DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT

CURRICULUM

Scheme and Syllabus I to II Semester

Outcome Based Education

(Academic Year 2026-2027)

Department of CSE-Cyber Security

1st & 2nd Semester B.E

ABOUT THE INSTITUTE

Dayananda Sagar Academy of Technology and Management- DSATM was established in 2011 with 5 UG Programmes and 1 PG Program, the programmes are approved by All India Council for Technical Education (AICTE) New Delhi, Affiliated to Visvesvaraya Technological University (VTU), Belagavi and DSATM is an autonomous institute from 2023-2024.

The Dayananda Sagar Institutions is one of pioneer institutions in India and abroad with six decades of excellence in Academic and Research. The newer campuses were necessary to accommodate the growing need of the technology and innovation.

DSATM nurtures the students in academic, research, sports, cultural and extracurricular activities.

- Creating an academic environment to nurture and develop competent entrepreneurs, leaders and professionals who are socially sensitive and environmentally conscious.
- Integration of Outcome Based Education and cognitive teaching and learning strategies to enhance learning effectiveness.
- Developing necessary infrastructure to cater to the changing needs of Business and Society.
- Optimum utilization of the infrastructure and resources to achieve excellence in all areas of relevance.
- Adopting learning beyond curriculum through outbound activities and creative assignments.
- Imparting contemporary and emerging techno-managerial skills to keep pace with the changing global trends.
- Facilitating greater Industry-Institute Interaction for skill development and employability enhancement.
- Establishing systems and processes to facilitate research, innovation and entrepreneurship for holistic development of students.
- Implementation of Quality Assurance System in all Institutional processes.

VISION OF THE INSTITUTE

To strive at creating the institution a centre of highest calibre of learning, so as to create an overall intellectual atmosphere with each deriving strength from the other to be the best of engineers, scientists with management & design skills.

MISSION OF THE INSTITUTE

- To serve its region, state, the nation and globally by preparing students to make meaningful contributions in an increasing complex global society challenges.
- To encourage, reflection on and evaluation of emerging needs and priorities with state-of-the-art infrastructure at institution.
- To support research and services establishing enhancements in technical, economic, human and cultural development.
- To establish interdisciplinary centre of excellence, supporting/ promoting student's implementation.
- To increase the number of Doctorate holders to promote research culture on campus.
- To establish IIPC, IPR, EDC, innovation cells with functional MOU's supporting student's quality growth.

QUALITY POLICY

Dayananda Sagar Academy of Technology and Management aims at achieving academic excellence through continuous improvement in all spheres of Technical and Management education. In pursuit of excellence cutting – edge and contemporary skills are imparted to the utmost satisfaction of the students and the concerned stakeholders.

ABOUT THE DEPARTMENT

In today's, economy organizations are using more and more digitization for all their financial transactions and other data communication and due to this organizations are more prone to attack; thus, we need a to secure our transaction. Cyber-Security is a process to secure all our transactions and assure the privacy, confidentiality and integrity for organizations as well as personal information.

Cybersecurity is the practice of protecting critical systems and sensitive information from digital attacks. Also known as information technology (IT) security, cybersecurity measures are designed to combat threats against networked systems and applications, whether those threats originate from inside or outside of an organization.

As per the survey done by IBM in 2020, the average cost of a data breach was USD 3.86 million globally and USD 8.64 million in the United States.

A strong cybersecurity strategy has layers of protection to defend against cybercrime, including cyber-attacks that attempt to access, change, or destroy data; extort money from users or the organization; or aim to disrupt normal business operations. Cyber Security must address the following cybersecurity issues in Critical infrastructure security, Network security, Application Security, Cloud security, Information security, End-user education, Disaster recovery/business continuity planning, Storage security, and Mobile security.

This course provides a wide variety of knowledge to enrich the students to be ready for the world of securing life.

With this small introduction, I would like to welcome all of you to the Department of CS in Cyber Security and Engineering.

VISION OF THE DEPARTMENT

To deliver quality education, foster professionalism, and develop cybersecurity skills to create globally competent, socially responsible engineers.

MISSION OF THE DEPARTMENT

M1: Foster dynamic learning with innovative curriculum and pedagogy for quality technical education.
M2: Partner with industry, academia, and society to enhance design thinking, research, innovation, and entrepreneurship.
M3: Promote Co-Curricular & extracurricular activities to build leadership, accountability, and ethical values.

PROGRAM EDUCATION OBJECTIVES (PEO'S):

PEO1: Excel in careers by applying knowledge in basic sciences, Computer Science, AI, ML, and Cybersecurity, contributing as skilled professionals or entrepreneurs.
PEO2: Pursue advanced studies and research in relevant fields.
PEO3: Adapt to technological advancements in multidisciplinary settings through lifelong learning, leadership, ethics, and strong soft skills.

PROGRAM OUTCOMES (PO's)

A Computer Science & Engineering (Cyber Security) graduate must demonstrate:

- **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: Ability to understand, investigate, and analyze cybersecurity incidents to restore resources and develop cyber defense strategies. **PSO2**: Apply advanced tools and techniques to identify, analyze, and mitigate cybersecurity threats and vulnerabilities effectively. **PSO3**: Demonstrate awareness of ethical and socially responsible technical solutions during the design and development of applications.

PROPOSED UG CREDIT STRUCTURE IN ALIGNMENT WITH VTU

Sl.No	Semester	No. of Credits
1	1st Semester	20
2	2nd Semester	20
3	3rd Semester	21
4	4th Semester	21
5	5th Semester	22
6	6th Semester	22
7	7th Semester	20
8	8th Semester	14
	Total	**160**

Scheme of Teaching and Examinations – 2026-27
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2026-27)

1st SEMESTER: PHYSICS CYCLE (Computer Science Stream) – Computer Science & Engineering-Cybersecurity (CSE-CY)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture L	Tutorial T	Practical P	Project S	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
1	BMATS101	Engineering Mathematics-1	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	BPHYS102	Applied Physics for Computer Science Stream	ASC	PHY	PHY	2	2	2	0	6	4	3	50	50	100
3	BCECE105	Introduction to Electronics Engineering	CEC-1	ECE	ECE	3	0	0	0	3	3	3	50	50	100
4	BESCS101	Principles of Programming using C	ESC	ISE	CSE	2	0	2	0	4	3	3	50	50	100
5	BETCS105	Introduction to AI and Applications	ETC	CSE	CSE	2	0	0	2	4	3	3	50	50	100
6	BCENC106	Communicative English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	BICNC107	Indian Constitution	HSSC	MED	MED	1	0	0	0	1	1	2	50	50	100
8	BIDTC108	Innovation and Design Thinking	AEC/SDC	ALD	ALD	1	0	0	0	1	1	2	50	50	100
Total						**15**	**4**	**4**	**2**	**25**	**20**	**21**	**400**	**400**	**800**

2nd SEMESTER: CHEMISTRTY CYCLE (Computer Science Stream) – Computer Science & Engineering-Cybersecurity (CSE-CY)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture L	Tutorial T	Practical P	Project S	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
1	BMATS201	Engineering Mathematics-2	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	BCHE202	Applied Chemistry for Computer Science Stream	ASC	CHE	CHE	2	2	2	0	6	4	3	50	50	100
3	BCECE203	Introduction to Electrical Engineering	CEC-2	EEE	EEE	2	2	0	0	4	3	3	50	50	100
4	BESCM202	Computer Aided Engineering Drawing	ESC	MED	MED	2	0	2	0	4	3	3	50	50	100
5	BPLCS205	Python Programming	PLC	CSE	CSE	2	0	2	0	4	3	3	50	50	100
6	BCENC206	Professional writing skills in English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	BSBKC207	Samskruthika Kannada	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
8	BEEXC208	Engineering Exploration	AEC/SDC	ALD	ALD	0	0	0	2	2	1	2	50	50	100
Total						**13**	**6**	**6**	**2**	**27**	**20**	**21**	**400**	**400**	**800**

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st**				
Course Title	:	**Engineering Mathematics – I for CSE & ECE Stream**				
Course Code	:	**BMATS/E101**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Course Category	:	**ASC**				
Stream	:	**ECE, CSE & Allied 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 calculus, differential equations and numerical methods in solving problems
3	Analyze problems using concepts of calculus, differential equations 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.
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 2025-26)

COURSE SYLLABUS		
Module No.	**Contents of the Module**	**Hours**
1	**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	**Ordinary Differential Equations of first order** Linear differential equation, Bernoulli's equation, exact differential equations and reducible to exact differential equation, Newton's law of cooling- problems, rate of decay of radioactive materials, LR circuits.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
3	**Ordinary Differential Equations of second and higher order** Second and higher order differential equations, inverse differential operator, Legendre's differential equations, method of variation of parameters, LC Circuits and LCR Circuits, deflection of beams.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
4	**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, Milne's method for second order differential equations.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
5	**Partial differential equations** Formation of partial differential equation, solution of PDE by direct	

	integration, 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**	

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	Advanced Engineering Mathematics, Erwin Kreyzig, Wiley Publications, 10th Edition, 2015
2	Numerical Methods, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age Publications, 6th Edition, 2012
3	Theory and problems of Differential and integral calculus, Frank Ayres and Elliott Mendelson, Schaum's outline series, McGraw Hill publications, 3rd Edition,1990
4	Higher Engineering Mathematics, B. S. Grewal, Khanna Publications, 44th Edition, 2021

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Advanced mathematics for Engineers and Scientists, Murray R Spiegel, Schaum's outline series, McGraw Hill publications.
2	Higher Engineering Mathematics, H. K. Dass and Er. Rajnish Verma, S. Chand Publication, 3rd Edition
3	Higher Engineering Mathematics, B.V. Ramana, McGraw-Hill Education, 11th Edition, 2017
4	Engineering Mathematics, Srimanta Pal & Subodh C.Bhunia , Oxford University Press, 3rd Edition, 2016.
5	A Textbook of Engineering Mathematics, N.P Bali and Manish Goyal, Laxmi Publications, 10th Edition, 2022.

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, differential equations and numerical methods	**Understand**	**L2**
CO2	Apply techniques of concepts of calculus, differential equations and numerical methods to solve Engineering Problems	**Apply**	**L3**
CO3	Analyze Engineering problems using concepts of calculus, differential equations 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:

C /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO

1													--	--
2	3												--	--
3		2											--	--
4			2		2				1	1			--	--

Weblinks and Video Lectures (e-Resources)	
1	https://archive.nptel.ac.in/courses/111/101/111101153/
2	https://nptel.ac.in/courses/111103021
3	https://nptel.ac.in/courses/111106101
4	https://archive.nptel.ac.in/courses/111/107/111107105/

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
		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	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	
				• 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	Introduction to the Course and syllabus	1
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	Jacobians - Definition and problems	1
1	Definition and problems	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	1
2	Bernoulli's equation and problems	1
2	Exact equations and reducible to exact	1
2	Problems continued on the above	1

2	Newton's law of cooling and problems	**1**
2	Rate of decay of radioactive materials	**1**
2	Problems continued on the above	**1**
2	LR Circuits	**1**
2	Problems continued on the above	**1**
2	Problems continued on the above	**1**
3	Second and higher order differential equations	**1**
3	Inverse differential operator, three types, problems on type-I,	**1**
3	Problems on type-II	**1**
3	Problems on type-III	**1**
3	Legendre's differential equation and problems	**1**
3	Method of variation of parameters-problems	**1**
3	LCR Circuits-problems	**1**
3	Defection of beams-problems	**1**
3	Problems on the above type	**1**
3	Problems on the above type	**1**
4	Introduction to Taylor's series	**1**
4	Numerical solution of ODE by Taylor's series method	**1**
4	Modified Euler's method and problems	**1**
4	Problems continued on the above	**1**
4	Runge-Kutta method of fourth order	**1**
4	Problems continued on the above	**1**
4	Milne's predictor and corrector method and problems	**1**
4	Problems continued on the above	**1**
4	Milne's method for second order differential equations	**1**
4	Problems continued on the above	**1**
5	Formation of partial differential equation-elimination of arbitrary constants	**1**
5	Formation of Partial Differential Equation-elimination of arbitrary functions	**1**
5	solution of PDE by direct integration	**1**
5	Problems continued on the above	**1**
5	Numerical solution of Laplace equation using standard five-point formula,	**1**
5	Problems continued on the above	**1**
5	Numerical solution of heat equation by Schmidt explicit formula	**1**
5	Problems continued on the above	**1**
5	Numerical solution of the wave equation	**1**
5	Problems continued on the above	**1**
		50 Hrs

Dayananda Sagar Academy of Technology & Management

Semester	**:**	**1st/2nd**				
Course Title	**:**	**Applied Physics for Computer Science Stream**				
Course Code	**:**	**BPHYS102/BPHYS202**				
Course Type (Theory/ Practical/ Integrated)	**:**	**Integrated**				
Course Category	**:**	**ASC**				
Stream	**:**	**Common to all CSE based 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
6	To give an exposure towards practical knowledge for the theoretical concepts and to perform honest measurements

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)

DSATM

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	**Laser and Optical Fibers:** **LASER**: Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action: Conditions and Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Measurement of pollutants in the environment, Numerical Problems. **Optical Fiber**: Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Classification of Optical Fibers, Attenuation, Applications: Point to point communication, Numerical Problems **Pre requisite: Properties of light** **Self-learning: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Total Internal Reflection**	8
Pedagogy	**Chalk and talk:** Expression for Energy Density (Derivation), Expression for NA **PPT:** Semiconductor Diode Laser **Videos:** Applications of Lasers and Optical Fibers	
2	**Quantum Mechanics:** de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function and its properties, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, it's energy Eigen values and Eigen States, Waveforms and Probabilities. Numerical Problems. **Pre requisite:Wave–Particle dualism** **Self-learning: de Broglie Hypothesis**	8
Pedagog	**PPT:** Quantization of Energy States, Waveforms and Probabilities, Principle of Complementarity,	

y	**Video:** Quantization of Energy States, Waveforms and Probabilities **Chalk Talk** **Group Discussion**	
3	**Quantum Computing:** **Principles of Quantum Information & Quantum Computing:** Introduction to Quantum Computing, Moore's law & its end, Differences between Classical & Quantum computing. Concept of qubit and its properties. Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits. **Dirac representation and matrix operations:** Matrix representation of 0 and 1 States, Identity Operator I, Applying I to$\|0\rangle$and $\|1\rangle$ states, Pauli Matrices and its operations on $\|0\rangle$and $\|1\rangle$states, Explanation of i) Conjugate of a matrix and ii) Transpose of a matrix. Unitary matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, and Quantum Superposition, normalization rule. Orthogonality, Orthonormality. Numerical Problems **Quantum Gates**: Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate, Phase Gate (or S Gate), T Gate, CNOT Gate (Discussion for 4 different input states), Numerical Problems. **Pre requisites: Matrices** **Self-learning: Moore's law, Young's double slit experiment**	**8**
Pedagogy	**PPT:** Introduction to Quantum Computing, Moore's law & its end, Differences between Classical & Quantum computing. Concept of qubit and its properties. **Video:** Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits. **Chalk Talk** **Group Discussion** **Seminars**	
4	**Electrical Conductivity in metals** Assumptions and 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 level, Success of Quantum Free Electron Theory . Numerical Problems. Semiconductors and its classification, Fermi level in Intrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valence band (only mention the expression), Relation between Fermi energy & Energy gap in intrinsic semiconductors(derivation), Electrical conductivity of a semiconductor (derivation), Hall effect, Expression for Hall coefficient (derivation) and its application. **Pre requisites: Fundamentals of semiconductor** **Self-learning: Fermi energy level for extrinsic semiconductors**	**8**

Pedagogy	**PPT:** Hall coefficient (derivation) and its application. **Video:** Hall coefficient (derivation) and its application, classification of Semiconductors **Chalk Talk,Group Discussion,Seminars**	
5	**Superconductivity** Temperature dependence of resistivity, Mathessian rule, Superconductors, Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Josephson Junctions (Qualitative), DC and RF SQUIDs, Applications: Maglev Vehicles. **Advanced Engineering Materials** Nanomaterials: properties of nanomaterials, quantum confinement(Qualitative), synthesis methods(Top-down & bottom-up approaches) and applications, Shape memory alloys (SMA), Characteristics and applications of SMAs, NiTi alloy and its properties **Pre requisites: Basics of nanomaterials** **Self-learning: Quantum Tunnelling**	**8**
Pedagogy	**PPT:** Nanomaterials and shape memory alloy **Video: Superconductor applications** **Chalk Talk** **Group Discussion** **Seminars**	

List of Experiments or Programs

Sl.No	Experiments/Programs	Cos
1	Determination of wavelength of LASER using Diffraction Grating.	**6**
2	Determination of acceptance angle and numerical aperture of the given Optical Fiber.	**6**
3	Determination of Magnetic Flux Density at any point along the axis of a circular coil	**6**
4	Determination of resistivity of a semiconductor by Four Probe Method	**6**
5	Study the I-V Characteristics of the Given Bipolar Junction Transistor	**6**
6	Determination of dielectric constant of the material of capacitor by Charging and Discharging method.	**6**
7	Study the frequency response of Series & Parallel LCR circuits.	**6**
8	Determination of Plank's Constant using LEDs.	**6**
9	Identification of circuit elements in a Black Box and determination of values of the components	**6**
10	Study the Characteristics of a Photo-Diode and to determine the power responsivity / Verification of Inverse Square Law of Intensity of Light	**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	A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.
2	Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications-2017.
3	Concepts of Modern Physics-Arthur Beiser: 6th Ed; Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006
4	An Introduction to Lasers theory and applications by M.N. Avadhanulu and P.S. Hemne revised Edition 2012. S. Chand and Company Ltd -New Delhi.
5	Fundamentals of Fibre Optics in Telecommunication & Sensor Systems, B.P. Pal, New Age International Publishers.
6	Quantum Computation and Quantum Information, Michel A. Nelsen & Isaac L. Chung, Cambridge Universities Press, 2010 Edition
7	Quantum Computing, Vishal Sahani, Mc Graw Hill Education, 2007 Edition

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

CO	Course Outcomes	RBT Level	Level Indicator
CO 1	Understand the various fundamental concepts in Applied Physics	**Remember/Understand**	**L1/L2**
CO 2	Apply the basic principles of physics in diverse engineering applications	**Apply**	**L3**
CO 3	Analyse the given numerical and find the solutions	**Analyse**	**L4**
CO 4	Design the simulations with the applications of physics	**Evaluate**	**L5**
CO 5	Create scientific models, reports and posters in teams on applied physics themes	**Create**	**L6**
CO 6	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
CO1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	3	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	--	2	--	--	--	--	--	--	--	--	--	--	--	--
CO4	--	--	2	--	2	--	--	--	--	--	--	--	--	--
CO5	--	--	--	--	--	--	--	--	2	2	--	1	--	--
CO6	--	--	--	--	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	**Quantum mechanics:**https://nptel.ac.in/courses/115/104/115104096/
4	**Physics:**http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
5	**Numerical Aperture of fiber:**https://bop-iitk.vlabs.ac.in/exp/numerical-aperture-measurement

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	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
	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					
									Scale down Marks of Experiments,

	Total CIE Practical					25	10	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	
				• 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	10	10	10			
Understand	24	24	24			15
Apply	8	8	8			
Analyse	8	8	8			10
Evaluate				50	50	25
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	Einstein's A and B Coefficients : Rates of Absorption and emissions, Thermal Equilibrium, Boltzmann Relation, Derivation of Expression for Energy Density. Conclusions on Einstein's coefficients	1.5 Hrs
1	Laser Action: Population Inversion explanation, Metastable State: Description using 3 level system, Requisites of a laser system : Energy Source, Active Medium, Laser Cavity	1
1	Semiconductor Diode Laser: Principle, Construction, Working, merits and demerits. Applications of LASER: Bar code scanner, Measurement of pollutants	1
1	Numerical Problems: Einstein coefficients, Boltzmann factor	0.5
1	Propagation of Light Through the Optical fiber (Ray Diagram), Acceptance angle and Numerical Aperture (NA) Explanation and derivation	1
1	Modes of Propagation and RI Profile, Classification of Optical Fibers: Single Mode Step Index and Multi Mode Step and Graded Index Fibers,	1
1	Attenuation, Attenuation Coefficient, Types of Fiber Losses: Absorption, Scattering and Geometrical Losses, Applications: point to point Communication	1
1	Numerical Problems : Numerical Aperture, Acceptance angle and	1
	Attenuation Co-efficient.	
2	Statement of de-Broglie Hypothesis, Derivation of expression for de Broglie wavelength (λ) by analogy and different forms of expression for (λ)	1
2	Heisenberg's Uncertainty Principle, Non existence of electron inside the nucleus (Non-relativistic),	1
2	Principle of Complementarity, Correlation between de Broglie Wavelength, Heisenberg's Uncertainty principle and wave packet, Wave Function, Explanation, General Mathematical Form (Exponential),	1
2	Physical Significance of a wave function (Probability Density) and Born Interpretation, Expectation value, Eigen functions and Eigen Values,	1
2	Schrödinger Time Independent wave definition, Setting up of Time independent Schrodinger wave equation in 1D (derivation) and extension to 3D (mention)	1

2	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	2
2	Numerical Problems on de Broglie Hypothesis, Heisenberg's Uncertainty Principle, Energy Eigen Values for a particle in 1D infinite potential well	1
3	Introduction to Quantum Computing, Moore's law & its end. Differences between classical & quantum computing.	1
3	Concept of qubit and its properties. Representation of qubit by Bloch sphere. single and two qubits. Extension to N qubits.	1
3	Matrix representation of 0 and 1 States, Identity Operator I, Applying I to |0> and |1> states to show there is no change, Pauli Matrices and its operations on 0 and 1 states, Explanation of i) Conjugate of a matrix and ii) Transpose of a matrix. Unitary Matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, and Quantum Superposition, normalization rule. Orthogonality, Orthonormality.	2
3	Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate, Phase Gate (or S Gate), T Gate	1
3	Controlled gate, CNOT Gate,	1
3	Numerical Problems: Identity, Unitary, Inner Product, Orthogonality, Gates: X Gates, Hadamard Gate, CNOT Gate, Relating T and S gates (Standard Forms),	2
4	Assumptions and Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory,	2
4	Fermi Energy, Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy level, Success of Quantum Free Electron Theory.	1
4	Semiconductors and its classification, Fermi level in Intrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valance band (only mention the expression),	2
4	Relation between Fermi energy & Energy gap in intrinsic semiconductors(derivation), Electrical conductivity of a semiconductor	2
	(derivation), Explanation of Hall Effect, Hall Voltage, Hall field, Derivation of Expression for Hall coefficient and Hall Voltage. Applications.	
4	Numerical Problems: Fermi energy, Fermi factor, electrical conductivity metals, semiconductor	1
5	General Introduction about Superconductivity, Graphical approach of Temperature dependence of resistivity in metals, Mathiessen's rule [$\rho=\rho 0+\rho(T)$], Temperature dependence of resistivity in superconductors, Definition of superconductivity & Critical temperature. Meissner's Effect,	1
5	Critical field, Temperature dependence of Critical field, Detailed explanation of Type1 & Type-II Superconductors. BCS Theory: Phonon & Phonon field, cooper pairs, High Temperature Superconductors(qualitative)	1
5	Brief explanation of SQUID & mention its applications, The construction and working of MAGLEV vehicle.	1

5	Numerical Problem: Critical field, Maithessen's rule	1
5	Nanomaterials, synthesis methods (qualitative) properties and applications, quantum confinement(Qualitative),	2
5	Shape memory alloys (SMA), Characteristics, Properties of NiTi alloy, applications	1
Total		40 Hrs

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st / 2nd**				
Course Title	:	**Introduction to Electronics Engineering**				
Course Code	:	**BCECE105/BCECE205**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Course Category	:	**CEC-1/ CEC-2**				
Stream	:	**Other Branches**		**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**3:0:0:0**		**SEE**	:	**50 Marks**
Total Hours	:	**40 Hrs T**		**SEE Duration**	:	**03 Hours**
Credits	:	**03**				

Course Learning Objectives: Students will be taught

Sl. No	Course Objectives
1	**Learn** the fundamentals of integrated circuits, communication systems and advanced technologies
2	Familiarise in **applying** the concepts of electronic circuits and devices for the given application
3	Provide the knowledge in **examining** various electronic circuits
4	Impart **design** skills of circuits for real time applications
5	**Equip** with the usage of modern tools to simulate various integrated circuits

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.

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DSATM

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	**Digital Electronics:** Binary, Decimal, Octal and hexadecimal Number systems, Number base Conversion, Complements, Basic theorems and properties of Boolean algebra, Boolean functions, Canonical and Standard forms, Digital Logic gates. **Combinational Logic:** Introduction, Adders: Half adder and Full adders. **Text-1**	8
Pedagogy	Mobile Studio	
2	**Operational Amplifiers:** Introduction, Block diagram of OPAMP, OPAMP parameters, Ideal and Practical Characteristics of OPAMP. **OPAMP applications:** Inverting and Non-Inverting Amplifiers, Voltage Follower, Summer, Differentiator, Integrator **Text-2**	8
Pedagogy	Think Pair Share	
3	**Embedded Systems –** Definition, Embedded systems vs General Computing Systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC. **Text – 3** Sensors, types and its Applications **Text – 5**	8

Pedagogy	Case Studies	
4	**Analog Communication –** Communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium - Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, FM. **Digital Communication:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission, Multiple Access Techniques. **Text - 4**	**8**
Pedagogy	Demonstration	
5	**Cellular wireless networks:** Cellular Telephone system, Cellular concepts, Network topology, wireless LAN, Bluetooth. **Text - 4** **Fundamentals of VLSI:** Evolution of Microelectronics, Basics structures NMOS, PMOS and CMOS, Moore's Law, Depletion Mode and Enhancement mode Transistors, VLSI Design flow. **Text - 5**	**8**
Pedagogy	Flipped Class Room	

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203- 0417-84
2	Op-amps and Linear Integrated Circuits, Ramakanth A Gayakwad, Pearson Education, 4th Edition
3	K V Shibu, 'Introduction to Embedded Systems', 2nd Edition, McGraw Hill Education (India), Private Limited, 2016
4	S L Kakani and Priyanka Punglia, 'Communication Systems', New Age International Publisher, 2017
5	Raj Kamal , 'Internet of Things - Architecture and Design Principles', Mc Graw Hill Education

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

CO	**Course Outcomes**	**RBT Level**	**Level Indicator**
CO1	**Understand** the concepts of integrated circuits, communication	**L2**	**Understand**

	systems and advanced technologies.		
CO2	**Apply** the fundamentals of integrated circuits to provide solution for analog and digital circuits.	**L3**	**Apply**
CO3	**Analyse** the operation of electronic circuits for a given problem scenario.	**L4**	**Analyse**
CO4	**Design** Linear Integrated and logic circuits for real time applications.	**L3**	**Apply**
CO5	**Examine** the performance of various electronic circuits using modern tools.	**L4**	**Analyse**

Mapping of Course Outcomes to Program Outcomes:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**	**-**
CO2	3	-	-	-	-	-	-	-	-	-	-	-	**2**	**-**	**-**
CO3		2	-	-	-	-	-	-	-	-	-	-	**2**	**-**	**-**
CO4	-	-	3	2	-	-	-	-	2	2	-	-	**2**	**-**	**-**
CO5	-	-	-	-	2	-	-	-	2	2	-	2	**2**	**-**	**-**

Weblinks and Video Lectures (e-Resources)

1	https://nptel.ac.in/courses/122106025
2	https://nptel.ac.in/courses/108105132
3	https://nptel.ac.in/courses/117104072
4	https://E-learning.vtu.ac.in
5	https://www.coursera.org/courses/digital-circuits

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				**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
		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
		CCA-2- Pedagogical Initiatives		50				

								method may be adopted
	Total CIE Theory					**50**	20	Scale down Marks of IAT and CCA to 50
SEE		Theory exam	Entire theory Syllabus	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
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:
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**
- 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	--	--	--	--	--	NA
Understand	10	20	20	--	--	NA
Apply	25	20	20	20	20	NA
Analyse	15	10	10	20	20	NA
Evaluate	--	--	--	10	10	NA
Create	--	--	--	--	--	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	04	06	10	10	20	50	33
CO2	10	05	10	10	20	55	37
CO3	10	05	05	05	10	35	23
CO4	05	05	--	--	--	10	07
CO5	--	--	--	--	--	--	--
Total	29	21	25	25	50	150	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (100% Theory)
Remember	--
Understand	33%
Apply	50%
Analyse	17%
Evaluate	--
Create	--

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage (%)
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	05	06	08	06	08	33	33
CO2	05	07	06	08	07	33	33
CO3	--	-	06	06	05	17	17
CO4	**10**	**07**	**--**	**--**	**--**	**17**	**17**
CO5	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Total	**20**	**20**	**20**	**20**	**20**	**100**	**100%**

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	**Digital Electronics:** Binary, Decimal, Octal and hexadecimal Number systems,	1
	Number base Conversion,	1
	Complements,.	1
	Basic theorems and properties of Boolean algebra,	1
	Boolean functions,	1
	Canonical and Standard forms, Digital Logic gates.	1
	Combinational Logic: Introduction, Adders: Half adder and	1
	Full adders	1
2	**Operational Amplifiers:** Introduction, Block diagram representation of OPAMP, .	1
	OPAMP parameters,	1
	Ideal Characteristics of OPAMP.	1
	Practical Characteristics of OPAMP.	1

	OPAMP applications: Inverting and Non-Inverting amplifiers,	1
	Voltage Follower, summer,	1
	Differentiator,	1
	Integrator	1
3	**Embedded Systems –** Definition, Embedded systems vs General Computing Systems,	1
	Classification of Embedded Systems, Major application areas of Embedded Systems,	1
	Elements of an Embedded System, Core of the Embedded System,	1
	Microprocessor vs Microcontroller, RISC vs CISC.	1
	Introduction to sensors	1
	Sensor types	1
	Sensor types Contd	1
	Applications of Sensors	1
4	**Analog Communication** - Modern communication system scheme, Information source, and input transducer,	1
	Transmitter, Channel or Medium - Hardwired and Soft wired,	1
	Noise, Receiver, Multiplexing,	1
	Types of communication systems. Types of modulation (only concepts) – AM, FM.	1
	Digital Communication : Advantages of digital communication over analog communication,	1
	ASK, FSK, PSK,	1
	Radio signal transmission,	1
	Multiple Access Techniques.	1
5	**Cellular wireless networks:** Cellular Telephone system,	1
	Cellular concepts, Network topology,	1
	wireless LAN,	1
	Bluetooth.	1
	Fundamentals of VLSI: Evolution of Microelectronics,	1
	Basics structures NMOS, PMOS and CMOS,	1
	Moore's Law, Depletion Mode and Enhancement mode Transistors,	1
	VLSI Design flow,	1
	Total	**40 Hrs**

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st / 2nd**				
Course Title	:	**Principles of Programming Using C**				
Course Code	:	**BESCS101 / BESCS201**				
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**				
Category	:	**ESC-1 / ESC-2**				
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	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)**.

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	CO2

	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.	
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, 7th Edition, ISBN-13. 978-9332555310, 2010.
2	Programming in ANSI C, E. Balaguruswamy, Tata McGraw-Hill,7th 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	**C**	**L5**
CO5	**Develop** solutions to problems using structured programming	**C**	**L5**

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--
CO4	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--
CO5	--	--	--	3	--	--	--	--	3	--	--	3	--	--	--

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
		Internal Assessment Test	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
	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
				25					
			Viva-	10					
		Open Ended Experiment	Write up	05	20	----	5	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Executio	10					
			Viva-voce	05					

	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 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	:	**I/II**				
Course Title	:	**Introduction to AI and Applications**				
Course Code	:	**BETCS105/205**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**ETC**				
Stream	:	**CSE**		**CIE**	:	**50 Marks**
Teaching hours/week (L: T:P:S)	:	**3:0:0:0**		**SEE**	:	**50 Marks**
Total Hours	:	**40**		**SEE Duration**	:	**3 Hours**
Credits	:	**3**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To provide fundamental knowledge of Artificial Intelligence, Generative AI, Machine Learning, Knowledge Representation, and Prompt Engineering concepts.
2	To enable students to apply AI, Gen AI and Machine Learning techniques and prompt engineering methods for solving real-world problems.
3	To develop analytical skills for evaluating different AI algorithms, models, and their performance across various applications.
4	To create awareness about current trends, ethical issues, and the impact of AI technologies in different domains.

Teaching-Learning Process

Pedagogical Initiatives:

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

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- 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.
- Show different ways to solve a problem & encourage the students to come up with creative & optimal-solutions
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Program -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Modul No.	Topics	Hours
1	**Introduction to Artificial Intelligence:** Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Limited Memory, Theory of Mind, Self-Awareness, Is Artificial Intelligence Same as Augmented Intelligence and Cognitive Computing, Machine Learning and Deep Learning. **Artificially Intelligent Machine:** Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Agent and Environment . **Textbook 1: Chapter 1 (1.1-1.5), Chapter 3 (3.1-3.4)**	08
Pedagogy	**Video Demonstration and Visualization.**	
2	**AI: What It Is and How It Works:** What is Generative AI and what it isn't? Predictive AI vs Generative AI: What's the difference? How does Generative AI work? How to use today's AI generators? How to use generative AI in your daily life?: AI in art, AI in business, AI in Finance and Banking, AI in Gaming, AI in Healthcare, AI in writing, AI in Learning, AI in Marketing and Advertisement, AI in Music, AI in Programming and software development, AI in transportation and development, AI everywhere **Benefits and Risks of AI:** Understanding the potential benefits of AI, Understanding the potential risks of AI, How to spot AI in the wild, Debating the ethics of AI-created content, AI and copyright law **Textbook 2: Chapter 1(only the topics mentioned), Chapter 2**	08
Pedagogy	**Case Study and Interactive Discussion**	
3	**Getting Started with All-Purpose AI Tools:** What is an all-purpose AI tool—and what can you do with it? How to use a generative AI tool? Getting to know publicly available AI tools: ChatGPT, Google Gemini, Claude, Meta AI, Microsoft Copilot, Perplexity, Pi, Poe, Using the most popular AI generators, Which generative AI tool is the best for you? How to construct a great prompt? Using AI-generated results—with caution. **Textbook 2: Chapter 3** **Knowledge Representation: Knowledge Representation:** Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge, Techniques of Knowledge Representation in AI **Textbook 1: Chapter 4 (4.1 – 4.5)**	08

Pedagogy	**Presentation**	
4	**Machine Learning:** Techniques in AI, Machine Learning Model, Regression Analysis in Machine Learning, Classification Techniques, Clustering Techniques, Naïve Bayes Classification, Neural Network, Support Vector Machine (SVM). **Textbook 1: Chapter 2 (2.1-2.8)**	**08**
Pedagogy	**Poster Presentation**	
5	**Computer Vision (CV):** Human Vision vs Computer Vision, How Does Computer Vision Work, The Evolution of Computer Vision, Tasks in Computer Vision, How Computer Vision Works with AI, Applications of Computer Vision, Which Vision Succeeded? Challenges in Computer Vision, Understanding Image Pixels **Where AI Is Heading Today?:** Expert System **AI Evolving with New Age Techniques:** Fuzzy Logic **Textbook 1: Chapter 6 (6.1- 6.9), Chapter 9 (9.1), Chapter 10 (10.1)**	**08**
Pedagogy	**Video demonstration and Simulation**	
	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	

Textbooks	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Reema Thareja, Artificial Intelligence: Beyond Classical AI, Pearson Education, 2023.
2	Michael Miller, Using Artificial Intelligence – Absolute Beginners Guide, Pearson 2025
Reference Books	
1	Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach (4th Edition), Pearson Education, 2023.
2	Elaine Rich, Kevin Knight, and Shivashankar B. Nair, Artificial Intelligence, McGraw Hill Education.
3	Tom Taulli, Prompt Engineering for Generative AI: ChatGPT, LLMs, and Beyond, Apress, Springer Nature.
4	Nilakshi Jain, Artificial Intelligence: Making A System Intelligent, First Edition, Wiley.

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

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Explain the fundamental concepts of Artificial Intelligence, Generative AI and Machine Learning including their principles, types, and real-world significance.	L2	U
CO2	Apply AI, Gen AI and ML techniques such as search algorithms, regression, classification, clustering, and prompt engineering methods to solve basic computational problems.	L3	AP
CO3	Analyze different AI models, algorithms, and techniques and compare their performance, advantages, and limitations in various scenarios.	L4	AN
CO4	Evaluate the impact of AI technologies, trends, and applications in diverse domains like healthcare, finance, education, and agriculture.	L5	E

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1																
CO2	3												2			
CO3		3														
CO4			3		2				2	2					2	

Weblinks and Video Lectures (e-Resources)	
1	Elements of AI – https://www.elementsofai.com
2	CS50's Introduction to Artificial Intelligence with Python – Harvard https://cs50.harvard.edu/ai/
3	Google Machine Learning Crash Course – https://developers.google.com/machine-learning/crash-course
4	Learn Prompting (Open-Source Guide) – https://learnprompting.org
5	Google AI – Learn with Google AI https://ai.google/education/
6	Coursera – Machine Learning by Andrew Ng (Stanford University) https://www.coursera.org/learn/machine-learning
7	OpenAI Prompt Engineering Guide (for ChatGPT) https://platform.openai.com/docs/guides/gpt-best-practices
8	Prompt Engineering for Developers – DeepLearning.AI + OpenAI https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/
9	Ethics in AI – Google Responsible AI Practices https://ai.google/responsibilities/responsible-ai-practices/
10	Google Teachable Machine (Train AI models visually without code) https://teachablemachine.withgoogle.com

CIE- Continuous Internal Evaluation (50 Marks)

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

CIE Course Assessment Plan

`	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module 1	Module 2	Module 2 to 2.5	Module-2.5 to 3	Module- 4	Module-5		
CO1	10	5	5	5	5	5	35	25%
CO2	10	10	5	5	10	10	50	25%
CO3		5			5	5	15	35%
CO4								15%
CO5								--
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	10% + 2%
Apply	20% + 2%
Analyze	40% + 4%
Evaluate	20% + 2%
Create	

SEE Marks Distribution

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module- 3	Module-4	Module-5		
CO1	20	10				30	30%
CO2		10	10	10	10	40	40%
CO3			10	10	10	30	30%
CO4							-
CO5							-
Total	20	20	20	20	20	100	100%

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st**				
Course Title	:	**Communicative English**				
Course Code	:	**BCENC106**				
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		03

	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.	
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	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,
		CCA-2- Pedagogical Initiatives		50				

								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, 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

Semester	:	**1st / 2nd**				
Course Title	:	**Indian Constitution**				
Course Code	:	**BICNC107 / BICNC207**				
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 about the

Sl. No	**Course Objectives**
1	The basic structure of Indian Constitution.
2	The Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3	The Union Government, political structure & codes, procedures.
4	The State Executive & Elections system of India.
5	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 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	**Module 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	**Module 2: Fundamental Rights and Directive Principles of State Policy** 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	**Module 3: The Union Executive** Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of	**03**

	India, Supreme Court of India, Judges of Supreme Court	
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	**Module 4: The State Executive** 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	**Module 5: Elections, Emergency Provisions and Constitutional Amendments** 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	The Indian Constitution: A Ready Reference Textbook as per VTU Syllabus, by Dr. Abhinav, Shashwat Publication, First Edition, 2023.
2	Constitution of India with important Case Laws, MCQs covering Constitutional Aspects of Indian Polity for Students, Competitive/ Civil Services Exams, Legal

	Fraternity, Practitioners, Legal, by Professionals, Professional Book Publishers,Edition-1 ,2023.
3	Introduction to the Constitution of India, by Durga Das Basu, Lexis Nexis Publication, 24rt Edition, 2019.
4	Constitution of India, Professional Ethics and Human Rights by Shubham Singles, Charles E. Haries, and et al., Cengage India Pvt.Ltd. Publications, Latest Edition, 2019.
5	Constitution of India -For Competitive Exams - Naidhruva Edutech Learning Solutions Publication, Latest Edition, 2022.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand and recall the concepts related to the Indian Constitution such as its historical context, key framers, structure, and basic functions.	Understand	L2
CO2	Comprehend the significance and principles underlying Fundamental Rights, Directive Principles of State Policy, and Fundamental Duties within the Indian Constitution	Understand	L2
CO3	Comprehend and grasp 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
CO1	--	--	--	--	--	3	--	--	--	--	--	02	--	--
CO2	--	--	--	--	--	3	--	--	--	--	--	02	--	--
CO3	--	--	--	--	--	3	--	--	--	--	--	02	--	--
CO4	--	--	--	--	--	3	--	--	--	--	--	02	--	--
CO5	--	--	--	--	--	3	--	--	--	--	--	02	--	--

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	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
		CCA-2- Pedagogical Initiatives		50				

								adopted
	Total CIE Theory					**50**	20	Scale down Marks of IAT and CCA to 50
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 questio 1 Mark each. Examination duration is 1 Hou
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	**Module 1: Introduction to the Indian constitution** 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	**Module 2: Fundamental Rights and Directive Principles of State Policy** 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	**Module 3: The Union Executive** 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	**Module 4: The State Executive** 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	**Module 5: Elections, Emergency Provisions and Constitutional Amendments**	1

	Election Commission of India, Elections & Electoral Process	
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

Semester	:	**1st**				
Course Title	:	**Innovation And Design Thinking**				
Course Code	:	**BIDTC108**				
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 Duration**	:	**01 Hour**
Credits	:	**01**				

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 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)

DSATM

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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	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=Ee4CKIPklik&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=16p9YRF0I-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	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
		CCA-2- Pedagogical Initiatives		50				

								one assessment method may be adopted
	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	3

	problems and overcome barriers and find innovative solutions.	
	Total	**15 Hrs**

Dayananda Sagar Academy of Technology & Management

Semester	:	**2nd**				
Course Title	:	**Engineering Mathematics – II for CSE & ECE Stream**				
Course Code	:	**BMATS/E201**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Course Category	:	**ASC**				
Stream	:	**ECE, CSE & Allied 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 vector and integral calculus, transform calculus and numerical methods in solving problems
3	Analyze problems using concepts of vector and integral calculus, transform Calculus 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.
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 2025-26)

COURSE SYLLABUS		
Module No.	**Contents of the Module**	**Hours**
1	**Numerical methods** Solution of polynomial and transcendental equations - Newton-Raphson method and Regula Falsi method, finite differences, interpolation/extrapolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae, numerical Integration-Simpson's one-third rule and Simpson's three-eighth rule.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
2	**Integral Calculus** Multiple integrals, evaluation of double and triple integrals, evaluation of double integrals-change of order of integration, change of variables, area using double and volume using triple integrals.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
3	**Vector Calculus** Vector differentiation: Scalar and vector fields, gradient, directional derivative, curl and divergence-physical interpretation, solenoidal and irrotational vector fields.	**10**

	Vector integration: Line integrals, applications to work done by a force.	
Pedagogy	**Chalk and board, group discussion, ppt, videos**	
4	**Laplace transform:** Definition, transforms of elementary functions, Laplace transform of $e^{at}f(t)$, $t^n f(t)$, $\frac{1}{t} f(t)$, derivatives, Laplace transform of periodic functions, unit step function.	**10**
Pedagogy	**Chalk and board, group discussion, ppt, videos**	

5	**Inverse Laplace transform**: Inverse Laplace transform, convolution theorem and problems. applications -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	Advanced Engineering Mathematics, Erwin Kreyzig, Wiley Publications, 10th Edition, 2015
2	Numerical Methods, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age Publications, 6th Edition, 2012
3	Theory and problems of Differential and integral calculus, Frank Ayres and Elliott Mendelson, Schaum's outline series, McGraw Hill publications, 3rd Edition,1990
4	Higher Engineering Mathematics, B. S. Grewal, Khanna Publications, 44th Edition, 2021

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Advanced mathematics for Engineers and Scientists, Murray R Spiegel, Schaum's outline series, McGraw Hill publications.
2	Higher Engineering Mathematics, H. K. Dass and Er. Rajnish Verma, S. Chand Publication, 3rd Edition
3	Higher Engineering Mathematics, B.V. Ramana, McGraw-Hill Education, 11th Edition, 2017
4	Engineering Mathematics, Srimanta Pal & Subodh C.Bhunia , Oxford University Press, 3rd Edition, 2016.
5	A Textbook of Engineering Mathematics, N.P Bali and Manish Goyal, Laxmi Publications, 10th Edition, 2022.

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 vector calculus, integral calculus, transform calculus and numerical methods	**Understand**	**L2**
CO2	Apply techniques of vector calculus, integral calculus, transform calculus and numerical methods to solve Engineering Problems	**Apply**	**L3**
CO3	Analyze Engineering problems using vector calculus, integral calculus, transform calculus and numerical methods	**Analyse**	**L4**
CO4	Develop mathematical solutions to various real time problems	**Evaluate**	**L5**
	using MATLAB		

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://youtube.com/playlist?list=PLMLsjhQWWlUoOGgo64vgzFfAcFpQeJzhX
2	https://youtube.com/playlist?list=PLMLsjhQWWlUpGtORaLzBlvw_QkpYCgoBa
3	https://youtube.com/playlist?list=PLMLsjhQWWlUrfmcsh0kJI8m6Esfz4TpU_
4	https://youtube.com/playlist?list=PLMLsjhQWWlUqSNC042WJpBS6zWFx9biwR
5	https://youtube.com/playlist?list=PLhSp9OSVmeyKQu9bO27NN_2wlyiHUX2-f

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
		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	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	
				• 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	Introduction, Numerical Solution of algebraic and transcendental equations, Regula-Falsi method and problems	1
1	Newton - Raphson method and problems	1
1	Finite differences: Introduction, Forward & Backward differences	1
1	Problems continued on the above	1
1	Interpolation: Newton's forward and backward interpolation formulae	1
1	Interpolation formulae for the unequal intervals: Newton's divided difference formula	1
1	Lagrange's interpolation formula and problems	1
1	Numerical integration: Simpson's one-third, three-eighth and trapezoidal rules	1
1	Problems on the above rules	1
1	Problems continued	1
2	Multiple Integrals: Evaluation of double and triple integrals	1

2	Problems on above topic	**1**
2	Change of order of integration and problems	**1**
2	Problems continued on above topic	**1**
2	Problems continued	**1**
2	Changing into polar coordinates and problems	**1**
2	Problems continued on above topic	**1**
2	Application to find area and volume	**1**
2	Problems continued on above topic	**1**
2	Problems continued	**1**
3	Scalar and vector fields, gradient and physical interpretation	**1**
3	Problems on the above	**1**
3	Gradient of a scalar and problems	**1**
3	Directional derivative and problems	**1**
3	Problems continued on above topic	**1**
3	Curl and divergence; physical interpretation	**1**
3	Problems continued on above topic	**1**
3	Solenoidal and irrotational vectors	**1**
3	Vector line integral and problems	**1**
3	Problems continued on above topic	**1**
4	Introduction and definition of Laplace transform	**1**
4	Laplace transform of some standard functions	**1**
4	Problems on the above	**1**
4	Basic properties of Laplace transforms	**1**
4	Problems on the above	**1**
4	Problems on the above	**1**
4	Laplace transform of periodic functions	**1**
4	Problems on the above	**1**
4	Laplace transform of unit-step function: properties	**1**
4	Problems on the above	**1**
5	Inverse Laplace transforms	**1**
5	Problems on the above	**1**
5	Problems on the above	**1**
5	Problems on the above	
5	Convolution theorem	**1**
5	Problems on the above	**1**
5	Problems on the above	**1**
5	Solution of LDE using Laplace transform	**1**
5	Problems on the above	**1**
5	Problems on the above	**1**
	Total	**50 Hrs**

Dayananda Sagar Academy of Technology & Management

Semester	:	**2nd**				
Course Title	:	**Elements of Electrical Engineering**				
Course Code	:	**BCECE104/BCECE204**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**CEC – 1 / CEC-2**				
Stream	:	**Electrical & Electronics Branch**		**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**2:2:0:0**		**SEE**	:	**50 Marks**
Total Hours	:	**40 Hrs Theory**		**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 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	**Power Generation, Transmission, Distribution and D.C Circuits:** **Power Generation:** Conventional and non-conventional energy resources. Hydel, Nuclear, Thermal, Solar & wind power generation. Introduction to Green H2 **Transmission & Distribution:** Power transmission and Distribution system using single line diagram approach, types and representation (short, medium-T & Pi networks and long transmission lines) of transmission lines, types and components of distribution systems. **DC Circuits:** Active and passive elements, Ohm's Law. KCL & KVL, series, parallel, series-parallel circuits. Time domain analysis of first order R-L and R-C circuits. Numerical examples	8
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning	
2	**A.C Circuits:** **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, Parallel circuits), Power and Power factor, Numerical examples. **Three Phase**: Analysis of three phase Balanced circuit, Voltage and current relation in star and delta connection (without derivation), Measurement of power. Series and Parallel resonance, Numerical examples.	8

Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning	
3	**AC Machines:** **Transformers:** Electromagnetism, Construction and principle of operation, equivalent circuit, EMF equation of transformer(without derivation), OC and SC test on transformer, regulation and Maximum efficiency calculations and applications. Numerical Examples with different loads. **Induction Motor:** Construction and working principle of three phase Induction Motor, types and applications, Slip and its significance**.** Constructional feature and working of single-phase induction motor, types and applications, Numerical Examples	**8**
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning 5. Cut sections 6. Demonstration	
4	**DC Motors & Synchronous Generator:** **DC Motors:** Classification, Construction and working principle of DC motors, concept of EMF & torque Equation of D.C Motor, concept of back EMF, characteristics and applications of DC motors. Numerical Examples **Synchronous Generator:** Classification, Construction and working principle of operation of synchronous generators, EMF equation, applications. Numerical Examples based on EMF Equation	**8**
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Demonstration	
5	**Switchgears & Electrical Installation:** 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	**8**
Pedagogy	1. Chalk and talk 2. Animated/NPTEL videos 3. Demonstration	

Reference Books	
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	Basic Electrical Engineering by DP Kothari and I J Nagrath ,McGraw-Hill ,3rd Edition 2017
2	Electrical Engineering: Principles & Applications by Allan R Hambley, Pearson 6th Edition,2019

3	Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.

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

CO	Course Outcomes	RBT Level	Level Indicator
CO1	**Understand the concepts, working principle, operation of different power systems, electrical machines, and the electrical installations.**	**Remember and Understand**	**L1 & L2**
CO2	**Apply the basic laws to the solve basic electrical engineering problems**	**Apply**	**L3**
CO3	**Analyse the basic DC & AC circuits.**	**Analyse**	**L4**
CO4	**Solve the different electrical circuit problems using modern tools.**	**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	--	3	--	--	--	--	--	--	--	--	--	--	--	--
CO4	--	--	3	3	3	--	--	--	2	2	--	--	2	2

Weblinks and Video Lectures (e-Resources)	
1	https://archive.nptel.ac.in/courses/108/105/108105053
2	http://lms.vtu.ac.in/econtent/BS.php
3	https://www.youtube.com/watch?v=awrUxv7B-a8
4	https://www.youtube.com/watch?v=4oRT7PoXSS0
5	https://www.youtube.com/watch?v=ZSCEfJ4TXW4

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-2- Pedagogical Initiatives		50				CCA chosen is Project Based Learning, then one assessment method may be adopted
	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	
				• 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.				

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):
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 2**5 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 (**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	8	6	15			**NA**
Understand	12	15	25			**NA**
Apply	18	20	10	15	05	**NA**
Analyse	12	9		15	12	**NA**
Evaluate				20	15	**NA**
Create				--	18	**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	**12**	**8**	**10**	**11**	**40**	**81**	**54%**
CO2	**8**	**10**	**12**	**8**	**10**	**48**	**32%**
CO3	**4**	**8**	**4**	**5**		**21**	**14%**
CO4							
Total	**24**	**26**	**26**	**24**	**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	**Module-1:** Power Generation: Introduction to Conventional & Non-Conventional Energy Sources	1
1	Hydel, Nuclear, Thermal power generation, Solar & wind power generation. Introduction to Green H2	1
1	Power transmission and Distribution system using single line diagram approach	1
1	Types and representation (short, medium-T & Pi networks and long transmission lines) of transmission lines	1
1	DC Circuits: Active and passive elements, Ohm's Law	1
1	KCL & KVL, series, parallel, series-parallel circuits	1
1	Numerical examples on series, parallel, series-parallel circuits	1
1	Time domain analysis of first order R-L and R-C circuits	1
2	**Module-2:** Single phase: Study and representation of sinusoidal waveform	1
2	Analysis of single phase AC circuits (R,L,C Circuits)	1
2	Analysis of Series R-L, R-C, R-L-C Circuits	1
2	Numerical examples of Analysis of Series R-L, R-C, R-L-C Circuits	1
2	Analysis of three phase Balanced circuit- Voltage and current relation in star and delta connection	1
2	Numerical examples of three phase Balanced circuit	1
2	Measurement of power ,power factor	1
2	Series and Parallel Resonance	1
3	**Module-3:** Transformers: Concept of Electromagnetism	1

3	Construction and principle of operation of transformer	**1**
3	Equivalent circuit, EMF, OC and SC test of transformer	**1**
3	Regulation and efficiency calculations, applications of transformer	**1**
3	Construction and working principle of three phase Induction Motor	**1**
3	Types of three phase Induction Motor and applications	**1**
3	Slip and its significance. Constructional feature and working of single-phase induction motor	**1**
3	Types of single phase Induction Motor and applications	**1**
4	**Module-4:** Classification, Construction of d.c. motors	**1**
4	Working principle of DC motor	**1**
4	EMF Equation, their characteristics and applications	**1**
4	Numerical Examples on DC Motors	**1**
4	Construction and working of Synchronous Generator	**1**
4	Types of Synchronous Generator, EMF equation,	**1**
4	Applications of Synchronous Generator	**1**
4	Simple Numerical Examples	**1**
5	**Module-5:** Components of LT switch gear-switch fuse unit, MCB	**1**
5	ELCB, RCCB	**1**
5	Types of wiring, types and ratings of Cables	**1**
5	Two way and three-way control of load ,Electric Shock	**1**
5	Earthing and its types	**1**
5	Safety Precautions to avoid shock	**1**
5	Demonstration of Energy meter and Smart meter	**1**
5	Elementary calculation of energy consumption and power factor improvement	**1**
	Total	**40 Hrs**

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st and 2nd**				
Course Title	:	**Applied Chemistry for Computer Science Stream**				
Course Code	:	**BCHES102/BCHES202**				
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**				
Course Category	:	**ASC**				
Stream	:	**Common to CSE branches**		**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 and corrosion chemistry.
2	To understand the mechanism of corrosion, thermodynamics and sensors to solve the societal problems.
3	To learn the significance of green chemistry, analytical techniques and nano materials.
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 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	**ELECTROCHEMISTRY AND ENERGY STORAGE SYSTEMS** **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. **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. **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 CH_3OH-O_2 fuel cell.	8
Pedagogy	Animated videos on battery and fuel cells, PPT on reference electrodes, Student's presentation on fuel cells and numerical problems.	
2	**CORROSION AND ITS CONTROL** **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	8

	(CPR), numerical problems. **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.	
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	**GREEN CHEMISTRY AND NANOMATERIALS** **Green Chemistry:** Introduction, 12 principles with real life examples, green synthesis of paracetamol. Introduction, construction, working and application of P V cell. **Nanomaterials:** Introduction, size-dependent properties, Synthesis of nanomaterials: Top-down and bottom-up approaches, Synthesis by Sol-gel and precipitation, Nanoscale materials: Fullerenes, Carbon nanotubes, and graphene's – properties and applications.	8
Pedagogy	Videos on nanomaterial synthesis, PPT on nanoscale materials, Student's group discussion on green route synthesis of drugs.	
4	**SENSORS AND DISPLAY SYSTEMS** **Sensors:** Introduction, working, principle and applications of Conductometric sensors, Electrochemical sensors, Thermometric sensors and Optical sensors. Sensors for the measurement of dissolved O_2 (DO). Electrochemical gas sensors for SOx and NOx. **Display Systems:** Photoactive and electro active materials, Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals: Introduction, classification, properties and application. Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's).	8
Pedagogy	Animated videos on sensors and display systems, PPT on Display system, Assignment and student's presentation on sensors applications.	
5	**THERMODYNAMICS AND CHEMICAL KINETICS:** **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. **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.	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)
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.
Open Ended Experiment (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 ptv 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=T4pSuflO9fk, https://www.youtube.com/watch?v=4HCsBMI7nSg

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
		Internal Assessment Test	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
		CCA-2- Pedagogical Initiatives		50				

								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
			Execution	25					

			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	5	2	One experiment for 20 marks. 20 marks reduced
			Execution	10					
			Viva-voce	05					
	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	

	• 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,
	  o 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.
	  o 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
1	**ELECTROCHEMISTRY AND ENERGY STORAGE SYSTEMS** **Electrochemistry**: Basic concepts of electrochemistry; Electrode system: Introduction, types of electrodes	1
	Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode.	1
	Reference electrode: Introduction, calomel electrode – construction, working and applications of calomel electrode.	1
	Concentration cell – Definition, construction and Numerical problems.	1
	Energy Storage Systems: Classification of batteries, with examples. Battery characteristics, cycle life and shelf life.	1
	Construction, working and applications of: Sodium-Ion battery, vanadium redox flow battery	1
	Fuel Cells- Introduction, Classification of fuel cells based on the type of fuel, electrolyte and temperature.	1
	Differences between the Conventional cell and fuel cell, Construction, working and applications of methanol -oxygen.	1
2	**CORROSION AND ITS CONTROL: Corrosion:** Introduction, Electrochemical theory.	1
	Types: differential aeration (waterline and pitting), differential metal and stress corrosion	1
	Factors affecting rate of corrosion. Corrosion control: Metal coating-galvanization and tinning,	1
	Surface conversion coating - anodizing and phosphating. Cathodic protection - sacrificial anode method.	1
	Impressed current method. corrosion penetration rate (CPR), numerical	1

	problems.	
	Metal finishing: Introduction, Technological importance. Electroplating: Introduction, conditions for electroplating.	1
	Electroplating of Chromium, Electroless plating: Introduction, distinction between electroplating and electroless plating processes.	1
	Electroless plating: Introduction, electroless plating of copper.	1
3	**GREEN CHEMISTRY AND NANOMATERIALS** **Green Chemistry:** Introduction, 12 principles with real life examples	1
	validation of greenness, industrial application of green chemistry	1
	Introduction, construction, working and application of P V cell.	1
	Nanomaterials: Introduction, size-dependent properties (Surface area, Electrical, Optical, and Catalytic properties).	1
	Synthesis of nanomaterials: Top-down and bottom-up approaches, Synthesis by Sol-gel method.	1
	Precipitation and chemical vapor deposition	1
	Nanoscale materials: Fullerenes, Carbon nanotubes	1
	graphene's – properties and applications.	1
4	**SENSORS AND DISPLAY SYSTEMS:** **Sensors:** Introduction, working, principle and applications of Conductometric sensors, Electrochemical sensors	1
	Thermometric sensors (Flame photometry) and Optical sensors (colorimetry).	1
	Sensors for the measurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals. Electrochemical gas sensors for SOx and NOx.	1
	Disposable sensors in the detection of biomolecules and pesticides.	1
	Display Systems: Photoactive and electro active materials.	1
	Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals (LC's) - Introduction, classification, properties and application.	1
	Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's)	1
	Quantum Light Emitting Diodes (QLED's).	1
5	**THERMODYNAMICS AND CHEMICAL KINETICS:** **Thermodynamics:** I and II Laws of thermodynamics – spontaneous and non-spontaneous processes.	1
	Entropy, Free energy(Gibbs free energy – Standard Gibbs free energy change) and chemical equilibrium – significance of entropy.	1
	Electrochemical Equilibrium. Application of thermodynamics to real world problems.	1
	Chemical Kinetics: Rate of a chemical reaction, factors affecting rates of reaction,	1
	Law of mass action – Le Chatelier's principle. Rate expression, order, and molecularity of reactions, zero order, first order reactions.	1
	Pseudo first order reaction – half-life period. Determination of rate constant and order of reaction.	1

	Temperature dependence of rate constant – Arrhenius equation, activation energy and its calculation;	**1**
	Elementary concept of collision theory of bimolecular gaseous reactions.	**1**
Total		**40 Hrs**

Dayananda Sagar Academy of Technology & Management

Semester	:	**1st / 2nd**				
Course Title	:	**COMPUTER AIDED ENGINEERING DRAWING**				
Course Code	:	**BESCM102 / BESCM202**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Course Category	:	**ESC-1 / ESC-2**				
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 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 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. **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)	**8**
Pedagogy	Chalk & Talk Use of Models and Software	
2	**Orthographic Projections of Planes:** Introduction, Definitions – projections of plane surfaces-triangle, square, rectangle, square, pentagon, hexagon and circle, planes in different positions by change of position method using first angle of projection only (No problems on side views)	**8**
Pedagogy	Chalk & Talk Use of Models and Software	
3	**Projections of Solids (First Angle of Projection only):** Introduction, Definitions – Projections of right regular tetrahedron, cube, prisms, pyramids, cylinders and cones in different positions (No problems on freely suspended solids and combination of solids)	**8**
Pedagogy	Chalk & Talk Use of Models and Software	
4	**Isometric Projections (Using Isometric Scale Only):** Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, cube, right regular prisms, pyramids, cylinders, cones, spheres, hemispheres and combination of two simple solids	**8**
Pedagogy	Chalk & Talk Use of Models and Software	
	Development of Lateral surfaces:	**8**

5	Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces)	
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	Illustrate the concepts of Orthographic Projections of points, Straight lines and Planes using drafting tool	**A**	L3
CO2	Exercise the Orthographic Projections of various solids employing drafting software	**A**	L3
CO3	Implement the Isometric Projections of solids, development of lateral surfaces of solids by utilising software application	**A**	L3
CO4	Practice the Orthographic projections of planes, solids by means of manual sketching	**A**	L3
CO5	Handle the isometric projections of solids/ development of lateral surfaces through manual sketching	**A**	L3

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)	
1	https://nptel.ac.in/courses/112104031
2	https://www.mooc-list.com/tags/engineering-drawing
3	https://www.mygreatlearning.com/academy/learn-for-free/courses/engineering-graphics-drawing

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
		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
		CCA-2- Pedagogical Initiatives		50				

								method may be adopted
	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	
				• 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	50	50	50	50	50	-
Analyse	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-

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	**100**
Analyse	**--**
Evaluate	**--**
Create	**--**
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

Semester	:	**2nd**				
Course Title	:	**Introduction to Python Programming**				
Course Code	:	**BPLCS201**				
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**				
Category	:	**PLC**				
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)**.

COURSE CURRICULUM

Module No.	Contents of the Module	Hours
1	**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. **Flow control:** Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules.	6
2	**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. **Lists:** The List Data Type, Working with Lists, Methods, List Memory management List-like Types. Tuples- Working with Tuples	6
3	**Dictionaries:** The Dictionary Data Type, Method, Working with dictionaries, types, data set handling with dictionaries, Pretty Printing. **Strings:** Working with Strings, Useful String Methods, Pattern matching with Regular Expressions, Patten matching without Regular Expressions	5
4	**Files operations:** Files and File Paths, The os. path Module, File Operations, Compressing Files with the zip file, exception handling.	5

	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	
5	**Object-Oriented Programming:** Encapsulation, Polymorphism, Abstraction, Inheritance **Scientific Computing Using Python:** Data analysis and numerical computing with NumPy and plotting, Introduction to scipy, pandas, Scikit-learn, pytorch.	**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	**CO3**

	which reads two values from the console and calls a function DivExp.	
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: 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'Relly 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**

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Weblinks and Video Lectures (e-Resources)

The Joy of Computing using Python:

https://onlinecourses.nptel.ac.in/noc23_cs20/preview Python for Data

Science: https://onlinecourses.nptel.ac.in/noc22_cs32/preview

Infyspringboard - Scip

https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012825354493067264

68422_shared/overvie Python for everybody: Course era

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
	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
				25					
			Viva-	10					
		Open Ended Experiment	Write up	05	20	----	**5**	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Executio	10					
			Viva-voce	05					
							25	10	Scale down Marks of Experiments, Record, Observation,

	Total CIE Practical							Practical Test and Open-Ended Experiment
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

Semester	:	**2nd**				
Course Title	:	**Professional Writing Skills in English**				
Course Code	:	**BCENC206**				
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 device innovative pedagogy to improve teaching-learning.

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	03

	Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises.	
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 Fillip 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	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
		CCA-2- Pedagogical Initiatives		50				

								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	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**		

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%
CO6	13	10	09	10	8	50	100%
Total							

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

Semester	:	**1ಸೆಮಿಸ್ಟರ್**				
Course Title	:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ				
Course Code	:	**BSBKC107 / 207**				
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	ವೃತಿಪರ ಪದವಿವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡಭಾಷೆಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡಸಂಸ್ಕೃತಿಯ ಪರಿಚಯಮಾಡಿಕೊಡುವುದು.
2	ಕನ್ನಡಸಾಹಿತ್ಯ ದ ಪರಧಾನ್ಯಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕಕಾವ್ಯ ಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸುವುದು.
3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸ್ಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4	ತಾಂತಿರಕವಾ ಕ್ತಿಗಳಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5	ಸಾಂಸ್ಕೃತಿಕಜನ್ನಡದ ಹಾಗೂ ಪರವಾಸ್ಕಥನ್ಗಳ ಪರಿಚಯಮಾಡಿಕೊಡುವುದು.

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	1) ಕರ್ನಿಟಕಸಂಸ್ಕೃತಿ - ಹಂಪನ್ನಗರಾಜಯಾ 2) ಕರ್ನಿಟಕವಕ್ತೇಕರಣ : ಒಂದುಅಪೂರ್ವಚರಿತ್ರರ - ಜಿ. ವೆಂಕಟಸುಬಬ ಯಾ 3) ಆಡಳಿತ್ಭಾಷೆಯಾಗಿಕನ್ನಡ-ಡಾ. ಎಲ್.ತಿಮ್ಮೇಶಮತ್ತುಪುರಘಸ್ವಿಕೇಶವಮೊತ್ತಿ	
Pedagogy	1) ಸಾಂಸ್ಕೃತಿಕನ್ನಡದನ್ನು ಭೋಧಿಸುವ ತ್ರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪರಸ್ತುತ್ಪುಸ್ಕ ಕ ಆಧರಿಸಿಬ್ಲಾಕ್ಬೋರ್ಡ್ವಿಧಾನ್ವನ್ನು ಅನುಸ್ರಿಸುವುದು. ಪರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟಗಳನ್ನು ತ್ಯಾರಿಸ್ಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತ್ರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸ್ಲು ಅವಕಾಶಮಾಡಿಕೊಡುವುದು. 2) ಇತಿಹಾಸ ಸಂಸ್ಕೃತಿ ಕನ್ನಡ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರಕ ವಿಕಾವಾ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚರ್ತ್ರರ ಮತ್ತು ಲೇಖನ್ಗಳು ಮತ್ತು ಕಥೆಕಾವಾ ಗಳ ಮೊಲಅಂಶಗಳಿಗ್ಗ ಸಂಬಂಧಪಟಟ ಪ್ರಶ್ನೆ ನಿರ್ಚತ್ತರ ಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತ್ರ ವಿಮರ್ಶಕರು ಬರಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತ್ರ ವಿಶ್ಲೇಷಿಸುವುದು. 3) ನ್ವೀನ್ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗ್ಗ ಸಂಬಂಧಪಟಟ ವಿಧಾನ್ಗಳನ್ನು ಶಿಕ್ಷಕರುವಿದ್ಯಾರ್ಥಿಗಳಿಗ್ಗಅನುಕೂಲವಾಗುವರೇತಿಯಲ್ಲಿಅಳವಡಿಸಿಕೊಳ್ಳ ಬಹುದು.	
2	1) ವಚನ್ಗಳು : ಬಸವಣ್ಣ , ಅಕ್ಕ ಮಹಾದೇವಿ, ಅಲ್ಲಾ ಮಪರಭು, ಅಲ್ಲಮ ಪ್ರಭುಯಾ , ಜೇಡರದಾಸಿಮಯಾ , ಅಲ್ಲ ಪ್ರಭುಕ್ಕ. 2) ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನುಫಲಇದರಿಂದೇನುಫಲ – ಪುರಂದರದಾಸ್ರು, ತ್ಲಾ ಣಿಸಿರುಕಂಡಾ ತಾಳುಮನ್ವೇ - ಕನ್ಕದಾಸ್ರು. 3) ತ್ತುಪದಗಳು - ಸಾವಿರಕೊಡಗಳಸುಟಟ ಯ - ಶಿಶುನಾಳಶರೀಫ.	
Pedagogy	1) ಸಾಂಸ್ಕೃತಿಕಕನ್ನಡದನ್ನು ಭೋಧಿಸುವ ತ್ರಗತಿಯಲ್ಲಿಶಿಕ್ಷಕರು ಪರಸ್ತುತ್ಪುಸ್ಕ ಕಆಧರಿಸಿ ಬ್ಲಾಕ್ಬೋರ್ಡ್ವಿಧಾನ್ವನ್ನು ಅನುಸ್ರಿಸುವುದು. ಪರಮುಖಅಂಶಗಳಚಾರ್ಟಗಳನ್ನು ತ್ಯಾರಿಸ್ಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತ್ರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸ್ಲು ಅವಕಾಶಮಾಡಿಕೊಡುವುದು. 2) ಇತಿಹಾಸ ಸಂಸ್ಕೃತಿ ಕನ್ನಡ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು ಅಂದರ ಕವಿಕಾವಾ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳಚರ್ತ್ರರ ಮತ್ತು ಲೇಖನ್ಗಳು ಮತ್ತು ಕಥೆಕಾವಾ ಗಳ ಮೊಲಅಂಶಗಳಿಗ್ಗ ಸಂಬಂಧಪಟಟ ಪ್ರಶ್ನೆ ನಿರ್ಚತ್ತರ ಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತ್ರ ವಿಮರ್ಶಕರು ಬರಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧ್ಯಮ ಮಗಳ ಮುಖಾಂತ್ರ ವಿಶ್ಲೇಷಿಸುವುದು. 3) ನ್ವೀನ್ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗ್ಗ ಸಂಬಂಧಪಟಟ ವಿಧಾನ್ಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗ್ಗ ಅನುಕೂಲವಾಗುವರೇತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳ ಬಹುದು.	

3	1) ಡಿ.ವಿಜಿಯವರಮಂಕುತಿಮಮ ನ್ಯಗೆQಂದಆಯದ ಕಲವುಭಾಗಗಳು. 2) ಕುರುಡುಕಾಂಚಾಣ - ದ್ಯ.ರಾ.ಬೇಂದರ. 3) ಹೊಸ್ಬಳಿನ್ಗೀತ್ರ - ಕುವೆಂಪು.	
Pedagogy	1) ಸಾಂಸ್ಕೃತಿಕಕನ್ನ ಡವನ್ನ ಭೋಧಿಸ್ಲು ತ್ರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪರಸ್ಪಿತ್ಪುಸ್ಕ ಕಆಧರಿಸಿ ಬ್ಲಾಕ್ಬೋರ್ಡಿ ವಿಧಾನ್ವನ್ನ ಅನ್ಸಿಸ್ವುದು. ಪರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟಿಗಳನ್ನ ತ್ಯಾರಿಸ್ಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನ ಪ್ರೇರೇಪಿಸ್ವುದು ಮತ್ತಿ ತ್ರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನ ಚರ್ಚಿಸ್ಲು ಅವಕಾಶಮಾಡಿಕೊಡುವುದು. 2) ಇತಿಹೇರ್ಚನ್ ತಕ್ಷಣ ಅನ್ಕೂಲಗಳನ್ನ ಬಳಸಿಕೊಳುವುದು ಅಂದರ ಕವಿಕಾವಾ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚರ್ತ್ಣರ ಮತ್ತಿ ಲೇಖನ್ಗಳು ಮತ್ತಿ ಕಥೆಕಾವಾ ಗಳ ಮೊಲ ಅಂಶಗಳಿಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ಧ್ವರ್ಚತ್ಣರ ಗಳು, ಸ್ಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತ್ರ ವಿಮಶಿಕರು ಬರQರುವ ವಿಮಶಿತ್ಮಕ ವಿಷಯಗಳನ್ನ ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧಾ ಮಗಳ ಮುಖಾಂತ್ರ ವಿಶ್ಾರೇಷಿಸ್ವುದು. 3) ನ್ವೀನ್ಮಾದರಿಯ ಸಾಹಿತ್ಾ ಭೋದನೆಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ವಿಧಾನ್ಗಳನ್ನ ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗ್ಗ ಅನ್ಕೂಲವಾಗುವರೇತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳು ಬಹುದು.	
4	1) ಡಾ. ಸ್ರ್.ಎಮ್.ವಿಶ್ವೇಶವ ರಯಾ : ವಾಕ್ತಿ ಮತ್ತಿ ಐತಿಹಾ - ಎ.ಎನ್. ಮೊತಿಹಿರಾವ್. 2) ಕರಕುಶಲಕಲಗಳು ಮತ್ತಿ ಪರಂಪರಯ ವಿಜ್ಞಾನ್ - ಕರೇಗೌಡ ಬೇಚನ್ಹಳಿ.	
Pedagogy	1) ಸಾಂಸ್ಕೃತಿಕಕನ್ನ ಡವನ್ನ ಭೋಧಿಸ್ಲು ತ್ರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪರಸ್ಪಿತ್ಪುಸ್ಕ ಕಆಧರಿಸಿ ಬ್ಲಾಕ್ಬೋರ್ಡಿ ವಿಧಾನ್ವನ್ನ ಅನ್ಸಿಸ್ವುದು. ಪರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟಿಗಳನ್ನ ತ್ಯಾರಿಸ್ಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನ ಪ್ರೇರೇಪಿಸ್ವುದು ಮತ್ತಿ ತ್ರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನ ಚರ್ಚಿಸ್ಲು ಅವಕಾಶಮಾಡಿಕೊಡುವುದು. 2) ಇತಿಹೇರ್ಚನ್ ತಕ್ಷಣ ಅನ್ಕೂಲಗಳನ್ನ ಬಳಸಿಕೊಳುವುದು ಅಂದರ ಕವಿಕಾವಾ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚರ್ತ್ಣರ ಮತ್ತಿ ಲೇಖನ್ಗಳು ಮತ್ತಿ ಕಥೆಕಾವಾ ಗಳ ಮೊಲ ಅಂಶಗಳಿಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ಧ್ವರ್ಚತ್ಣರ ಗಳು, ಸ್ಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತ್ರ ವಿಮಶಿಕರು ಬರQರುವ ವಿಮಶಿತ್ಮಕ ವಿಷಯಗಳನ್ನ ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧಾ ಮಗಳ ಮುಖಾಂತ್ರ ವಿಶ್ಾರೇಷಿಸ್ವುದು. 3) ನ್ವೀನ್ಮಾದರಿಯ ಸಾಹಿತ್ಾ ಭೋದನೆಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ವಿಧಾನ್ಗಳನ್ನ ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗ್ಗ ಅನ್ಕೂಲವಾಗುವರೇತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳು ಬಹುದು.	
5	1) ಯುಗಾQ – ವಸ್ಧೇಂದರ. 2) ಮ್ಗಾನೆಎಂಬಗಿರಿಜನ್ಪವಿತ್ - ಡಾ. ಹಿ.ರ್ಚ. ಬೋರಲಿಂಗಯಾ	
Pedagogy	1) ಸಾಂಸ್ಕೃತಿಕಕನ್ನ ಡವನ್ನ ಭೋಧಿಸ್ಲು ತ್ರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪರಸ್ಪಿತ್ಪುಸ್ಕ ಕಆಧರಿಸಿ ಬ್ಲಾಕ್ಬೋರ್ಡಿ ವಿಧಾನ್ವನ್ನ ಅನ್ಸಿಸ್ವುದು. ಪರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟಿಗಳನ್ನ ತ್ಯಾರಿಸ್ಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನ ಪ್ರೇರೇಪಿಸ್ವುದು ಮತ್ತಿ ತ್ರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನ ಚರ್ಚಿಸ್ಲು ಅವಕಾಶಮಾಡಿಕೊಡುವುದು. 2) ಇತಿಹೇರ್ಚನ್ ತಕ್ಷಣ ಅನ್ಕೂಲಗಳನ್ನ ಬಳಸಿಕೊಳುವುದು ಅಂದರ ಕವಿಕಾವಾ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚರ್ತ್ಣರ ಮತ್ತಿ ಲೇಖನ್ಗಳು ಮತ್ತಿ ಕಥೆಕಾವಾ ಗಳ ಮೊಲ ಅಂಶಗಳಿಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ಧ್ವರ್ಚತ್ಣರ ಗಳು, ಸ್ಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತ್ರ ವಿಮಶಿಕರು ಬರQರುವ ವಿಮಶಿತ್ಮಕ ವಿಷಯಗಳನ್ನ ಟಿಪಿಟಿ, ಡಿಗಿಟಲ್ ಮಾಧಾ ಮಗಳ ಮುಖಾಂತ್ರ ವಿಶ್ಾರೇಷಿಸ್ವುದು. 3) ನ್ವೀನ್ಮಾದರಿಯ ಸಾಹಿತ್ಾ ಭೋದನೆಗ್ಗ ಸ್ಂಬಂಧಪಟಟ ವಿಧಾನ್ಗಳನ್ನ ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗ್ಗ ಅನ್ಕೂಲವಾಗುವರೇತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳು ಬಹುದು.	

Reference Books

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)	
1	ಸಾಂಸ್ಕೃತಿಕಕನ್ನಡ- ಡಾ.ಹಿ.ಚಿ. ಬೊರೇಲಿಂಗಯಾ ಮತ್ತು ಡಾ. ಎಲ್.ತಿಮ್ಮೇಶ್
2	ಶಿರೇಆರ್ಮಂಜುನಾಥ್ಹಾಗೊಪಿ. ನಗರಾಜ
3	ಡಾ. ಪುರಶಂತ್ತಿನಾಯಕಮತ್ತು ಶಿರೇಟಿ.ಎಲ್.ರವೀಂದರ

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

CO	Course Outcomes	RBT Level	Level Indicator
CO 1	ಕನ್ನಡಭಾಷೆ ಸಾಹಿತ್ಯ ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯಕುರಿತು ಅರಿವುಮೊಡುತ್ತದೆ. ಮತ್ತು	ಸ್ಮರಿಸುವುದು	L-2
CO 2	ಕನ್ನಡಸಾಹಿತ್ಯದ ಪರಧಾನ್ಯಾಗವಾದ ಆಧುನಿಕಪೂವಿ ಮತ್ತು	ಆಧುನಿಕಕಾವಾಗಳನ್ನು ಅಥೆಧಿಸಿಕೊಳುವುದು	L-2
CO 3	ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹರ್ಚಿನ್ ಒಂಗ್ಗ ಮತ್ತು ಜ್ಞಾನ್ಯಕ ಸಾಂಕೊತಿ ಮೊಡುತ್ತದೆ. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯಬಗ್ಗೆ ಅರಿವು ಹಾಗೊ ಆಸ್ಕ್ತಿಹಚಾತಿಗುತ್ತದೆ.	ಸ್ಮರಿಸುವುದು	L-1
CO 4	ತಾಂತಿರಕವಾಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೊ ಅವರುಗಳು ಸಾಂಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ರ್ನಡಿಸ್ ಇನಿನತ್ರ ವಾಕ್ತಿಗಳಬಗ್ಗೆ ತಿಳಿದುಕೊಳುಲು ಕೌತ್ಯಕತ್ರಹಚಾತಿಗುತ್ತದೆ .	ಅಥೆಧಿಸಿಕೊಳುವುದು	L-1
CO 5	ಸಾಂಸ್ಕೃತಿಕ, ಜನ್ಪದ ಹಾಗೊ ಪರವಾಸ್ಕಥನ್ಗಳ ಪರಿಚಯಮಾಡಿಕೊಡುವುದು.	ಅಥೆಧಿಸಿಕೊಳುವುದು	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	--	--	--	--	--	--	--	--	1	2	--	2	--	--
CO2	--	--	--	--	--	--	--	--	2	2	--	2	--	--
CO3	--	--	--	--	--	--	--	--	2	1	--	1	--	--
CO4	--	--	--	--	--	--	--	--	2	1	--	1	--	--
CO5	--	--	--	--	--	--	--	--	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

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	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
		CCA-2- Pedagogical Initiatives		50				

								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**	**-**	**-**

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	9	9	50	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	ಕರ್ನಿಟಕಸ್ಂಸ್ಕೃತಿ – ಹಂಪರ್ನಗರಾಜಯಾ	1
2	ಕರ್ನಿಟಕಏಕ್ತೇಕರಣ : ಒಂದುಅಪೂವಿಚರಿತ್ರರ – ಜಿ. ವೆಂಕಟಸ್ಂಬಬ ಯಾ	1
3	ಆಡಳಿತ್ಬಾಷೆಯಾಗಿಕನ್ನ ಡ - ಡಾ. ಎಲ್.ತಿಮ್ಮೇಶಮತ್ತಿಂಪ್ರರಫಸ್ವಿಕೇಶವಮೊತಿ	1
4	ವಚನ್ಗಳು : ಬಸ್ವಣ , ಅಕ್ಕಮಹಾದೇವಿ, ಅಲಾಮಪರಭು, ಅಯ ಕ್ತಮಾಯಾ , ಜೇಡರದ್ಯಸಿಮಯಾ , ಅಯ ಕ್ತಅಕ್ಕಮ .	1
5	ಕ್ತೇತ್ತಿನೆಗಳು : ಅದರಿಂದೇನ್ಂಫಲಇದರಿಂದೇನ್ಂಫಲ – ಪುರಂದರದ್ಯಸ್ರು, ತ್ಲಾಣಿಸ್Qರುಕಂಡಾ ತಾಳುಮನ್ವೇ – ಕನ್ಕದ್ಯಸ್ರು.	1
6	ತ್ತಪದಗಳು – ಸಾವಿರಕೊಡಗಳಸ್ಂಟಟ ಂ – ಶಿಶುರ್ನಳಶರೇಫ.	1
7	ಡಿ.ವಿ.ಜಿಯವರಮಂಕುತಿಮಮ ನ್ಕಗೆQಂದಆಯದ ಕಲವುಭಾಗಗಳು.	1
8	ಕುರುಡುಕಾಂಚಾಣ – ದ್ಯ.ರಾ.ಬೇಂದರ.	1
9	ಹೊಸ್ಬಳ್ಳಿನ್ಗೀತ್ರ – ಕುವೆಂಪು	1
10	ಡಾ. ಸ್ರ್.ಎಮ್.ವಿಶ್ವೇಶವ ರಯಾ : ವಾಕ್ತಿಮತ್ತಿಂಐತಿಹಾ – ಎಎನ್ಮೊತಿರಾವ್.	1½
11	ಕರಕುಶಲಕಲಗಳುಮತ್ತಿಂಪರಂಪರಯವಿಜ್ಞಾನ್ – ಕರೇಗೌಡಬೇಚನ್ಹಳಿ	1½
12	ಯುಗಾQ – ವಸ್ಂಧೇಂದರ.	1½
13	ಮ್ಗಾನೆಎಂಬಗಿರಿಜನ್ಪವಿತ್ – ಡಾ. ಹಿ.ರ್ಚ. ಬೊೇರಲಿಂಗಯಾ	1½
Total		15 Hrs

Dayananda Sagar Academy of Technology & Management

Semester	:	**2nd**				
Course Title	:	**Engineering Exploration Course**				
Course Code	:	**BEEXC208**				
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.	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	
10	Smart Water Distribution and Conservation Network, Solar-Powered Mobile Charging	

Sl.	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=EAIaIQobChMIsf3N4bD3_wIVHAyDAx1a5wkrEAAYASAAEgJNe_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