply	15	20	10	20	10	NA
Analyse	10	5	-	20	10	NA
Evaluate	-	-	-	10	10	NA
Create	-	-	-	-	20	NA

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	15	10	10	15	40	90	60%
CO2	10	5	10	10	10	45	30%
CO3	5	5	-	5	-	15	10%
CO4	-	-	-	-	-	-	
Total	25	20	20	25	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	10
Understand	20
Apply	15
Analyse	5
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	8	12	18	12	10	60	60%
CO2	--	12	12	10	--	34	34%
CO3	--	--	6	--	--	6	6%
CO4	--	--	--	--	--	--	--
Total	8	24	36	22	10	100	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1.	Power Generation: Conventional and non-conventional energy resources.	1
	Hydel, Nuclear power generation.	1
	Thermal, Solar & wind power generation. Introduction to Green H2	1
	Power transmission and Distribution system using single line diagram approach	1
	DC Circuits: Active and passive elements, Ohm's Law. KCL & KVL	1
	series-parallel circuits by Mesh analysis and nodal analysis method	1
	Superposition theorem. Thevenin's theorem.	1
	Time domain analysis of first order R-L and R-C circuits	1
2.	Single phase AC circuits: Study and representation of sinusoidal waveform,	1
	analysis of single- phase AC circuits (R, L, C circuit)	1
	analysis of single-phase AC circuits (R-L, R-C, R-L-C Series),	1
	Numerical examples on R-L-C circuits	1
	Concepts of Power & Power factor	1
	Three Phase: Analysis of three phase Balanced circuit	1
	Voltage and current relation in star and delta connection,	1
	Numerical examples of three phase circuits	1
3.	Transformers: Electromagnetism basic principle	1
	Construction and principle of operation of Transformers	1
	EMF, regulation, efficiency calculations of Transformers with Numerical examples	1
	working of single-phase Auto transformer, applications	1
	Induction Motor: Types, Construction and working principle of three phase Induction Motor and applications of three phase Induction Motor, Slip and its significance.	1
	single-phase induction motor - Types of 1-phase induction motors, Constructional feature and working	1
	principle of operation and applications of single-phase induction motor	1
	4.	DC Motors: Types of DC motors. Construction
working principle. torque equation of DC motors		1
characteristics and applications of DC motors		1
Numerical examples on DC motor		1
Special motors- Constructional features, working and application of stepper motor		1
Constructional features, working and application of BLDC		1
Constructional features, working and application of PMSM		1
Constructional features, working and application of servo motor.		1

5.	Components of LT switch gear-switch fuse unit,	1
	Working of MCB, ELCB, RCCB	1
	Types of wiring	1
	house/building wiring and its estimation	1
	types and ratings of Cables ,Two way and three-way control of load.	1
	Earthing and its types.	1
	Electric Shock, Safety Precautions to avoid shock,	1
	elementary calculation of energy consumption and power factor improvement	1
Total		40 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	2 nd		
Course Title	:	Introduction to Python Programming		
Course Code	:	23PLCS21		
Course Type (Theory/ Practical/ Integrated)	:	Integrated		
Category	:	PLC / PBL		
Stream	:	Common to all branches	CIE	: 50 Marks
Teaching hours/ week (L:T:P:S)	:	2:0:2:0	SEE	: 50 Marks
Total Hours	:	28+12=40 Hrs	SEE Duration	: 3 Hours
Credits	:	03		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Learn the syntax and semantics of the Python programming language.
2	Illustrate the process of structuring the data using lists, tuples
3	Analyse string manipulation and pattern matching methods
4	Demonstrate the use of built-in functions to navigate the file system.
5	Implement the Object-Oriented Programming concepts in Python.

Teaching-Learning Process

Pedagogy:

Some sample strategies to accelerate the attainment of the various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in Python.
3. Encourage collaborative (Group) learning to enhance team building.
4. Include at least three **HOTs (Higher-order Thinking Skills)** modulewise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE CURRICULUM

Module No.	Contents of the Module	Hours
1	<p>Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program.</p> <p>Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules.</p>	6
2	<p>Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print (), Local and Global Scope, The global Statement, Exception Handling, Recursion.</p> <p>Lists: The List Data Type, Working with Lists, Methods, List Memory management List-like Types. Tuples- Working with Tuples</p>	6
3	<p>Dictionaries: The Dictionary Data Type, Method, Working with dictionaries, types, data set handling with dictionaries, Pretty Printing.</p> <p>Strings: Working with Strings, Useful String Methods, Pattern matching with Regular Expressions, Patten matching without Regular Expressions</p>	5
4	<p>Files operations: Files and File Paths, The os. path Module, File Operations, Compressing Files with the zip file, exception handling.</p> <p>Classes and objects: Defining a Class, Defining a Method, Instantiating an Object, Invoking a Method, Using Constructor, Using Class Attributes and Static Methods, Understanding Object, property , decorators, composition and aggregation</p>	5
5	<p>Object-Oriented Programming: Encapsulation, Polymorphism, Abstraction, Inheritance</p> <p>Scientific Computing Using Python: Data analysis and numerical computing with NumPy and plotting, Introduction to scipy, pandas, Scikit-learn, pytorch.</p>	6

Pedagogical Initiatives (Not limited to):

- **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another
- **Problem Solving:** encourages cognitive thinking and enables creative problem solving
- **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily.
- **Case studies:** maps different domains in real time applications
- **Demonstration:** exhibits the implementation process

List of Programs

Getting Started: Introducing Python, Setting Up Python in operating systems like windows, LINUX etc., Python in Real time Applications.

Note: Python platforms to be used: Anaconda, Pycharm, IDLE.

Sl. No.	List of Programs	COs
1.	a. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages. b. Develop a Python program to check whether a given number is palindrome or not and also count the number of occurrences of each digit in the input number	CO1
2.	a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console. b. Write a function to calculate factorial of a number with and without recursion.	CO2
3.	a. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages using functions. b. Develop a python program to convert binary to decimal, octal to hexadecimal using functions.	CO2
4.	Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable messages.	CO2
5.	a. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items] b. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and file methods open(), read lines(), and write()].	CO3
6.	a. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods. b. Write a function named DivExp which takes TWO parameters a, b and returns a value c ($c=a/b$). Write suitable assertion for $a>0$ in function DivExp and raise an exception for when $b=0$. Develop a suitable program which reads two values from the console and calls a function DivExp.	CO3
7.	a. Develop a Python program to demonstrate find all function and character class using regex module. b. Develop a python program that could search the text in a file for phone numbers (+919900889977) and email addresses (sample@gmail.com).	CO4

8.	Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the addition of N complex numbers.	CO3
9.	Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use __init__() method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.].	CO3
10.	Develop a program to convert list and dictionary into NumPy array	CO5
	Open Ended Questions: <ol style="list-style-type: none"> 1. Design a web page using Flask in python. 2. Demonstrate Web scraping using suitable example. 3. Demonstrate API Integration. 4. Demonstrate about Data Visualization. 5. Demonstrate GUI Applications. 6. Demonstrate E-mail Automation. 	

Programming Language Course / Project Based Learning (PLC/PBL): Introduction to Python Programming

This Course refers to Professional Theory Core Course Integrated with Practical Component Credit for this course can be 03 and its Teaching Learning hours (L: T: P: PJ) can be considered as (2: 0: 2: 0).

CIE for Practical component of the PLC/PBL:

15 marks for the conduction of practical experiment and preparation of the Laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.

On completion of every program in the laboratory, the student shall be evaluated including viva-voce and marks shall be awarded on the same day.

Each program report can be evaluated for **15 marks** (Write-up – 3 marks, Execution – 8 marks .and Viva – 4 marks)

The Laboratory test (duration 2 hours / 3 hours) after completion of all the programs shall be conducted for 50 marks and scaled down to **10 marks**.

The project review (periodical review) shall be conducted for 50 marks and scale down to **10 marks**.

The theory part shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE).

However, questions from the practical part of PLC/PBL shall be included in the SEE question paper. This course is common to all branches of first year B.E 2023-24 regulation.

Note: L- Theory Lecture, T- Tutorial, P-Practical, PJ-Project, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

Text Books

1. **Automate the Boring Stuff with Python**, Al Sweigart, No Starch Press, 1st Edition, 2015
2. **Scientific Computing with Python: High-performance scientific computing with NumPy, SciPy, and pandas** by Claus Fuhrer, Jan Erik Solem, Olivier Verdier, Pakt publications, 2nd Edition, 2021

Reference Books

1. **Think Python: How to Think Like a Computer Scientist**, Allen B. Downey, Green Tea Press 2nd Edition, 2015.
2. **Python for data analysis**, Wes Mckinney, O'Reilly Publications, 3rd edition ,2023

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the syntax and schematics of Python programming.	Understand	L2
CO2	Apply data structures, functions for effective implementation of solution.	Apply	L3
CO3	Analyse object-oriented concepts and file operations.	Analyse	L4
CO4	Evaluate strings using pattern recognition techniques.	Evaluate	L5
CO5	Implement real world problems by using Data analysis and Scientific computation methods.	Create	L6

Weblinks and Video Lectures (e-Resources)

- 1 The Joy of Computing using Python: https://onlinecourses.nptel.ac.in/noc23_cs20/preview
- 2 Python for Data Science: https://onlinecourses.nptel.ac.in/noc22_cs32/preview
- 3 Infyspringboard-Scipy: https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01282535449306726468422_shared/overview
- 4 Python for everybody: Course era
- 5 Udemy: <https://www.udemy.com/course/python-pandas/> -

Assessment Pattern (both CIE and SEE)

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 Credits & 2 Credits Courses – Theory (if Integrated)

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average / Total	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	(50+50+50) / 3	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Project Review – 1	Considering all the Modules	20	50	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Project Review – 2		30				
Total CIE Theory						25	10	Scale down Marks of IAT and CCA to 25

CIE	Practical	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	10	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05	10				
			Observation book	05					
		Practical Test	Write up	15	50	----	10	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	5	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		Total CIE Practical						25	10

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1 (Review 1)	CCA-2 (Review 2)	
	50 Marks	50 Marks	50 Marks	20 Marks	30 Marks	50 Marks
Remember	10	-	-	-	-	
Understand	20	10	-	10		
Apply	20	20	10	5	5	20
Analyse	-	20	20	5	5	10
Evaluate	-	-	15	-	10	10
Create	-	-	5	-	10	10

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	-	-	-	20	13.33%
CO2	5	5	10	10	10	40	26.66%
CO3	5	5	5	5	15	35	23.33%
CO4	5	5	5	5	15	35	23.33%
CO5	--	--	5	5	10	20	13.33%
Total	25	25	25	25	50	150	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5
Understand	5
Apply	10

Analyse	10
Evaluate	10
Create	10

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	--	--	--	--	10	10%
CO2	10	10	--	--	--	20	20%
CO3	--	10	10	--	--	20	20%
CO4	--	--	10	10		20	20%
CO5	--	--		10	10	20	20%
Total	20	20	20	20	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 st			
Course Title	:	Principles of Programming Using C			
Course Code	:	23ESCS11			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	ESC			
Stream	:	Common to all branches	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	2:0:2:0	SEE	:	50 Marks
Total Hours	:	28+12=40 Hrs	SEE	:	3 Hours
Credits	:	03	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the basics of computers and C programming.
2	Learn the concepts of Functions, and Strings using C programming.
3	Study different Searching, Sorting techniques, and File handling in C.
4	Explore user-defined data structures such as Arrays, Pointers, and Structures in implementing solutions to problems.
5	Design and develop solutions to problems using a structured programming approach.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to C: Fundamentals of computing, Flowcharts, Pseudocodes, Algorithm, Data types, Variables, Constants, Pre-processors, Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, Types of Errors, Applications of C language.	5
2	Operators and expressions in C: Operators in C: arithmetic, relational, equality, logical, assignment, unary, conditional, bitwise operator, Increment and decrement operator, Conditional Operator, operator precedence, keywords and identifiers, type conversion and typecasting. Decision control and Looping statements: Introduction to decision control, Conditional branching statements, Iterative statements, Nested loops, break and continue statements, goto statement.	5
3	Functions: Basics of functions, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive and non-recursive functions. Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, operations on arrays, one-dimensional array, multidimensional arrays, passing arrays to functions, applications of arrays	6
4	Strings: Introduction, String taxonomy, operations on strings, miscellaneous string and character functions, arrays of strings: Pointers: Introduction to pointers, Declaring pointer variables, Pointer to pointer, passing arguments to functions using pointers, Array of pointers, Dynamic memory allocation functions malloc/realloc/free. Structure and Union: Introduction, Structures and functions, Unions, Unions inside structures, Self-referential structures.	6
5	Searching algorithm: Linear search, Binary search. Sorting algorithm: Selection sort, Insertion sort, Bubble sort. File Handling: Introduction, Using files, Read and Write Operations on files	6

Pedagogical Initiatives (Not limited to):

- **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another
- **Problem Solving:** encourages cognitive thinking and enables creative problem solving
- **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily.
- **Case studies:** maps different domains in real time applications
- **Demonstration:** exhibits the implementation process

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Write a C program to implement a Simple Calculator.	CO1
2	a) Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages. b) Write a C program to print Pyramid of stars patterns using Looping	CO1
3	Implement Matrix multiplication and validate the rules of multiplication using C Program.	CO1
4	Write a C program for the following condition using Functions, Assume a Car servicing Center. Every service request by the Car Service Center the given charges are levied along with taxes. a. Car water wash - Rs. 500 + 10% tax b. Oil in the Engine must be at least 300 ml. If it goes below 300 ml (Ask the user to input the current level of oil in the engine), top up is done by the agency (the value of top up is given by the user so that level is at least 300 ml). Cost of 1 ml is Rs. 5 + 12.5% tax. 1. Define suitable variables to capture the above 2 parameters and corresponding taxes 2. Compute the total amount to be paid. 3. Display the total with 17 places which includes 7 places for fraction. The integer part of the total must be prefixed with 0's and a sign, if required.	CO2
5	Write a program in C using functions to swap two numbers using global variables concept and call by reference concept.	CO2
6	Implement a C program to read the values from the user today's date and your Date of birth in the format dd-mm-yyyy. Consider your sleeping time 8 hours a day, read 12 hours and spend 1.5 hours a day for eating. Calculate how many minutes have you spent as of this date for Sleeping and Eating. The number of years you have spent for reading as of this date (amount of time spent for reading in years).	CO2
7	a) Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques. b) Implement a C Program to check String is a Palindrome or Not	CO2

8	Write a C Program to Implement linear search and binary search.	CO3
9	Write a C Program to Implement Bubble Sort.	CO3
10	Write a C program to read employee information (Name, Designation, Salary) from the user and write it to a file.	CO3
11	Write a C Program to input even & odd elements of an array in two separate arrays. The program first finds the odd and even elements of the array. Then the odd elements of an array are stored in one array and even elements of an array is stored in another array	CO4
12	Write a C program to define a structure to represent a cricketer's information (name, runs, average). Read the data corresponding to N Cricketer's in a structure array. The space for the array of structures should be determined at run-time by user input.	CO4
Open ended Programs		
1	Develop a 'C' program to calculate the gravitational pull between two objects.	CO1
2	Demonstrate a simple units convertor for distance, temperature, and liquid volume.	CO1
3	Calculate the displacement for an automobile using pointers.	CO4
4	Demonstrate the use of an array of pointers.	CO4

CIE for Principles of Programming Using C (Integrated Professional Core Course (IPCC)):

This Course refers to professional theory core course integrated with practical. Credit for this course can be 03 and its Teaching Learning hours (L : T : P: PJ) can be considered as (2 : 0 : 2 : 0).

15 marks for the conduction of practical experiment and preparation of the Laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.

On completion of every program in the laboratory, the student shall be evaluated including viva-voce and marks shall be awarded on the same day.

Each program report can be evaluated for **15 marks** (Write-up – 3 marks, Execution – 8 marks .and Viva – 4 marks)

The Laboratory test (duration 2 hours / 3 hours) after completion of all the programs shall be conducted for 50 marks and scaled down to **10 marks**.

The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

This course is common to all branches of first year B.E/B.Tech. 2023-24 regulation.

Note: L- Theory Lecture, T- Tutorial, P-Practical, PJ-Project, IPCC: Integrated Professional Core Course, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Computer Fundamentals and Programming in C, Reema Thareja, Oxford University, Second Edition, ISBN-13: 978-0-19-946373-2, 2017.
2	C, The Complete Reference is a book on computer programming, Herbert Schildt, McGraw Hill Education, 4th Edition, ISBN-13: 978-0070411838, 2017.

Reference Books

1	C: How to program, H. M. Deitel, P. J. Deitel, Pearson Education, 7 th Edition, ISBN-13. 978-9332555310, 2010.
2	Programming in ANSI C, E. Balaguruswamy, Tata McGraw-Hill, 7 th Edition, ISBN 1-874152-02-0, 2019.
3	C Programming for Dummies, Dan Hookin, John Wiley & Sons, 2nd Edition, ISBN-13: 978-1119740247, 2021.

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

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basics of programming in C	U	L2
CO2	Apply the knowledge of Functions, Strings using C Programming	A	L3
CO3	Analyse the user-defined data structures such as Arrays, Pointers and Structures in implementing solutions to problems.	An	L4
CO4	Implement different searching, sorting techniques, and file handling operations.	C	L5
CO5	Develop solutions to problems using structured programming approach	C	L5

Weblinks and Video Lectures (e-Resources)

1	https://archive.nptel.ac.in/courses/106/105/106105171/ (12 Weeks NPTEL Course Videos)
2	https://researchcomputing.princeton.edu/education/external-online-resources/cplusplus
3	https://www.w3schools.com/c/
4	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/
5	https://sanfoundry.com/c-programming-examples-linked-list/
6	https://onlinecourses.swayam2.ac.in/cec20_cs02/preview
7	https://www.youtube.com/watch?v=_MF8L7ZxwRE
8	https://www.youtube.com/watch?v=0Sg6QHmIFJE

9	https://www.newtondesk.com/c-programming-handwritten-study-notes-pdf/
10	https://www.eskimo.com/~scs/cclass/notes/top.html
11	https://www.javatpoint.com/c-programming-language-tutorial
12	https://www.tutorialspoint.com/cprogramming/index.htm

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 Credits & 2 Credits Courses – Theory (if Integrated)

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	(50+50+50) / 3	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
	Total CIE Theory						25	10

CIE	Practical	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	10	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05	10				
			Observation book	05					
		Practical Test	Write up	15	50	----	10	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	5	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		Total CIE Practical						25	10

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed

The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

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

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IC shall be **25 Marks** and for the laboratory component **25 Marks**.

**CIE for the theory component of the IC
Internal Assessment test:**

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **10 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester and **5 Marks** for conducting Open Ended Experiments.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks conduction(Observation Book) and 5 Marks for Record Book. Marks of all experiments' write-ups and conduction are added and scaled to **10 Marks**.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions should be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	10	-	-			-
Understand	20	10	-			-
Apply	20	20	10			20
Analyse	-	20	20			-
Evaluate	-	-	20			-
Create	-	-	-			30

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	25	25				50	33.3%
CO2			25			25	16.6%
CO3				25		25	16.6%
CO4					50	50	33.3%
CO5	5	5	5	5	5	25	25% (Lab)
Total	25	25	25	25	50	150	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	--
Understand	10
Apply	15
Analyse	15
Evaluate	--
Create	10

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	--	--	--	20	20%
CO2	10	10	10	--	--	30	30%
CO3	--	--	10	10	--	20	20%
CO4	--	--	--	--	20	20	20%
CO5	--	3	2	3	2	10	10%
Total	20	23	22	13	22	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	2 nd			
Course Title	:	Professional Writing Skills in English			
Course Code	:	23CENC26			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Course Category	:	HSSC			
Stream	:	Common to All Branches	CIE	:	50 Marks
Teaching hr/week (L: T:P:S)	:	1:0:0:0	SEE	:	50 Marks
Total Hours	:	15 Hrs	SEE Duration	:	2 Hours
Credits	:	1			

Course Learning Objectives: Students will be taught.

Sl.No	Course Objectives
1	To Identify the Common Errors in Writing and Speaking of English
2	To Achieve better technical writing and Presentation skills.
3	To read technical proposals properly and make them to Write good technical reports
4	Acquire Employment and Workplace communication skills.
5	To learn about Techniques of Information Transfer through presentation in different level.

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can devise innovative pedagogy to improve teaching-learning.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Identifying Common Errors in Writing and Speaking English: Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
2	Nature and Style of sensible writing: Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
3	Technical Reading and Writing Practices: Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	

4	Professional Communication for Employment: Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	
5	Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its importance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	03
Pedagogy	(i) Direct instructional method (Low/Old Technology) (ii) Enquiry and evaluation based learning (iii) Personalized learning (iv) Problems based learning through discussion (v) Chalk & Talk, Interaction, Live examples & Videos	

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Professional Writing Skills in English” published by Phillip Learning – Education (ILS), Bangalore – 2022.
2	Functional English” (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].
3	English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
4	Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
5	Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017
6	High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd – 2015
7	Effective Technical Communication – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	To Identify the Common Errors in Writing and Speaking of English	Remember	L-1
CO2	To practice better Technical writing and Presentation skills.	Understand	L-2
CO3	To read Technical proposals properly and make them to Write good technical reports	Understand	L-2
CO4	Acquire Employment and Workplace communication skills.	Apply	L-3
CO5	To learn about Techniques of Information Transfer through presentation in different level	Understand	L-2

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	https://drive.google.com/drive/folders/1rqloQbY2HWu7xbFSmaGU3YAc7Tbhc3b1
2	https://drive.google.com/file/d/1UbpxJBcZNFyCxMEK0KqpR6NjpNfd4e1n/view?usp=drive_link
3	https://drive.google.com/file/d/11GUI1amPCq75n8mHoGnc9qzv_OJFzCHM/view?usp=drive_link
4	https://drive.google.com/file/d/1RbPsNDA_ATiTXP_Tn8y2Udpc2NZTcvoy/view?usp=drive_link
5	https://drive.google.com/file/d/1brLXNdwBFugdZJ1B4_TtzN43_KhhZvZI/view?usp=drive_link

Constitution of India / Samskruthika Kannada / Communicative English / Professional writing skills in English/ Innovation Design & Thinking

1 Credit Courses – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						25	10	Scale down Marks of IAT and CCA to 25

SEE		Theory exam – (MCQ Type)	Entire syllabus	50	---	50	18	SEE Exam is theory Exam with MCQ type Question Papers of 50 Questions with each question 1 Mark each. Examination duration is 1 Hour
CIE + SEE				100	---	---	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

1 Credit Course – Theory

Assessment Details (both CIE and SEE)

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

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

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Crossword, Maize, Debate, Role Play, Community Service, Mind Map, Concept Map, Case Study, Group Discussions, Ideathon

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests (MCQ) each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 to be conducted after 4th week
- CCA2 to be conducted after 9th week.
- The evaluation of CCAs includes either through quiz or rubrics

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject .
- The question paper shall be set for 50 Marks. The medium of the question paper shall be English.
The duration of SEE is 01 hours.
- The question paper will have 50 MCQs **covering all modules**. The questions shall map with the course outcome, program outcome and Blooms RBT level.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	18	18	17	18	17
Understand	16	13	15	17	15
Apply	8	9	10	7	8
Analyse	8	10	8	8	10
Evaluate	--	--	--	--	--
Create	--	--	--	--	--

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	19	5	--	--	5	29	25%
CO2	6	20	--	--	6	32	24%
CO3	--	--	17	7	5	29	21%
CO4	--	--	8	18	6	32	16%
CO5	--	--	--	--	28	28	14%
Total	25	25	25	25	50		100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	35%
Understand	30%
Apply	20%
Analyse	15%
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	3	2	2	2	1	10	20%
CO2	4	3	2	3	3	15	30%
CO3	2	1	2	3	2	10	20%
CO4	2	3	2	1	2	10	20%
CO5	2	1	1	1	0	5	10%
Total	13	10	09	10	8	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Identifying Common Errors in Writing and Speaking English: Common errors identification in parts of speech	1
1	Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules)	1
1	Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused	1
2	Nature and Style of sensible writing: Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion	1
2	Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities	1
2	Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words	1
3	Technical Reading and Writing Practices: Technical writing process & Scientific Writing Process, Spotting Error & Sentence Improvement	1
3	Introduction to Technical Reports writing, Significance of Reports, Types of Reports, Cloze Test and Theme Detection Exercises	1
3	Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals Grammar – Voices and Reported Speech	1
4	Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading	1
4	Job Applications, Types of official / employment / business Letters,	1
4	Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos	1
5	Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's,.	1
5	Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its importance in GD and Interview.	1
5	Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills	1
	Revision	
Total		15 Hrs



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	1 st ಸೆಮಿಸ್ಟರ್			
Course Title	:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ			
Course Code	:	23SBKC17			
Course Type (Theory/Practical/Integrated)	:	Theory			
Course Category	:	HSSC			
Stream	:	Common to all	CIE	:	50 Marks
Teaching hr/week (L: T:P:S)	:	1:0:0:0	SEE	:	50 Marks
Total Hours	:	15 Hrs	SEE Duration	:	2 Hours
Credits	:	1			

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸುವುದು.
3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5	ಸಾಂಸ್ಕೃತಿಕ ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Teaching-Learning Process

Pedagogy (General Instructions):

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

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



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<ol style="list-style-type: none">1) ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ2) ಕರ್ನಾಟಕ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟ ಸುಬ್ಬಯ್ಯ3) ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊಫಸರ್ ವಿ ಕೇಶವಮೂರ್ತಿ	
Pedagogy	<ol style="list-style-type: none">1) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.2) ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರೆ ಕವಿ ಕಾವ್ಯಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಣಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.3) ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.	
2	<ol style="list-style-type: none">1) ವಚನಗಳು : ಬಸವಣ್ಣ , ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮ ಪ್ರಭು, ಆಯ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಆಯ್ಕಿ ಲಕ್ಕಮ್ಮ.2) ಕೀರ್ತನೆಗಳು : ಅದರಿದೇನು ಫಲ ಇದರಿದೇನು ಫಲ - ಪುರಂದರ ದಾಸರು, ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು.3) ತತ್ವಪದಗಳು - ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ.	
Pedagogy	<ol style="list-style-type: none">1) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.2) ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರೆ ಕವಿ ಕಾವ್ಯಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಣಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.3) ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.	

3	<ol style="list-style-type: none"> 1) ಡಿ.ವಿ.ಜಿ ಯವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದು ಕೆಲವು ಭಾಗಗಳು. 2) ಕುರುಡು ಕಾಂಚಾಣ - ದಾ.ರಾ.ಬೇಂದ್ರೆ. 3) ಹೊಸಬಾಳಿನ ಗೀತೆ - ಕುವೆಂಪು. 	
Pedagogy	<ol style="list-style-type: none"> 1) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು. 2) ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರೆ ಕವಿ ಕಾವ್ಯಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಣಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು. 3) ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು. 	
4	<ol style="list-style-type: none"> 1) ಡಾ. ಸರ್.ಎಮ್.ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ ಎನ್ ಮೂರ್ತಿ ರಾವ್. 2) ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ - ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ. 	
Pedagogy	<ol style="list-style-type: none"> 1) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು. 2) ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರೆ ಕವಿ ಕಾವ್ಯಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಣಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು. 3) ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು. 	
5	<ol style="list-style-type: none"> 1) ಯುಗಾದಿ - ವಸುಧೇಂದ್ರ. 2) ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ - ಡಾ. ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ 	
Pedagogy	<ol style="list-style-type: none"> 1) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು. 2) ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರೆ ಕವಿ ಕಾವ್ಯಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಣಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು. 3) ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು. 	

Reference Books

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

1	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ- ಡಾ.ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್.ತಿಮ್ಮೇಶ್ (
2	ಶ್ರೀ ಆರ್ ಮಂಜುನಾಥ್ ಹಾಗೂ ಪಿ. ನಾಗರಾಜ
3	ಡಾ. ಪ್ರಾಶಾಂತ್ ಜಿ ನಾಯಕ ಮತ್ತು ಶ್ರೀ ಟಿ.ಎಲ್. ರವೀಂದ್ರ

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

CO	Course Outcomes	RBT Level	Level Indicator
C01	ಕನ್ನಡ ಭಾಷೆ ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.	ಸ್ಮರಿಸುವುದು	L-2
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.	ಅರ್ಥೈಸಿಕೊಳ್ಳುವುದು	L-2
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿ ಹೆಚ್ಚಾಗುತ್ತದೆ.	ಸ್ಮರಿಸುವುದು	L-1
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ .	ಅರ್ಥೈಸಿಕೊಳ್ಳುವುದು	L-1
C05	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.	ಅರ್ಥೈಸಿಕೊಳ್ಳುವುದು	L-2

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	--	--	--	--	--	--	--	--	1	2	--	2	--	--
C02	--	--	--	--	--	--	--	--	2	2	--	2	--	--
C03	--	--	--	--	--	--	--	--	2	1	--	1	--	--
C04	--	--	--	--	--	--	--	--	2	1	--	1	--	--
C05	--	--	--	--	--	--	--	--	1	2	--	2	--	--

Weblinks and Video Lectures (e-Resources)

1	https://youtu.be/S4w3FLZxY_A
2	https://youtu.be/XEMiYE3E3i8
3	https://youtu.be/RboxwA8KerM
4	https://youtu.be/3eE8XTePzTI
5	https://youtu.be/YzS26-ezxO8

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1 Credit Courses – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	20	
CIE	Theory	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	15	6	Average of Three Internal test each of 50 Marks scale down the marks to 15
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	10	4	
		CCA-2- Pedagogical Initiatives		50				
Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted								

	Total CIE Theory				25	10	Scale down Marks of IAT and CCA to 25	
SEE		Theory exam – (MCQ Type)	Entire syllabus	50	----	50	18	SEE Exam is theory Exam with MCQ type Question Papers of 50 Questions with each question 1 Mark each. Examination duration is 1 Hour
CIE + SEE				100	----	----	40	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

1 Credit Course - Theory

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Crossword, Maize, Debate, Role Play, Community Service, Mind Map, Concept Map, Case Study, Group Discussions, Ideathon

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests (MCQ) each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 to be conducted after 4th week
- CCA2 to be conducted after 9th week.
- The evaluation of CCAs includes either through quiz or rubrics

Total score for CCA is **25 Marks**

Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject .
- The question paper shall be set for 50 Marks. The medium of the question paper shall be English. **The duration of SEE is 01 hours.**
- The question paper will have 50 MCQs **covering all modules**. The questions shall map with the course outcome, program outcome and Blooms RBT level.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	18	17	18	18	18
Understand	16	15	13	15	17
Apply	8	10	8	9	7
Analyse	8	8	10	10	8
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	18	6	-	-	2	26	20%
CO2	7	19	-	-	2	28	25%
CO3	-	-	17	7	8	32	20%
CO4	-	-	8	18	8	34	20%
CO5	-	-	-	-	30	30	15%
Total	25	25	25	25	25	-	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	35%
Understand	25%
Apply	20%
Analyse	20%
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	2	1	1	0	1	5	10%
CO2	2	3	2	1	2	10	20%
CO3	2	1	2	3	2	10	20%
CO4	4	3	2	3	3	15	30%
CO5	3	2	2	2	1	10	20%
Total	13	10	9	10	8	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪನಾಗರಾಜಯ್ಯ	1
2	ಕರ್ನಾಟಕ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ	1
3	ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶಮತ್ತು ಪ್ರೊಫೆಸರ್ ವಿಕೇಶವಮೂರ್ತಿ	1
4	ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿಲಕ್ಕಮ್ಮ.	1
5	ಕೀರ್ತನೆಗಳು : ಅದರಂದೇನು ಫಲ ಇದರಂದೇನು ಫಲ - ಪುರಂದರದಾಸರು, ತಲ್ಲಣಿಸದಿರುಕಂಡ್ಯತಾಳುಮನವೇ - ಕನಕದಾಸರು.	1
6	ತತ್ವಪದಗಳು - ಸಾವಿರಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ.	1
7	ಡಿ.ವಿ.ಜಿಯವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದಕೆಲವು ಭಾಗಗಳು.	1
8	ಕುರುಡುಕಾಂಚಾಣ - ದಾ.ರಾ.ಬೇಂದ್ರೆ.	1
9	ಹೊಸಬಾಳಿನ ಗೀತೆ - ಕುವೆಂಪು	1
10	ಡಾ. ಸರ್.ಎಮ್.ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎಎನ್.ಮೂರ್ತಿರಾವ್.	1½
11	ಕರಕುಶಲಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ - ಕರೀಗೌಡಬೀಚನಹಳ್ಳಿ	1½
12	ಯುಗಾದಿ - ವಸುಧೇಂದ್ರ.	1½
13	ಮೆಗಾನೆಂಬರಿಗಿರಿಜನಪರ್ವತ - ಡಾ. ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ	1½
Total		15 Hrs



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	2nd			
Course Title	:	Smart Materials and Technology			
Course Code	:	23ETCV21			
Course Type (Theory/Practical/Integrated)	:	Theory			
Category	:	ETC			
Stream	:	Common to all Branches	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	03 Hour
Credits	:	03	Duration	:	

Course objectives

- To develop the students ability to learn emerging materials and prefabricated building components
- To make students to learn smart materials and technologies
- To learn building information modeling for building design
- To learn the concepts of 3-D printing and intelligent devices.

Teaching-Learning Process

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Arrange visits to near by sites to give brief information about the Civil Engineering structures.
3. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
4. Encourage collaborative (Group) Learning in the class.
5. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
10. Individual teachers can devise innovative pedagogy to improve teaching-learning.

Module-1(08)

Emerging Materials

Introduction to Smart Materials, Honey comb structure (Carbon & Graphite composites), Nano-materials, Engineered polymers, emerging sustainable by-products (Flyash, GGBS, Glass Fiber, Basalt Fibers, Bamboo) and Construction Chemicals. Active smart Polymers and shape memory alloys

Module-2(08)

Prefabricated / Manufactured building components.

Definition, types of prefabricated/manufactured building components and infrastructure, modular coordination, standardization, materials, systems, production, transportation and installation. Pre-fabricated structures finance and economic. Mechanics of smart composite materials

Module-3(08)

Smart Materials

Definition, Principles of Piezo-electricity, materials (Polymers and Ceramics), sensors (Piezo-electricsensor, strain gauge, shear sensor, in-plane and out of plane sensor, accelerometer), smart composites magnetostrictive, electrostrictive, magnetorheological, electroheological materials

Module-4(08)

BIM – IBMS Applications

BIM: Definition, Necessity, advantages, BIM in building design, structural design and construction. IBMS – Definition, Necessity, advantages, Types of IBMS; One Typical Modeling of a smart material (Piezoelectric/magnetostrictive/electrostrictive) using BIM

Module-5(08)

Smart Technology Applications

Development, Importance, advantages, common terminologies, classification, and the Process chain, in 3–D modelling & printing, Data conversion and transmission of GIS & Drone survey; Checking and preparation; Post processing using Intelligent Devices like H-GPS;

Course Outcomes

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

CO	Course Outcomes	RBT Level Indicator
CO1	Remember and understand the concepts of smart materials, constituent elements, properties, uses & applications in all diverse field of engineering: technology with the use of BIM and IBMS	L1 & L2
CO2	Apply the concepts of smart materials and technology in construction automation by adopting to pre-fabricated units & standardisation of building components in a structure and.....	L3
CO3	Analyse different sensors as smart materials, adopted in monitoring & evaluating life cycle of a project	L4
CO4	Evaluate the situation to provide an economical and sustainable smart materials /Technology leading to a process of smart construction	L5

Assessment Details (both CIE and SEE)

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

Continuous Internal Evaluation(CIE):

Three Tests each of 20 Marks;

- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-

100% of the courses/ respectively.

- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the Cos and POs for a total of 40Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project / field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100marks) shall be scaled down to 50marks

Semester End Examination(SEE):

Theory SEE will be conducted by University as per the scheduled time table,with common question papers for the subject (**duration03 hours**)

- The question paper shall be set for 100marks.The medium of the question paper shall be English).The duration of SEE is 03 hours.
- The question paper will have10 questions.Two questions per module.Each question is set for 20marks.The students have to answer 5 full questions, selecting one full question from each module. The student has to answer for 100 marks and **marks scored out of 100 shall be proportionally reduced to 50marks.**

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

Suggested Learning Resources:

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

1. DonaldR.Askelandand PradeepP.Fulay, Essentials of Materials Science and Engineering 2009,Cengage Learning.

WeblinksandVideoLectures(e-Resources):

1. <https://archive.nptel.ac.in/courses/112/104/112104251/>
2. <https://archive.nptel.ac.in/courses/112/104/112104173/>
3. <https://archive.nptel.ac.in/courses/113/106/113106099/>
4. Youtube Videos

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

- Site visits to understand the prefabricated building components.
- Visit to Smart material manufacturing facilities
- Visit to 3-D printing facility

CO – PO Mapping

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

Engineering Science Course (ESC) / Emerging Technology Course (ETC) / Programming Language Course (PLC)

3 credits - Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50			20	
CIE	Theory	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	25	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3 & 4	50				
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods as per VTU Clause 22OB4.2 of regulations to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives		50				
Total CIE Theory						50	20	Scale down

								Marks of IAT and CCA to 50
SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				<ul style="list-style-type: none"> • The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component. • The Laboratory Component for the IPCC shall be for CIE only. • However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only. 				

4 Credit Course – IPCC

The Minimum Marks to be secured in CIE to appear for SEE shall be 10marks (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks -25) in the Practical Component. The Laboratory Component of the IPCC shall be for CIE only. However, in SEE the questions from the Laboratory Component shall be included in the respective Modules only.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the theory component of the IPCC shall be **25 Marks** and for the laboratory component **25 Marks**.

CIE for the theory component of the IPCC

Internal Assessment test:

The IA test questions are to be framed to map the Course Outcomes(COs), Program Outcomes(POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **15 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

CIE for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day. The **15 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester.
- The CIE Marks awarded in the case of the practical component shall be based on the continuous evaluation of the laboratory report and the conduction. Each experiment report can be evaluated for 05 Marks and conduction for 10Marks. Marks of all experiments' write-ups and conduction are added and averaged to 15 Marks.
- The laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for 50 Marks and scaled down to **05 Marks**.
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.

- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

The theory component of the IPCC shall be for both CIE and SEE.

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student has to answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. Marks **scored out of 100 shall proportionally be reduced to 50 Marks.**
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

3 Credit Course – Theory

Note: A few of the Courses of 3 Credit are Integrated Course Type, for such courses the method suggested for 4 Credit IPCC shall be followed.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 35% of the maximum Marks (18 Marks out of 50).

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

Possible continuous and comprehensive assessment:

Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Group Problem Solving, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom, storytelling. The assessment of these techniques can be either based on Quiz or rubrics.

The faculty may adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Continuous Internal Evaluation (CIE):

The CIE Marks for the internal assessment test shall be **25 Marks** and for the continuous and comprehensive assessment (CCA) shall be **25 Marks**.

Internal Assessment test:

The IA test questions are to be framed to map the course outcomes, program outcomes and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Three Tests each of **50 Marks** scaled down to **25 Marks**

- First test after 6th week of the semester (syllabus completion of 35 – 40%)
- Second test after 10th week of semester (syllabus completion of 65 – 70%)
- Third test after 14th week of semester (syllabus completion of 90 – 100%)

The average score of three test is taken and scaled down to **25 Marks**.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **25 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**
 Total Marks scored for theory component of CIE (IAT + CCA) is **50 Marks**

Semester End Examination (SEE):

- Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 Marks. The student must answer 5 full questions, selecting one full question from each module summing up to maximum score of 100 Marks. **Marks scored out of 100 shall proportionally be reduced to 50 Marks.**

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	IAT-3	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks	50 Marks
Remember	12	10				___
Understand	14	16				___
Apply	18	16		12	12	___
Analyse	6	8		14	14	___
Evaluate	--	--		14	14	___
Create	--	--		10	10	___

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weight age %
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	10	10	10	10	20%
CO2	10	10	10	10	10	10	20%
CO3	10	10	10	10	10	10	20%
CO4	10	10	10	10	10	10	20%
CO5	10	10	10	10	10	10	20%
Total	50	50	50	50	50	50	100%