



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 <sup>st</sup> /2 <sup>nd</sup>			
Course Title	:	Applied Physics for Electrical Stream			
Course Code	:	23PHYE12/23PHYE22			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Course Category	:	ASC			
Stream	:	Common to ECE and EEE	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 numerical and apply the theoretical concepts of physics for solving the same
4	To enlighten the concepts of physics for properties of different materials
5	To develop scientific temper among students and encourage them to do projects

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



**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**

<b>Module No.</b>	<b>Contents of the Module</b>	<b>Hours</b>
<b>1</b>	<b>Laser and Optical Fibers:</b> <b>LASER:</b> Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action: Population Inversion, Metastable state, Requisites of a laser system, CO <sub>2</sub> Laser, Applications: Bar code scanner, Measurement of pollutants in the environment, Numerical Problems. <b>Optical Fiber:</b> Propagation mechanism, Acceptance angle and Numerical Aperture (NA), Classification of Optical Fibers, Attenuation, Applications: Point to point communication, Numerical Problems <b>Pre requisite: Properties of light</b> <b>Self-learning: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Total Internal Reflection</b>	<b>8</b>
<b>Pedagogy</b>	<b>Chalk and talk:</b> Expression for Energy Density (Derivation), Expression for NA <b>PPT:</b> Semiconductor Laser <b>Videos:</b> Applications of Lasers and Optical Fibers <b>Group Discussion</b> <b>Seminar</b>	
<b>2</b>	<b>Electrical Properties of Solids:</b> <b>Metals:</b> Quantum Free Electron Theory of Metals: Assumptions, Fermi-energy, Fermi level, Variation of Fermi Factor with Temperature, Mention of expression for electrical conductivity of metals. <b>Dielectric Properties:</b> Polar and non-polar dielectrics, Types of Polarization Mechanisms, internal fields in solids (Mention expression), Clausius-Mossotti equation (Derivation), super capacitors: types and applications, Numerical Problems.	<b>8</b>
<b>Pedagogy</b>	<b>PPT:</b> Application of dielectrics in transformer. <b>Video:</b> SQUID, MAGLEV, capacitors and transformers <b>Chalk Talk</b> <b>Group Discussion</b> <b>Seminars</b>	

3	<p><b>Maxwell's Equations and EM waves:</b></p> <p><b>Maxwell's Equations:</b> Fundamentals of Vector Calculus. Divergence and Curl of Electric field and Magnetic field (static), Gauss' divergence theorem and Stoke's theorem, Faraday's laws of EMI, Current Density, Equation of Continuity, Displacement Current (with derivation), Maxwell's equations in vacuum, Numerical Problems</p> <p><b>EM Waves:</b> The wave equation in differential form in free space (Derivation of the equation using Maxwell's equations), Plane Electromagnetic Waves in vacuum, their transverse nature.</p> <p><b>Pre requisites: Basics of electrostatics</b></p> <p><b>Self-learning:</b> Faraday's laws of EMI, laws of Electrostatics and Magnetism</p>	8
Pedagogy	<p><b>PPT:</b> Stoke's theorem</p> <p><b>Video:</b> Electromagnetic waves</p> <p><b>Chalk Talk</b></p> <p><b>Group Discussion</b></p> <p><b>Seminars</b></p>	
4	<p><b>Semiconductors and Devices:</b></p> <p>Expression for concentration of electrons in conduction band &amp; holes concentration in valance band (only mention the expression), Relation between Fermi energy &amp; Energy gap in intrinsic semiconductors(derivation), Electrical conductivity of a semiconductor (derivation), Hall effect, Expression for Hall coefficient (derivation) and its application. Photo-diode and Power responsivity, sensors, Numerical problems.</p> <p><b>Pre requisites: Law of mass action</b></p> <p><b>Self-learning:</b> Types of Semiconductors</p>	8
Pedagogy	<p><b>PPT:</b> Hall effect, Photo diode</p> <p><b>Video:</b> Introduction to semiconductor</p> <p><b>Chalk Talk</b></p> <p><b>Group Discussion</b></p> <p><b>Seminars</b></p>	
5	<p><b>Magnetic materials</b></p> <p>Origin of magnetic moment, Bohr Magneton, Comparision of Dia, Para and Ferro Magnetism, Domain theory, Hysteresis, Soft and Hard magnetic materials, Antiferromagnetic materials, Ferrites and its applications</p> <p><b>Advanced Engineering Materials</b></p> <p>Liquid Crystal Display, Types, Working, Applications, Shape memory alloys (SMA), Characteristics and applications of SMAs, NiTi alloy and its properties</p> <p><b>Pre requisites: Magnetic properties</b></p> <p><b>Self-learning:</b> Applications of SMA</p>	8
Pedagogy	<p><b>PPT:</b> LCD, SMA</p> <p><b>Video:</b> Ferrites and Applications</p> <p>Chalk Talk</p> <p><b>Group Discussion</b></p> <p><b>Seminars</b></p>	

## 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	Introduction to Electrodynamics, David Griffith, 4 <sup>th</sup> Edition, Cambridge University Press 2017.
5	Lasers and Non Linear Optics – B.B. Laud, 3rd Ed, New Age International Publishers 2011

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

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

### Mapping of Course Outcomes to Program Outcomes:

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

### Weblinks and Video Lectures (e-Resources)

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

**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
<b>Total CIE Theory + Practical</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>15</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>10</b>	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				
<b>Total CIE Theory</b>						<b>25</b>	10	Scale down Marks of IAT and CCA to 25

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

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				



**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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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			10
Apply	8	8	8			
Analyse	8	8	8			5
Evaluate				50	50	35
Create						

### CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1		Test-2		Test-3			
	Module-1	Module-2	Module-2	Module-3	Module-4	Module-5		
CO1	6	4	4	6	6	4	30	20
CO2	16	8	8	16	10	14	72	48
CO3	4	4	4	4	4	4	24	16
CO4	4	4	4	4	4	4	24	16
CO5								
CO6								
<b>Total</b>	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	--	--	--	--	--	--	--
<b>Total</b>	41	41	40	38	40	200	100%

### Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Derivation of expression for energy density equation and its significance	1
1	Requisites of a Laser system ( Excitation source, Active media and laser cavity) and pumping, Conditions for laser action(population inversion & meta stable state)	1
1	Principle, Construction and working of CO2 Laser with energy level diagram, Application of Lasers in Bar code scanner and Measurement of pollutants.	1
1	Propagation mechanism, Angle of Acceptance, Numerical Aperture  (NA), Classification of optical fibers.	2
1	Types of attenuation, Mention of Expression for Attenuation coefficient,	1
1	Discussion of block diagram of point to point communication.	1
1	Numerical Problems : Ratio of Population, Number of photons / sec in a LASER beam of certain power output, Numerical Aperture, Acceptance angle and Attenuation Co-efficient	1
2	Assumptions of Quantum Free Electron Theory of Metals,   Fermi-energy, Fermi factor, Variation of Fermi Factor with Temperature and Energy. Mention of expression for electrical conductivity	1
2	Fundamentals of dielectrics. Polar and non- polar dielectrics, Polarization, Mention of relation between dielectric constant and polarization.	1
2	Electrical polarization Mechanisms (Electronic, Ionic, Orientation and Space charge).	1
2	Definition of internal field in case of solids and mention of its expression for one dimensional case.	1
2	Mention of expressions for internal field for three dimensional cases and Lorentz field.	1
2	Derivation of Clausius-Mossotti equation.	1
2	Supercapacitors, types and applications	1
2	Numerical Problems : Fermi factor, Electrical Conductivity, Polarization, Clausius-Mossotti relation, Variation critical field with temperature	1
3	Fundamentals of vector calculus: Briefly explain scalar product, vector product, Concept of divergence, gradient and curl along with physical significance and examples like Div and curl of E and B	1
3	Discuss the three different types of integrations viz linear, surface and volume integrations. Derivation of Gauss divergence theorem, mention Stokes' theorem.	1
3	Explain briefly Gauss flux theorem in electrostatics and magnetism, Ampere's law, Biot-Savart's law and Faraday's laws of electromagnetic induction,	2
3	Discuss continuity equation, definition of displacement current( $I_d$ ), expression for displacement current, Maxwell- Ampere's law, List four Maxwell's equations in differential form and in vacuum	1

3	Derive Wave equation for EM waves in vacuum in terms of electric field using Maxwell's Equations. Explanation of Plane electromagnetic waves in vacuum along with the equations for Electric Field and Magnetic field variations.	1
3	Explain the transverse nature of electromagnetic waves (Linear, Circular, Elliptical Polarization) Numerical Problems on Divergence and Curl	1
4	Explanation of Fermi level in intrinsic semiconductor and Explanation of Fermi level in ntype & p-type semiconductors,	1
4	Carrier concentration (only expression), Relation between Fermi energy & Energy gap in intrinsic semiconductors (derivation)	1
4	Law of mass action: to show $n_e n_h = a$ , Derivation of Electrical conductivity of a semiconductor and also Mention expression for intrinsic semiconductor	2
4	Explanation of Hall Effect, Hall Voltage, Hall field , Derivation of Expression for Hall coefficient and Hall Voltage. Applications.	2
4	Sensor, Photo Diode : Construction, working & power responsivity by graphical approach and applications.	1
4	Numerical Problem: Electrical conductivity, Hall Effect.	1
5	Introduction to Magnetic properties, Origin of magnetic moment, Bohr Magneton	1
5	Comparision of Dia, Para and Ferro Magnetism, Antiferromagnetic materials, Ferrites and its applications	1
5	Domain theory, Hysteresis, Soft and Hard magnetic materials,	1
5	Numerical Problem : Magnetic susceptibility	1
5	Liquid Crystals, Characteristics, LCD- types, Working, Applications	2
5	Shape memory alloys (SMA), Characteristics, applications - SMA, Properties of NiTi alloy,	2
<b>Total</b>		<b>40 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 <sup>st</sup> and 2 <sup>nd</sup>				
Course Title	:	Applied Chemistry for Electrical Stream				
Course Code	:	23CHEE12/23CHEE22				
Course Type (Theory/ Practical/ Integrated)	:	Integrated				
Course Category	:	ASC				
Stream	:	ECE & EEE		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, electronic materials and corrosion
2	To understand the mechanism of corrosion, nano materials and electronic materials to solve the societal problems.
3	To learn significance of thermodynamics, chemical kinetics 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 analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

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

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<p><b>ELECTROCHEMISTRY AND ENERGY STORAGE SYSTEMS (8hrs)</b></p> <p><b>Electrochemistry:</b> Basic concepts of electrochemistry; Electrode system: types of electrodes, Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode: Construction, working and applications of Calomel electrode. Concentration cells and Numerical problems.</p> <p><b>Energy Storage Systems:</b> Introduction, Classification of batteries. Battery characteristics (Energy density, Shelf life, Life cycle) Construction, working and applications of: Sodium-Ion battery, vanadium redox flow battery.</p> <p><b>Fuel Cells-</b> 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 <math>\text{CH}_3\text{OH-O}_2</math> fuel cell.</p>	8
Pedagogy	Animated videos on battery and fuel cells, PPT on reference electrodes, Student's presentation on fuel cells and numerical problems.	
2	<p><b>CORROSION AND ITS CONTROL (8hrs)</b></p> <p><b>Corrosion:</b> Introduction, Electrochemical theory, types: differential aeration (waterline and pitting), differential metal and stress corrosion. Factors affecting rate of corrosion (Anodic to cathodic area ratio, Nature of corrosion product, Nature of medium-PH, temperature, conductance). Corrosion control: Metal coating-galvanization and tinning, surface conversion coating - anodizing. Cathodic protection - sacrificial anode method and impressed current method. Corrosion penetration rate (CPR), numerical problems.</p> <p><b>Metal finishing:</b> Introduction, Technological importance. Electroplating: Introduction, Conditions for electroplating, electroplating of chromium, Electroless plating: Introduction, electroless plating of copper, distinction between electroplating and electroless plating processes.</p>	8
Pedagogy	Field visit to identify different types of corrosion, Animated videos and PPTs on electroplating and electroless plating, PPT on reference electrodes, Student's presentation on corrosion control and numerical problems.	

3	<p><b>CHEMISTRY OF ELECTRONIC MATERIALS (8hrs)</b></p> <p><b>Conductors and Insulators:</b> Introduction, principle with examples (With energy level diagrams), semiconductors- production of electronic grade silicon-Czochralski process (CZ) and Float zone (FZ) methods.</p> <p><b>Polymers:</b> Introduction, synthesis (Addition and condensation), Molecular weight - Number average, weight average and numerical problems, Synthesis properties and applications of commercially important polymers-Methyl methacrylate (Plexi glass or PMMA), polyurethane, Kevlar fibre.</p> <p><b>Biodegradable polymers:</b> Introduction and their requirements. Synthesis and properties of Polylactic acid.</p> <p><b>Conducting polymers</b> – synthesis and conducting mechanism of polyacetylene.</p>	8
Pedagogy	Poster presentation activity for students of solar cells for domestic and Industrial applications, Animated videos on polymer synthesis, PPT on biodegradable and conducting polymers, Assignment to collect different types of polymers with applications.	
4	<p><b>NANOMATERIALS AND DISPLAY SYSTEMS (8hrs)</b></p> <p><b>Nanomaterials:</b> Introduction, size dependent properties of nanomaterials (Surface area, Catalytic, Electrical, Optical property), preparation of nanomaterials by Top-down and bottom-up approach, sol-gel and precipitation method with example. Introduction, properties and applications-Carbon nanotubes, Fullerenes and nanofibers. Principle, applications of UV-Vis spectroscopy, Infra-red spectroscopy,</p> <p><b>Display systems:</b> Liquid crystals - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). properties and application in Organic light emitting diodes (OLED's), Quantum Light emitting diodes (QLED's).</p>	8
Pedagogy	Videos, presentation on the synthesis of nanomaterials, Student's presentation on nanomaterials and its applications. Videos of manufacturing of commercial LCD's, OLED's, QLED's	
5	<p><b>THERMODYNAMICS AND CHEMICAL KINETICS:</b></p> <p><b>Thermodynamics:</b> I and II Laws of thermodynamics – spontaneous and non-spontaneous processes, entropy, Free energy and chemical equilibrium – significance of entropy. Electrochemical Equilibrium, Application of thermodynamics to real world problems.</p> <p><b>Chemical Kinetics:</b> Rate of a chemical reaction, factors affecting rate of reaction, Law of mass action – Le Chatelier's principle. Rate expression, order, and molecularity of reactions, zero order, first order and pseudo first order reaction – half-life period. Determination of rate constant and order of reaction. Temperature dependence of rate constant – Arrhenius equation, activation energy and its calculation; elementary concept of collision theory of bimolecular gaseous reactions.</p>	8
Pedagogy	PPT on thermodynamics, videos on chemical Kinetics. Presentation on Free energy.	



## List of Experiments or Programs

Sl.No	Experiments/Programs	COs
1	Estimation of total hardness of water by EDTA method	
2	Determination of COD of waste water.	
3	Estimation of Iron in steel using standard $K_2Cr_2O_7$ solution by using external indicator method	
4	Determination of percentage of copper in brass using standard sodium thiosulphate solution	
5	Determination of amount of chlorine present in Bleaching powder (Iodometry)	
6	Kinetic study of the reaction of KI with $K_2S_2O_8$	
<b>Instrumental Experiments (Any 4)</b>		
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.	
<b>Demonstration Experiments (Any 2)</b>		
1	Estimation of Sodium present in soil/effluent sample using flame photometry	
2	Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch	
3	Synthesis of Iron oxide nanomaterials	
4	Estimation of CaO present in the given cement sample by EDTA method	

## Reference Books

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

1	Chemistry for Engineers, Teh Fu Yen, Imperial college press, 2008, ISBN: 97818609747742.
2	Advances in corrosion science and technology, M.G. Fontana, R.W. Staettle, Springer publications, 2012, ISBN: 9781461590620.
3	Fundamentals of analytical chemistry, Douglas A. Skoog et.al., 8th edition, 2004, Thomson Asia pvt Ltd. ISBN: 978-0-495-55828-6
4	Engineering chemistry, Shubha Ramesh et.al., Wiley India, 1 st Edition, 2011, ISBN: 9788126519880.
5	Energy storage and conversion devices, Anurag Gaur, A. L. Sharma, Anil Arya, 2021, CRC Press, Taylor and Francis Group, 1 st Edition, ISBN: 9781003141761.
6	E-waste recycling and management: present scenarios and environmental issues, Khan, Anish, and Abdullah M. Asiri. 2019, Springer, Vol. 33. ISBN: 978-3-030-14186-8.

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

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
<b>Total CIE Theory + Practical</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>15</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>10</b>	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				
<b>Total CIE Theory</b>						<b>25</b>	10	Scale down Marks of IAT and CCA to 25

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

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				

#### 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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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								
<b>Total</b>	<b>26</b>	<b>24</b>	<b>30</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>150</b>	<b>100</b>

### 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	--	--	--	--	--	--	--
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>100</b>	<b>100%</b>

## Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
01	Basic concepts of <b>electrochemistry</b> ; Electrode system: Introduction, types of electrodes,	01
	Ion selective electrode – definition, construction, working and applications of glass electrode.	01
	Determination of pH using glass electrode. Reference electrode: Introduction, calomel electrode – construction, working and applications of calomel electrode.	01
	Concentration cell – Definition, construction and Numerical problems.	01
	<b>Energy Storage Systems</b> : Classification of batteries, with examples. Battery characteristics, Energy density, cycle life and shelf life.	01
	Construction, working and applications of: Sodium-Ion battery, vanadium redox flow battery	01
	Fuel Cells- Introduction, Classification of fuel cells based on the type of fuel, electrolyte and temperature. Differences between the Conventional cell and fuel cell.	01
	Construction, working and applications of methanol -oxygen	01
02	<b>Corrosion</b> : Electrochemical theory, types: differential aeration (waterline and pitting), differential metal and stress corrosion.	01
	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.	01
	surface conversion coating - anodizing. Cathodic protection - sacrificial anode method and impressed current method.	01
	corrosion penetration rate (CPR), numerical problems.	01
	<b>Metal finishing</b> : Introduction, Technological importance. Electroplating: Introduction.	01
	Conditions for electroplating, Electroplating of chromium.	01
	Electroless plating: Introduction, electroless plating of copper.	01
	Distinction between electroplating and electroless plating processes.	01
03	<b>Conductors and Insulators</b> : Introduction, principle with examples (With energy level diagrams).	01
	semiconductors- production of electronic grade silicon-Czochralski process (CZ) and Float zone (FZ) methods.	01
	<b>Polymers</b> : Introduction, synthesis (Addition and condensation),	01
	Molecular weight - Number average, weight average and numerical problems.	01
	Synthesis properties and applications of Methyl methacrylate (Plexi glass or PMMA), polyurethane.	01
	Synthesis properties and applications Kevlar fibre. Biodegradable polymers: Introduction	01
	<b>Biodegradable polymers</b> : Requirements. Synthesis and properties of Polylactic acid.	01
	<b>Conducting polymers</b> – synthesis and conducting mechanism of polyacetylene.	01
04	<b>Nanomaterials</b> : Introduction, size dependent properties of nanomaterials (Surface area, Catalytic, Electrical, Optical property), preparation of nanomaterials by Top-down and bottom-up approach.	01
	Preparation of nanomaterials by sol-gel and precipitation method with example.	01
	Introduction, properties and applications-Carbon nanotubes, Fullerenes and nanofibers.	01
	Principle, applications of UV-Vis spectroscopy, Infra-red spectroscopy.	01
	<b>Display systems</b> : Liquid crystals - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's).	01
	Classification, properties and application of Organic light emitting diodes (OLED's),	01
	Classification, properties and application of Quantum Light emitting diodes (QLED's).	01
	<b>Perovskite materials</b> : Introduction, properties and applications in optoelectronic devices.	01

05	I and II Laws of <b>thermodynamics</b> – spontaneous and non-spontaneous processes.	01
	Entropy, Free energy (Gibbs free energy – Standard Gibbs free energy change) and chemical equilibrium – significance of entropy.	01
	Electrochemical Equilibrium. Application of thermodynamics to real world problems.	01
	<b>Chemical Kinetics:</b> Rate of a chemical reaction, factors affecting rates of reaction,	01
	Law of mass action – Le Chatelier’s principle. Rate expression, order, and molecularity of reactions, zero order, first order reactions.	01
	half-life period. Determination of rate constant, order of reaction.	01
	Temperature dependence of rate constant – Arrhenius equation, activation energy and its calculation;	01
	Elementary concept of collision theory of bimolecular gaseous reactions.	01
<b>Total</b>		<b>40 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught.

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

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



DSATM

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

**COURSE SYLLABUS**

<b>Module No.</b>	<b>Contents of the Module</b>	<b>Hours</b>
1	<b>Introduction to Communicative English:</b> 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
<b>Pedagogy</b>	(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	<b>Introduction to Phonetics:</b> 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
<b>Pedagogy</b>	(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	<b>Basic English Communicative Grammar and Vocabulary PART- I:</b> Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	03
<b>Pedagogy</b>	(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	<b>Basic English Communicative Grammar and Vocabulary PART - II:</b> 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
<b>Pedagogy</b>	(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	<b>Communication Skills for Employment:</b> 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
<b>Pedagogy</b>	(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	

<b>Reference Books</b>	
<b>Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)</b>	
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	<a href="https://drive.google.com/drive/folders/1rqloQbY2HWu7xbFSmaGU3YAc7Tbhc3b1">https://drive.google.com/drive/folders/1rqloQbY2HWu7xbFSmaGU3YAc7Tbhc3b1</a>
2	<a href="https://drive.google.com/file/d/1UbpxJBcZNFyCxMEK0KqpR6NjpNfd4e1n/view?usp=drive_link">https://drive.google.com/file/d/1UbpxJBcZNFyCxMEK0KqpR6NjpNfd4e1n/view?usp=drive_link</a>
3	<a href="https://drive.google.com/file/d/11GUI1amPCq75n8mHoGnc9qzv_OJFzCHM/view?usp=drive_link">https://drive.google.com/file/d/11GUI1amPCq75n8mHoGnc9qzv_OJFzCHM/view?usp=drive_link</a>
4	<a href="https://drive.google.com/file/d/1RbPsNDA_ATiTXP_Tn8y2Udpc2NZTcvoy/view?usp=drive_link">https://drive.google.com/file/d/1RbPsNDA_ATiTXP_Tn8y2Udpc2NZTcvoy/view?usp=drive_link</a>
5	<a href="https://drive.google.com/file/d/1brLXNdwbFugdZJ1B4_TtzN43_KhhZvZI/view?usp=drive_link">https://drive.google.com/file/d/1brLXNdwbFugdZJ1B4_TtzN43_KhhZvZI/view?usp=drive_link</a>



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
<b>Total CIE Theory</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	<b>15</b>	<b>6</b>	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>10</b>	<b>4</b>	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				
<b>Total CIE Theory</b>								

						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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week
- CCA2 to be conducted after 9<sup>th</sup> 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%
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>50</b>	<b>--</b>	<b>--</b>

### 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%
<b>Total</b>	<b>13</b>	<b>10</b>	<b>09</b>	<b>10</b>	<b>8</b>	<b>50</b>	<b>100%</b>

## 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
	<b>Revision</b>	
<b>Total</b>		<b>15 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught

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

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



DSATM

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

**COURSE SYLLABUS**

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

**Reference Books**

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

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

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

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

**Mapping of Course Outcomes to Program Outcomes:**

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

**Weblinks and Video Lectures (e-Resources)**

1	<a href="https://youtu.be/1gDmNDJ9SHc">https://youtu.be/1gDmNDJ9SHc</a>
2	<a href="https://youtu.be/cQHDAfrptUc">https://youtu.be/cQHDAfrptUc</a>
3	<a href="https://youtu.be/GFulyqgB5g0">https://youtu.be/GFulyqgB5g0</a>



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
<b>Total CIE Theory + Practical</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>25</b>	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) - II	Module - 3	50				
		Internal Assessment Test (IAT) - III	Module - 4 & 5	50				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>25</b>	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				
<b>Total CIE Theory</b>						<b>50</b>	<b>20</b>	Scale down Marks of IAT and CCA to 50

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				

#### 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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> week of semester with project demonstration and submission of the report

Total score for CCA is **25 Marks**

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

**Semester End Examination (SEE):**

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

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

### CIE- Continuous Internal Evaluation (50 Marks)

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

### CIE Course Assessment Plan

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

### SEE- Semester End Examination (50 Marks)

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

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

## Scheme of Evaluation for SEE

Question No.	Module	Marks
1	Module 1 or Module 2	30
2	Module 3	40
3	Module 4 or Module 5	30
<b>Note:</b> 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	-	-	-	-	-	-	-
<b>Total</b>	30	30	40	30	30	100	100

## Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	<b>Introduction:</b> 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	<b>Orthographic Projections of Points, Straight Lines:</b> 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	<b>Orthographic Projections of Planes (First Angle of Projection only):</b> 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	<b>Projections of Solids (First Angle of Projection only):</b> 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	<b>Isometric Projections:</b> 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	<b>Development of lateral surfaces:</b> 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
<b>Total</b>		<b>40 Hrs</b>





**Dayananda Sagar Academy of Technology & Management**  
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**ELECTRICAL & ELECTRONICS  
ENGINEERING STREAM**



**Dayananda Sagar Academy of Technology & Management**  
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**Applied Science Course: ASC**

**1<sup>st</sup> Semester -Physics Cycle**

<b>Applied Science Course: ASC</b>						
<b>Course Code</b>	<b>Title</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Project</b>	<b>Credits</b>
23MATC11	Engineering Mathematics-1	3	2	0	0	4
23PHYE12	Applied Physics for Electrical Stream	2	2	2	0	4

**1<sup>st</sup> Semester - Chemistry Cycle**

<b>Applied Science Course: ASC</b>						
<b>Course Code</b>	<b>Title</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Project</b>	<b>Credits</b>
23MATC11	Engineering Mathematics-1	3	2	0	0	4
23CHEE12	Applied Chemistry for Electrical Stream	2	2	2	0	4

**2<sup>nd</sup> Semester – Physics Cycle**

<b>Applied Science Course: ASC</b>						
<b>Course Code</b>	<b>Title</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Project</b>	<b>Credits</b>
23MATC21	Engineering Mathematics-2	3	2	0	0	4
23PHYE22	Applied Physics for Electrical Stream	2	2	2	0	4

**2<sup>nd</sup> Semester - Chemistry Cycle**

<b>Applied Science Course: ASC</b>						
<b>Course Code</b>	<b>Title</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Project</b>	<b>Credits</b>
23MATC21	Engineering Mathematics-2	3	2	0	0	4
23CHEC22	Applied Chemistry for Electrical Stream	2	2	2	0	4



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## Core Engineering Courses (CEC)

### 1<sup>st</sup> Semester - Physics Cycle

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

### 2<sup>nd</sup> Semester – Chemistry Cycle

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



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

### Engineering Science Course: ESC

#### 1<sup>st</sup> Semester -Physics Cycle

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

#### 2<sup>nd</sup> Semester – Chemistry Cycle

Engineering Science Course: ESC						
Course Code	Title	Lecture	Tutorial	Practical	Project	Credit
23ESCS21	Principles of Programming using C	2	0	2	0	3
23ESCM22	Computer Aided Engineering Drawing	2	0	2	0	3



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

### Emerging Technology Course: ETC

#### 1<sup>st</sup> Semester -Physics Cycle

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

#### 2<sup>nd</sup> Semester – Chemistry Cycle

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



# Dayananda Sagar Academy of Technology & Management

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## Programming Language Courses: PLC

### 1<sup>st</sup> Semester -Physics Cycle

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

### 1<sup>st</sup> Semester – Chemistry Cycle

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

### 2<sup>nd</sup> Semester -Physics Cycle

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

### 2<sup>nd</sup> Semester – Chemistry Cycle

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



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

**1<sup>st</sup> Semester Physics Cycle & Chemistry Cycle**

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

**2<sup>nd</sup> Semester Physics Cycle & Chemistry Cycle**

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



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

### Humanity and Social Science Course: HSSC

#### 1<sup>st</sup> Semester Physics Cycle

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

#### 1<sup>st</sup> Semester Chemistry Cycle

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

#### 2<sup>nd</sup> Semester Physics Cycle

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

#### 2<sup>nd</sup> Semester Chemistry Cycle

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



- The student has to select one course from the Core Engineering Course (CEC) group.
- EEE Students shall opt for any one of the courses from the ESC-I group except, 23CECE12 - Introduction to Electrical Engineering
- The students have to opt for the courses from CEC group without repeating the course in either 1st or 2nd semester
- The students must select one course from either ETC-I or PLC-I group.
- 23ESCS11 course is mandatory in First Semester



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

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

### 1<sup>st</sup> SEMESTER: PHYSICS CYCLE – (Electrical & Electronics Engineering Stream) - Electrical & Electronics Engineering (EEE)

Sl.No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MATC11	Engineering Mathematics-1	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	23PHYE12	Applied Physics for Electrical Stream	ASC	PHY	PHY	2	2	2	0	6	4	3	50	50	100
3	23CECE15	Introduction to Electronics Engineering	CEC-1	ECE	ECE	3	0	0	0	3	3	3	50	50	100
4	23ESCS11	Principles of Programming using C	ESC	ISE	CSE	2	0	2	0	4	3	3	50	50	100
5	23ETCS13	Introduction to IOT	ETC	CSE(AI)	CSE	2	0	0	2	4	3	3	50	50	100
6	23CENC16	Communicative English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	23ICNC17	Indian Constitution	HSSC	MED	MED	1	0	0	0	1	1	2	50	50	100
8	23IDTC18	Innovation Design &Thinking	AEC/SDC	ALD	ALD	1	0	0	0	1	1	2	50	50	100
<b>Total</b>						<b>15</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>25</b>	<b>20</b>	<b>21</b>	<b>400</b>	<b>400</b>	<b>800</b>

### 2<sup>nd</sup> SEMESTER: CHEMISTRTY CYCLE - (Electrical & Electronics Engineering Stream) - Electrical & Electronics Engineering (EEE)

Sl.No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MATC21	Engineering Mathematics-2	ASC	MAT	MAT	3	2	0	0	5	4	3	50	50	100
2	23CHEE22	Applied Chemistry for Electrical Stream	ASC	CHE	CHE	2	2	2	0	6	4	3	50	50	100
3	23CECE24	Elements of Electrical Engineering	CEC-2	EEE	EEE	2	2	0	0	4	3	3	50	50	100
4	23ESCM22	Computer Aided Engineering Drawing	ESC	MED	MED	2	0	2	0	4	3	3	50	50	100
5	23PLCS21	Introduction to Python Programming	PLC	ISE	CSE	2	0	2	0	4	3	3	50	50	100
6	23CENC26	Professional writing skills in English	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
7	23SBKC27	Samskruthika Kannada	HSSC	HSS	HSS	1	0	0	0	1	1	2	50	50	100
8	23EEXC28	Engineering Exploration	AEC/SDC	ALD	ALD	0	0	0	2	2	1	2	50	50	100
<b>Total</b>						<b>13</b>	<b>6</b>	<b>6</b>	<b>2</b>	<b>27</b>	<b>20</b>	<b>21</b>	<b>400</b>	<b>400</b>	<b>800</b>





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Semester	:	1 <sup>st</sup> / 2 <sup>nd</sup>		
Course Title	:	Elements of Electrical Engineering		
Course Code	:	23CEC14 / 23CECE24		
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	: 3 Hours
Credits	:	03	Duration	

**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.



**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	<p><b>Power Generation, Transmission, Distribution and D.C Circuits:</b></p> <p><b>Power Generation:</b> Conventional and non-conventional energy resources. Hydel, Nuclear, Thermal, Solar &amp; wind power generation. Introduction to Green H<sub>2</sub></p> <p><b>Transmission &amp; Distribution:</b> Power transmission and Distribution system using single line diagram approach, types and representation (short, medium-T &amp; Pi networks and long transmission lines) of transmission lines, types and components of distribution systems.</p> <p><b>DC Circuits:</b> Active and passive elements, Ohm's Law. KCL &amp; KVL, series, parallel, series-parallel circuits. Time domain analysis of first order R-L and R-C circuits. Numerical examples</p>	8
<b>Pedagogy</b>	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning	
2	<p><b>A.C Circuits:</b></p> <p><b>Single phase:</b> 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.</p> <p><b>Three Phase:</b> 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.</p>	8
<b>Pedagogy</b>	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning	
3	<p><b>AC Machines:</b></p> <p><b>Transformers:</b> 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.</p> <p><b>Induction Motor:</b> 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</p>	8
<b>Pedagogy</b>	1. Chalk and talk 2. Animated/NPTEL videos 3. Problem Based Learning 4. Experiential Learning 5. Cut sections 6. Demonstration	



C02	3	--	--	--	--	--	--	--	--	--	--	--	--	--
C03	--	3	--	--	--	--	--	--	--	--	--	--	--	--
C04	--	--	3	3	3	--	--	--	2	2	--	--	2	2

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

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
<b>Total CIE Theory + Practical</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	(50+50+50) / 3	<b>25</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	<b>25</b>	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
	<b>Total CIE Theory</b>					<b>50</b>	20	Scale down Marks of IAT and CCA to 50
<b>SEE</b>		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
<b>CIE + SEE</b>				100	----	----	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				

#### 4 Credit Course - IPCC

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

##### **Assessment Details (both CIE and SEE)**

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

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

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

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

##### **Possible continuous and comprehensive assessment:**

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

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

##### **Continuous Internal Evaluation (CIE):**

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

##### **CIE for the theory component of the IPCC**

###### **Internal Assessment test:**

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

Three Tests each of **50 Marks**

- First test after 6<sup>th</sup> week of the semester (syllabus completion of 35 - 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 - 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

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

##### **CIE for the practical component of the IPCC**

- On completion of every experiment/program in the laboratory, the students shall be evaluated

and Marks shall be awarded on the same day. The **15 Marks** are for conducting the experiment and preparation of the laboratory record, the other **10 Marks shall be for the test** conducted at the end of the semester.

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

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

**Semester End Examination (SEE):**

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

**3 Credit Course - Theory**

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

**Assessment Details (both CIE and SEE)**

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

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

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

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

**Possible continuous and comprehensive assessment:**

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

The faculty may adopt any other CCA method of implementation and its assessment with prior approval

of Program Assessment Committee (PAC).

**Continuous Internal Evaluation (CIE):**

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

**Internal Assessment test:**

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

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

- First test after 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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	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	--	--	--	--	--	--	--
<b>Total</b>	<b>24</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>50</b>	<b>150</b>	<b>100%</b>

### 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	--	--	--	--	--	--	--
<b>Total</b>	<b>8</b>	<b>24</b>	<b>36</b>	<b>22</b>	<b>10</b>	<b>100</b>	<b>100%</b>

## Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	<b>Module-1:</b> 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	<b>Module-2:</b> 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	<b>Module-3:</b> 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	<b>Module-4:</b> 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

<b>5</b>	<b>Module-5:</b> Components of LT switch gear-switch fuse unit, MCB	<b>1</b>
<b>5</b>	ELCB, RCCB	<b>1</b>
<b>5</b>	Types of wiring, types and ratings of Cables	<b>1</b>
<b>5</b>	Two way and three-way control of load ,Electric Shock	<b>1</b>
<b>5</b>	Earthing and its types	<b>1</b>
<b>5</b>	Safety Precautions to avoid shock	<b>1</b>
<b>5</b>	Demonstration of Energy meter and Smart meter	<b>1</b>
<b>5</b>	Elementary calculation of energy consumption and power factor improvement	<b>1</b>
<b>Total</b>		<b>40 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

### 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**

<b>Module No.</b>	<b>Contents of the Module</b>	<b>Hours</b>
<b>1</b>	<b>Introduction to Engineering Exploration, Workplace Readiness Skills</b> 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.	<b>02</b>
<b>Pedagogy</b>	Understand the course objective and explore the project ideas through brainstorming.	
<b>2</b>	<b>Problem Identification, Specification Development</b> - Clear and measurable requirements, identifying relevant benchmarks, identifying the gap between the available and required products, requirements documentation.	<b>02</b>
<b>Pedagogy</b>	Demonstrate existing projects – video/website/hands-on <b>[Demonstration Phase]</b>	
<b>3</b>	<b>Platform Based Development-</b> 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.	<b>04</b>
<b>Pedagogy</b>	Handson Session - Tinkercad, Wireshark tool, CryptTool, Kali Linux-fundamental commands, HTML, CSS commands,3D Printing Simulator Model, Altair software, Arduino IDE <b>[Exploration Phase]</b>	
<b>4</b>	Design and Develop Solution, Testing. Prototype—Start to Create Your Solution	<b>20</b>
<b>Pedagogy</b>	Experiential Project Based Learning <b>[Open Ended Phase]</b>	
<b>5</b>	Report Writing, Project Demonstration and Presentation	<b>02</b>
<b>Pedagogy</b>	Demonstration and Presentation	

## List of Experiments or Programs

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

Sl. No	Open Ended Phase
1	<b>Project Stream 1:</b> Electronics, Robotics, IOT and Sensors
2	<b>Project Stream 2:</b> Computer Science and IT Applications
3	<b>Project Stream 3:</b> Mechanical and Electrical tools
4	<b>Project Stream 4:</b> 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	<a href="https://www.electronicsforu.com/mini-projects-ideas?utm_source=google&amp;utm_medium=cpc&amp;utm_campaign=Ele.com+-+traffic+Dynamic+Search+-22-12-2021&amp;gclid=EAlaIQobChMIsf3N4bD3_wlVHAyDAX1a5wkrEAAYASAAEgJNe_D_BwE">https://www.electronicsforu.com/mini-projects-ideas?utm_source=google&amp;utm_medium=cpc&amp;utm_campaign=Ele.com+-+traffic+Dynamic+Search+-22-12-2021&amp;gclid=EAlaIQobChMIsf3N4bD3_wlVHAyDAX1a5wkrEAAYASAAEgJNe_D_BwE</a>
2	<a href="https://www.mooc-list.com/tags/design-thinking?__cf_chl_tk=OiyDIM1QC0P7pJVSWWWpKKITaJH2pBsQoyI9laeWj.U-1688552822-0-gaNycGzNC5A">https://www.mooc-list.com/tags/design-thinking?__cf_chl_tk=OiyDIM1QC0P7pJVSWWWpKKITaJH2pBsQoyI9laeWj.U-1688552822-0-gaNycGzNC5A</a>
3	<a href="https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-problem-statement">https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-problem-statement</a>
4	<a href="https://www.3dsourced.com/rigid-ink/best-3d-printing-books/#3D%20Printing%20Courses">https://www.3dsourced.com/rigid-ink/best-3d-printing-books/#3D%20Printing%20Courses</a>
5	<a href="https://youtu.be/nE1C4ghfvac">https://youtu.be/nE1C4ghfvac</a>
6	<a href="https://youtu.be/ebO38bbq0_4">https://youtu.be/ebO38bbq0_4</a>
7	<a href="https://youtu.be/qUEbxTkPIWI">https://youtu.be/qUEbxTkPIWI</a>
8	<a href="https://youtu.be/5zAQot4pKgU">https://youtu.be/5zAQot4pKgU</a>
9	<a href="https://youtu.be/QQZ6EGf0Ju8">https://youtu.be/QQZ6EGf0Ju8</a>
10	<a href="https://youtu.be/UgtjRob5qMg">https://youtu.be/UgtjRob5qMg</a>

**Assessment Pattern (both CIE and SEE)**

**Engineering Exploration Course**

**1 Credit Courses – Project**

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
<b>Total CIE Project</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Project Based Learning</b>	Review – 1	Module - 1 & 2	50	$(50+50+50) / 3$	<b>25</b>	<b>10</b>	Average of Three reviews each of 50 Marks scale down the marks to 25 Marks
		Review – 2	Module - 3 & 4	50				
		Review – 3	Module - 5	50				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>25</b>	<b>10</b>	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
	<b>Total CIE Project</b>					<b>50</b>	<b>20</b>	Scale down Marks of IAT and CCA to 25
<b>SEE</b>		Project Based Evaluation	Entire syllabus	50	-	<b>50</b>	<b>18</b>	Writeup (10) Conduction and Results (30) Viva Voce (10), Duration 03 hours
<b>CIE + SEE</b>				<b>100</b>	-	-	<b>40</b>	

**Assessment Details (both CIE and SEE)**

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

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

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

**Continuous Internal Evaluation (CIE):**

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

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

The phases of evaluating the project:

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

**Rubrics for Review 1:**

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

**Rubrics for Review 2:**

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

**Rubrics for Review 3:**

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

**Continuous and Comprehensive Assessment (CCA):**

CCA1 and CCA2 are evaluated for 50 marks each.

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

**Semester End Examination (SEE):**

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

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

**CIE- Continuous Internal Evaluation (50 Marks)**

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

**CIE Course Assessment Plan**

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

**SEE- Semester End Examination (50 Marks)**

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

Analyse	30%
Evaluate	10%
Create	-

### SEE Course Plan

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

### Course Contents and Lecture Schedule

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





# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught

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

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



DSATM

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

**COURSE SYLLABUS**

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

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

#### List of Experiments or Programs

Sl.No	Experiments/Programs	COs
	NIL	

#### Reference Books

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

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

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

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

**Mapping of Course Outcomes to Program Outcomes:**

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

**Weblinks and Video Lectures (e-Resources)**

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

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
<b>Total CIE Theory + Practical</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>25</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>25</b>	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				
<b>Total CIE Theory</b>						<b>50</b>	20	Scale down Marks of IAT and CCA to 50

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	---	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				

**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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **10 Marks**.
- Open Ended Experiments are conducted after the completion of regular Experiments/Programs for 20 Marks and scaled down to **5 Marks**
- Scaled-down Marks of write-up, evaluations and tests, will be added as CIE Marks for the laboratory component of IC/IPCC for **25 Marks**.
- The minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of maximum Marks) in the theory component and 10 (40% of maximum Marks) in the practical component.
- The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total Marks of all questions should not be more than 25 Marks.

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

**Semester End Examination (SEE):**

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



### CIE- Continuous Internal Evaluation (50 Marks)

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

### CIE Course Assessment Plan

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

### 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	--	--	--	--	--	--	--
<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>50</b>	<b>100%</b>

## Course Contents and Lecture Schedule

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

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



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught

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

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



DSATM

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

**COURSE SYLLABUS**

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

<b>5</b>	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.	<b>03</b>
<b>Pedagogy</b>	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)

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

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

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

**Mapping of Course Outcomes to Program Outcomes:**

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

**Weblinks and Video Lectures (e-Resources)**

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

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	
<b>Total CIE Theory</b>				<b>50</b>	----	----	<b>20</b>		
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	<b>25</b>	10	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks	
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50					
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50					
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>25</b>	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					
	<b>Total CIE Theory</b>						<b>50</b>	<b>20</b>	Scale down Marks of IAT and CCA to 50



<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week
- CCA2 to be conducted after 9<sup>th</sup> 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	-	-	-	-	-	-	-
<b>Total</b>	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%
<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>50</b>	<b>100%</b>

## Course Contents and Lecture Schedule

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



## Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught

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

### Teaching-Learning Process

#### Pedagogy (General Instructions):

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

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



DSATM

**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**

<b>Module No.</b>	<b>Contents of the Module</b>	<b>Hours</b>
<b>1</b>	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	<b>3</b>
<b>Pedagogy</b>	Lecture: Introduction to design thinking process. Presentation and Videos.	
<b>2</b>	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	<b>3</b>
<b>Pedagogy</b>	Ideate the problem and analysis through Journey mapping, customer mapping	
<b>3</b>	<b>Analyze Phase: 5-Whys and 1How</b> 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	<b>3</b>
<b>Pedagogy</b>	Group Activity: Conducting a collaborative activity “5Whys Analysis” on the Identified problem. Brainstorming potential solution using “1How” approach.	
<b>4</b>	<b>Project Management Fundamentals and Prototyping</b> 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.	<b>3</b>
<b>Pedagogy</b>	Design a solution combining insights from “5Whys and 1How” technique and project Canva for the identified problem.	
<b>5</b>	<b>Finding Solution Through IDEATION</b> Apply ideation, critical thinking and problem-solving skills, to real-world problems and overcome barriers and find innovative solutions.	<b>3</b>
<b>Pedagogy</b>	Presentation by Team	

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

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

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

**Mapping of Course Outcomes to Program Outcomes:**

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

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



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
<b>Total CIE Theory</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	(50+50+50) / 3	<b>25</b>	10	Average of Three Internal test each of 50 Marks scale down the marks to 25 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (MCQ)	Module - 5	50				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	(50+50) / 2	<b>25</b>	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				

	<b>Total CIE Theory</b>				<b>50</b>	20	Scale down Marks of IAT and CCA to 25	
<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week
- CCA2 to be conducted after 9<sup>th</sup> 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
<b>Total</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>30</b>	<b>50</b>	<b>150</b>	<b>100</b>

### 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
<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>50</b>	<b>100</b>

## 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	<b>Analyze Phase: 5-Whys and 1How</b> 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	<b>Project Management Fundamentals and Prototyping</b> 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	<b>Finding Solution Through IDEATION</b> Apply ideation, critical thinking and problem-solving skills, to real-world problems and overcome barriers and find innovative solutions.	3
<b>Total</b>		<b>15 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	1 <sup>st</sup> / 2 <sup>nd</sup>		
Course Title	:	Introduction to Electronics Engineering		
Course Code	:	23CECE15 / 23CECE25		
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	<b>Learn</b> the fundamentals of integrated circuits, communication systems and advanced technologies
2	Familiarise in <b>applying</b> the concepts of electronic circuits and devices for the given application
3	Provide the knowledge in <b>examining</b> various electronic circuits
4	Impart <b>design</b> skills of circuits for real time applications
5	<b>Equip</b> 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.



**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	<p><b>Digital Electronics:</b> 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.</p> <p><b>Combinational Logic:</b> Introduction, Adders: Half adder and Full adders. <b>Text-1</b></p>	8
<b>Pedagogy</b>	Mobile Studio	
2	<p><b>Operational Amplifiers:</b> Introduction, Block diagram of OPAMP, OPAMP parameters, Ideal and Practical Characteristics of OPAMP.</p> <p><b>OPAMP applications:</b> Inverting and Non-Inverting Amplifiers, Voltage Follower, Summer, Differentiator, Integrator <b>Text-2</b></p>	8
<b>Pedagogy</b>	Think Pair Share	
3	<p><b>Embedded Systems</b> – 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. <b>Text – 3</b></p> <p>Sensors, types and its Applications <b>Text – 5</b></p>	8
<b>Pedagogy</b>	Case Studies	
4	<p><b>Analog Communication</b> – 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.</p> <p><b>Digital Communication:</b> Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission, Multiple Access Techniques. <b>Text - 4</b></p>	8
<b>Pedagogy</b>	Demonstration	
5	<p><b>Cellular wireless networks:</b> Cellular Telephone system, Cellular concepts, Network topology, wireless LAN, Bluetooth. <b>Text - 4</b></p> <p><b>Fundamentals of VLSI:</b> Evolution of Microelectronics, Basics structures NMOS, PMOS and CMOS, Moore’s Law, Depletion Mode and Enhancement mode Transistors, VLSI Design flow. <b>Text - 5</b></p>	8
<b>Pedagogy</b>	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, 4 <sup>th</sup> 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	<b>Understand</b> the concepts of integrated circuits, communication systems and advanced technologies.	L2	Understand
CO2	<b>Apply</b> the fundamentals of integrated circuits to provide solution for analog and digital circuits.	L3	Apply
CO3	<b>Analyse</b> the operation of electronic circuits for a given problem scenario.	L4	Analyse
CO4	<b>Design</b> Linear Integrated and logic circuits for real time applications.	L3	Apply
CO5	<b>Examine</b> the performance of various electronic circuits using modern tools.	L4	Analyse

**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	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3		2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	3	2	-	-	-	-	2	2	-	-	2	-	-
CO5	-	-	-	-	2	-	-	-	2	2	-	2	2	-	-

**Weblinks and Video Lectures (e-Resources)**

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



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
<b>Total CIE Theory</b>				<b>50</b>			<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>25</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>25</b>	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				
<b>Total CIE Theory</b>						<b>50</b>	<b>20</b>	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	

#### 4 Credit Course – IPCC

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

#### **Assessment Details (both CIE and SEE)**

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

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

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

#### **Possible continuous and comprehensive assessment:**

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

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

#### **Continuous Internal Evaluation (CIE):**

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

#### **CIE for the theory component of the IPCC**

##### **Internal Assessment test:**

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

##### **Three Tests each of 50 Marks**

- First test after 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

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

#### **CIE for the practical component of the IPCC**

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

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

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

**Semester End Examination (SEE):**

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

**3 Credit Course – Theory**

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

**Assessment Details (both CIE and SEE)**

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

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

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

**Possible continuous and comprehensive assessment:**

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

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

**Continuous Internal Evaluation (CIE):**

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

**Internal Assessment test:**

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

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

- First test after 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> week. The evaluation includes either through quiz or rubrics

	<ul style="list-style-type: none"> <li>• CCA as project-based learning, <ul style="list-style-type: none"> <li>○ CCA is evaluated for <b>50 Marks</b> with review 1 of <b>20 Marks</b> after and review 2 of <b>30 Marks</b> includes project demonstration/competition and report submission.</li> <li>○ The evaluation of review 1 after 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> week of semester with project demonstration and submission of the report</li> </ul> </li> </ul> <p>Total score for CCA is <b>25 Marks</b> Total Marks scored for theory component of CIE (IAT + CCA) is <b>50 Marks</b></p> <p><b>Semester End Examination (SEE):</b></p> <ul style="list-style-type: none"> <li>• Theory SEE will be conducted as per the scheduled timetable, with common question papers for the subject</li> <li>• The question paper shall be set for 100 Marks. The medium of the question paper shall be English. <b>The duration of SEE is 03 hours.</b></li> <li>• 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. <b>Marks scored out of 100 shall proportionally be reduced to 50 Marks.</b></li> </ul> <p>There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), <b>should have a mix of topics</b> 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</p>
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### 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	--	--	--	--	--	--	--
<b>Total</b>	<b>28</b>	<b>22</b>	<b>26</b>	<b>24</b>	<b>50</b>	<b>150</b>	<b>100</b>

## 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	--	--	--	--	--	--	--
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>100</b>	<b>100%</b>

## Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	<b>Digital Electronics:</b> 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
	<b>Combinational Logic:</b> Introduction, Adders: Half adder and	1
	Full adders	1
2	<b>Operational Amplifiers:</b> Introduction, Block diagram representation of OPAMP, .	1
	OPAMP parameters,	1
	Ideal Characteristics of OPAMP.	1
	Practical Characteristics of OPAMP.	1
	<b>OPAMP applications:</b> Inverting and Non-Inverting amplifiers,	1
	Voltage Follower, summer,	1
	Differentiator,	1

	Integrator	1
3	<b>Embedded Systems</b> – 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
	<b>Introduction to sensors</b>	1
	Sensor types	1
	Sensor types Contd	1
	Applications of Sensors	1
4	<b>Analog Communication</b> – 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
	<b>Digital Communication</b> : Advantages of digital communication over analog communication,	1
	ASK, FSK, PSK,	1
	Radio signal transmission,	1
	Multiple Access Techniques.	1
5	<b>Cellular wireless networks:</b> Cellular Telephone system,	1
	Cellular concepts, Network topology,	1
	wireless LAN,	1
	Bluetooth.	1
	<b>Fundamentals of VLSI:</b> 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
<b>Total</b>		<b>40 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

<b>Semester</b>	:	<b>2<sup>nd</sup></b>	
<b>Course Title</b>	:	<b>Introduction to Internet of Things (IOT)</b>	
<b>Course Code</b>	:	<b>23ETCS23</b>	
<b>Course Type (Theory/ Practical/ Integrated)</b>	:	<b>Theory</b>	
<b>Course Category</b>	:	<b>ETC</b>	
<b>Stream</b>	:	<b>CSE Stream</b>	<b>CIE</b> : <b>50 Marks</b>
<b>Teaching hours/week (L: T:P:S)</b>	:	<b>2:0:0:2</b>	<b>SEE</b> : <b>50 Marks</b>
<b>Total Hours</b>	:	<b>40 Hrs</b>	<b>SEE Duration</b> : <b>3 Hours</b>
<b>Credits</b>	:	<b>3</b>	

**Course Learning Objectives:** Students will be taught

Sl.No	Course Objectives
1	<ul style="list-style-type: none"> <li>• Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Understand the recent application domains of IoT in everyday life.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Gain insights about the current trends of Associated IOT technologies and IOT Analytics'.</li> </ul>
4	<ul style="list-style-type: none"> <li>• To come out with real time projects addressing the socio economic problems prevailing in the society</li> </ul>

### Teaching-Learning Process

#### Pedagogy (General Instructions):

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

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





DSATM

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

**COURSE SYLLABUS**

Module No.	Contents of the Module	Hours
1	<b>Basics of Networking:</b> Introduction, Network Types, Layered network models, Addressing, TCP/IP Transport layer, Internetworking, ipv4, ipv6, Transition from ipv4 to ipv6. <b>Emergence of IoT:</b> Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components Textbook 1: Chapter 1- 1.1 to 1.5, Chapter 4 – 4.1 to 4.4 . Text Book 2:Chapter 20 – 20.1 to 20.4	8 hrs
<b>Pedagogy</b>	<b>ICT Based Learnings, Project</b>	
2	<b>IoT Sensing and Actuation:</b> Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics. Textbook 1: Chapter 5 – 5.1 to 5.9	8 hrs
<b>Pedagogy</b>	<b>ICT Based Learnings ,Project</b>	
3	IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading. Textbook 1: Chapter 6 – 6.1 to 6.5	8 hrs
<b>Pedagogy</b>	<b>ICT Based Learnings ,Project</b>	
4	ASSOCIATED IOT TECHNOLOGIES Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.  IOT CASE STUDIES Agricultural IoT – Introduction and Case Studies  Textbook 1: Chapter 10– 10.1 to 10.6; Chapter 12- 12.1-12.2	8 hrs
<b>Pedagogy</b>	<b>Project, Collaborative Learning</b>	
5	IOT CASE STUDIES AND FUTURE TRENDS Vehicular IoT – Introduction Healthcare IoT – Introduction, Case Studies IoT Analytics – Introduction Introduction to Arduino, Arduino UNO Programming.	

	Textbook 1: Chapter 13– 13.1; Chapter 14- 14.1-14.2; Chapter 17- 17.1 ;Text Book 4 : Chapter 7 – 7.1 to 7.4	<b>8 hrs</b>
<b>Pedagogy</b>	<b>Project, Collaborative Learning</b>	

**List of Experiments or Programs using Arduino/Raspberry Pi**

Sl.No	Experiments/Programs	Cos
1	<b>Networking Projects to understand Internet Connectivity to IoT</b>	<b>CO4</b>
2	<b>Basic Working of Sensors using Hardware and Software</b>	<b>CO4</b>
3	<b>Reading Temperature and Relative Humidity value from Sensor</b>	<b>CO4</b>
4	<b>Understanding of IPV4 and IPV6 Protocol Study</b>	<b>CO4</b>
5	<b>Sensor Networks: Wireless Sensor Networks, Sensor Nodes</b>	<b>CO4</b>
6	<b>Understanding IoT Working by using Tinkercad Simulation Software</b>	<b>CO5</b>
7	<b>Implementation of different modules using Tinkercad</b>	<b>CO5</b>
8	<b>Implementation of IoT with Raspberry Pi</b>	<b>CO5</b>
9	<b>Health Monitoring System</b>	<b>CO5</b>
10	<b>Smart Agriculture System</b>	<b>CO5</b>

**Reference Books**

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

1	Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", Cambridge University Press 2021. Reference:
2	Behrouz A. Forouzan, "Data Communications and Networking", McGraw-Hill, Fourth edition, 2007, Page no: 579 to 587 , 596 to 605.
3	S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.
4	Srinivasa K G, " Internet of Things", CENGAGE learning India, 2017.
5	Sudip Misra, "IOT PPT", Lecture 22 - "Introduction to Arduino". Reference: <a href="http://www.infocobuild.com/education/audio-video-courses/computer-science/introduction-to-iiit-kharagpur.html">http://www.infocobuild.com/education/audio-video-courses/computer-science/introduction-to-iiit-kharagpur.html</a>
6	Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
7	Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

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

CO	Course Outcomes	RBT Level	Level Indicator
C01	Describe the evolution of IoT, IoT networking components, Internet Protocols and addressing strategies in IoT.	Remember	L1
C02	Classify various sensing devices and actuator types.	Understand	L2
C03	Demonstrate the processing in IoT.	Apply	L3
C04	Analysing different Associated IOT Technologies	Analyze	L4
C05	Develop the IOT applications using Arduino/ Raspberry Pi	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
C01	--	--	--	--	--	--	--	--	--	--	--	--	2	1
C02	3	--	--	--	--	--	--	--	--	--	--	--	--	--
C03	3	--	--	--	--	--	--	--	--	--	--	--	--	--
C04	--	3	--	--	3	1	1	1	3	2	--	3	2	2
C05	--	--	--	--	3	1	1	1	3	2	--	3	2	2

**Weblinks and Video Lectures (e-Resources)**

1	<a href="https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/">https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/</a>
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Assessment Pattern (both CIE and SEE)

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

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

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

CIE	Project/ 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					
		<b>Total CIE Practical</b>						25	10

<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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					Project/Practical
	Continuous Assessment Tests			Continuous Comprehensive Assessment (CCA)		Project /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	18	18	18	10	10	05
Understand	16	16	16	10	10	05
Apply	16	16	16	10	10	10
Analyse				4	4	10
Evaluate						10
Create				16	16	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	4	3	3			10	20%
CO2	6	6	3			15	30%
CO3			4	4	4	12	24%
CO4				4	3	07	14%
CO5				3	3	06	12%
<b>Total</b>	<b>10</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>50</b>	<b>100%</b>

### SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	12
Understand	13
Apply	15
Analyse	5
Evaluate	--
Create	5

## SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	3	2	3	2	2	12	24%
CO2	3	3	3	2	2	13	26%
CO3	--	--	5	5	5	15	30%
CO4	--	--	1	2	2	5	10%
CO5	--	--	--	2	3	5	10%
<b>Total</b>	<b>6</b>	<b>5</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>50</b>	<b>100%</b>

## Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	<b>Basics of Networking:</b> Introduction	1
2	Network Types	1
3	Layered network models	1
4	Addressing, TCP/IP Transport layer	1
5	Internetworking, ipv4, ipv6 Transition from ipv4 to ipv6	1
6	<b>Emergence of IoT:</b> Introduction ,Evolution of IoT	1
7	Enabling IoT	1
8	Complex Interdependence of Technologies	1
9	IoT Networking Components	1
10	Project	2
11	<b>IoT Sensing and Actuation:</b> Introduction, Sensors	1
12	Sensor Characteristics	1
13	Sensorial Deviations, Sensing Types	1
14	Sensing Considerations, Actuators	1
15	Actuator Types, Actuator Characteristics.	1
16	Data Format	1
17	Importance of Processing in IoT	1
18	Processing Topologies	1
19	IOT Device Design and Selection Considerations	1
20	Processing Offloading.	1
21	Project	2
22	ASSOCIATED IOT TECHNOLOGIES	1
23	Cloud Computing: Introduction	1
24	Virtualization, Cloud Models	1
25	Service-Level Agreement in Cloud Computing	1
26	Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.	1
27	IOT CASE STUDIES ,Agricultural IoT – Introduction and Case Studies	1

<b>28</b>	Project	<b>3</b>
<b>29</b>	IOT CASE STUDIES AND FUTURE TRENDS	<b>1</b>
<b>30</b>	Vehicular IoT – Introduction	<b>1</b>
<b>31</b>	Healthcare IoT – Introduction	<b>1</b>
<b>32</b>	Case Studies IoT Analytics – Introduction to Arduino	<b>1</b>
<b>33</b>	Arduino UNO Programming	<b>1</b>
<b>34</b>	Project	<b>3</b>
<b>Total</b>		<b>40 Hrs</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be able to:

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

### Teaching-Learning Process

#### Pedagogy:

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

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



DSATM

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

COURSE CURRICULUM

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

**Pedagogical Initiatives (Not limited to):**

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

## List of Programs

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

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

Sl. No.	List of Programs	COs
1.	a. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages. b. Develop a Python program to check whether a given number is palindrome or not and also count the number of occurrences of each digit in the input number	CO1
2.	a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console. b. Write a function to calculate factorial of a number with and without recursion.	CO2
3.	a. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages using functions. b. Develop a python program to convert binary to decimal, octal to hexadecimal using functions.	CO2
4.	Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable messages.	CO2
5.	a. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items] b. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and file methods open(), read lines(), and write()].	CO3
6.	a. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods. b. Write a function named DivExp which takes TWO parameters a, b and returns a value c ( $c=a/b$ ). Write suitable assertion for $a>0$ in function DivExp and raise an exception for when $b=0$ . Develop a suitable program which reads two values from the console and calls a function DivExp.	CO3
7.	a. Develop a Python program to demonstrate find all function and character class using regex module. b. Develop a python program that could search the text in a file for phone numbers (+919900889977) and email addresses ( <a href="mailto:sample@gmail.com">sample@gmail.com</a> ).	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
	<b>Open Ended Questions:</b> <ol style="list-style-type: none"> <li>1. Design a web page using Flask in python.</li> <li>2. Demonstrate Web scraping using suitable example.</li> <li>3. Demonstrate API Integration.</li> <li>4. Demonstrate about Data Visualization.</li> <li>5. Demonstrate GUI Applications.</li> <li>6. Demonstrate E-mail Automation.</li> </ol>	

### 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, 1<sup>st</sup> 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, 2<sup>nd</sup> Edition, 2021

**Reference Books**

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

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

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

**Weblinks and Video Lectures (e-Resources)**

- 1 The Joy of Computing using Python: [https://onlinecourses.nptel.ac.in/noc23\\_cs20/preview](https://onlinecourses.nptel.ac.in/noc23_cs20/preview)
- 2 Python for Data Science: [https://onlinecourses.nptel.ac.in/noc22\\_cs32/preview](https://onlinecourses.nptel.ac.in/noc22_cs32/preview)
- 3 Infyspringboard-Scipy: [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_01282535449306726468422\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01282535449306726468422_shared/overview)
- 4 Python for everybody: Course era
- 5 Udemy: <https://www.udemy.com/course/python-pandas/> -

Assessment Pattern (both CIE and SEE)

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

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

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average / Total	Reduced Marks	Minimum Passing Marks	Evaluation Details
<b>Total CIE Theory + Practical</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	(50+50+50) / 3	<b>15</b>	<b>6</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Project Review – 1	Considering all the Modules	20	50	<b>10</b>	<b>4</b>	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				
<b>Total CIE Theory</b>						<b>25</b>	<b>10</b>	Scale down Marks of IAT and CCA to 25

<b>CIE</b>	<b>Practical</b>	Conduction of Experiments	Continuous Evaluation of each experiment			Average of all Experiments	<b>10</b>	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	----	<b>10</b>	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	----	<b>5</b>	2	One experiment for 20 marks.  20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		<b>Total CIE Practical</b>						<b>25</b>	10

<b>SEE</b>		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	<b>50</b>	18	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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%
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>50</b>	<b>150</b>	<b>100%</b>

### 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%
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>100</b>	<b>100%</b>





## Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be able to:

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

### Teaching-Learning Process

#### Pedagogical Initiatives:

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

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



DSATM

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

**COURSE CURRICULUM**

Module No.	Topics	Hours
1	<b>Introduction to C:</b> 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	<b>Operators and expressions in C:</b> 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. <b>Decision control and Looping statements:</b> Introduction to decision control, Conditional branching statements, Iterative statements, Nested loops, break and continue statements, goto statement.	5
3	<b>Functions:</b> Basics of functions, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive and non-recursive functions. <b>Arrays:</b> 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	<b>Strings:</b> Introduction, String taxonomy, operations on strings, miscellaneous string and character functions, arrays of strings: <b>Pointers:</b> 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. <b>Structure and Union:</b> Introduction, Structures and functions, Unions, Unions inside structures, Self-referential structures.	6
5	<b>Searching algorithm:</b> Linear search, Binary search. <b>Sorting algorithm:</b> Selection sort, Insertion sort, Bubble sort. <b>File Handling:</b> Introduction, Using files, Read and Write Operations on files	6

**Pedagogical Initiatives (Not limited to):**

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

**List of Programs:**

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

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

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

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

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

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

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

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

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

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

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

#### **Text Books**

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

#### **Reference Books**

1	C: How to program, H. M. Deitel, P. J. Deitel, Pearson Education, 7 <sup>th</sup> Edition, ISBN-13. 978-9332555310, 2010.
2	Programming in ANSI C, E. Balaguruswamy, Tata McGraw-Hill, 7 <sup>th</sup> 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	<b>Understand</b> the basics of programming in C	U	L2
CO2	<b>Apply</b> the knowledge of Functions, Strings using C Programming	A	L3
CO3	<b>Analyse</b> the user-defined data structures such as Arrays, Pointers and Structures in implementing solutions to problems.	An	L4
CO4	<b>Implement</b> different searching, sorting techniques, and file handling operations.	C	L5
CO5	<b>Develop</b> solutions to problems using structured programming approach	C	L5

#### Weblinks and Video Lectures (e-Resources)

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

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

**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
<b>Total CIE Theory + Practical</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) - I	Module - 1 & 2	50	$(50+50+50) / 3$	<b>15</b>	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				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>10</b>	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				
	<b>Total CIE Theory</b>						<b>25</b>	10

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



<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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)
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>50</b>	<b>150</b>	<b>100%</b>

### 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%
<b>Total</b>	<b>20</b>	<b>23</b>	<b>22</b>	<b>13</b>	<b>22</b>	<b>100</b>	<b>100%</b>



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

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

**Course Learning Objectives:** Students will be taught.

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

## Teaching-Learning Process

### Pedagogy (General Instructions):

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

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



DSATM

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

**COURSE SYLLABUS**

<b>Module No.</b>	<b>Contents of the Module</b>	<b>Hours</b>
<b>1</b>	<b>Identifying Common Errors in Writing and Speaking English:</b> 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.	<b>03</b>
<b>Pedagogy</b>	(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	
<b>2</b>	<b>Nature and Style of sensible writing:</b> 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.	<b>03</b>
<b>Pedagogy</b>	(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	
<b>3</b>	<b>Technical Reading and Writing Practices:</b> Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises.	<b>03</b>
<b>Pedagogy</b>	(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	<b>Professional Communication for Employment:</b> 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
<b>Pedagogy</b>	(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	<b>Professional Communication at Workplace:</b> 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
<b>Pedagogy</b>	(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	

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



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

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

**Mapping of Course Outcomes to Program Outcomes:**

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

**Weblinks and Video Lectures (e-Resources)**

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

**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
<b>Total CIE Theory</b>				<b>50</b>	----	----	<b>20</b>	
<b>CIE</b>	<b>Theory</b>	Internal Assessment Test (IAT) – I (MCQ)	Module - 1 & 2	50	$(50+50+50) / 3$	<b>15</b>	6	Average of Three Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) – II (MCQ)	Module - 3 & 4	50				
		Internal Assessment Test (IAT) – III (QUIZ)	Module - 5	50				
	<b>Continuous Comprehensive Assessment (CCA)</b>	CCA-1- Pedagogical Initiatives	Considering all the Modules	50	$(50+50) / 2$	<b>10</b>	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				
<b>Total CIE Theory</b>						<b>25</b>	10	Scale down Marks of IAT and CCA to 25

<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week
- CCA2 to be conducted after 9<sup>th</sup> 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%
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>50</b>		<b>100%</b>

### 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%
<b>Total</b>	<b>13</b>	<b>10</b>	<b>09</b>	<b>10</b>	<b>8</b>	<b>50</b>	<b>100%</b>

## 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
	<b>Revision</b>	
<b>Total</b>		<b>15 Hrs</b>



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

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

**Course Learning Objectives:** Students will be taught

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

**Teaching-Learning Process**

**Pedagogy (General Instructions):**

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

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



DSATM

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

**COURSE SYLLABUS**

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



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

Reference Books

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

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

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

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

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)

1	<a href="https://youtu.be/S4w3FLZxY_A">https://youtu.be/S4w3FLZxY_A</a>
2	<a href="https://youtu.be/XEMiYE3E3i8">https://youtu.be/XEMiYE3E3i8</a>
3	<a href="https://youtu.be/RboxwA8KerM">https://youtu.be/RboxwA8KerM</a>
4	<a href="https://youtu.be/3eE8XTePzTI">https://youtu.be/3eE8XTePzTI</a>
5	<a href="https://youtu.be/YzS26-ezxO8">https://youtu.be/YzS26-ezxO8</a>

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**1 Credit Courses – Theory**

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

	<b>Total CIE Theory</b>				<b>25</b>	10	Scale down Marks of IAT and CCA to 25	
<b>SEE</b>		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
<b>CIE + SEE</b>				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 6<sup>th</sup> week of the semester (syllabus completion of 35 – 40%)
- Second test after 10<sup>th</sup> week of semester (syllabus completion of 65 – 70%)
- Third test after 14<sup>th</sup> 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 4<sup>th</sup> week
- CCA2 to be conducted after 9<sup>th</sup> 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%
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>-</b>	<b>100%</b>

**SEE- Semester End Examination (50 Marks)**

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

SEE Course Plan

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

Course Contents and Lecture Schedule

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



# Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	2 <sup>nd</sup>		
Course Title	:	Engineering Mathematics – II for ECE & EEE Stream		
Course Code	:	BMATE201		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Course Category	:	ASC		
Stream	:	ECE & EEE	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 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	<b>Numerical methods</b> 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	<b>Chalk and board, group discussion, ppt, videos</b>	
2	<b>Integral Calculus</b> 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	<b>Chalk and board, group discussion, ppt, videos</b>	
3	<b>Vector Calculus</b> Vector differentiation: Scalar and vector fields, gradient, directional derivative, curl and divergence-physical interpretation, solenoidal and irrotational vector fields. Vector integration: Line integrals, surface and volume integral, theorems of Green, Gauss and Stokes, applications to work done by a force and flux.	10
Pedagogy	<b>Chalk and board, group discussion, ppt, videos</b>	
4	<b>Laplace transform:</b> 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	<b>Chalk and board, group discussion, ppt, videos</b>	

5	<b>Inverse Laplace transform:</b> Inverse Laplace transform, convolution theorem and problems. applications –solution of Linear differential equations using Laplace transform.	10
<b>Pedagogy</b>	<b>Chalk and board, group discussion, ppt, videos</b>	

#### 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 Kreyszig, Wiley Publications, 10 <sup>th</sup> Edition, 2015
2	Numerical Methods, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age Publications, 6 <sup>th</sup> Edition, 2012
3	Theory and problems of Differential and integral calculus, Frank Ayres and Elliott Mendelson, Schaum's outline series, McGraw Hill publications, 3 <sup>rd</sup> Edition, 1990
4	Higher Engineering Mathematics, B. S. Grewal, Khanna Publications, 44 <sup>th</sup> 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, 3 <sup>rd</sup> Edition
3	Higher Engineering Mathematics, B.V. Ramana, McGraw-Hill Education, 11 <sup>th</sup> Edition, 2017
4	Engineering Mathematics, Srimanta Pal & Subodh C. Bhunia, Oxford University Press, 3 <sup>rd</sup> Edition, 2016.
5	A Textbook of Engineering Mathematics, N.P Bali and Manish Goyal, Laxmi Publications, 10 <sup>th</sup> 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	<b>Understand</b>	<b>L2</b>
CO2	Apply techniques of vector calculus, integral calculus, transform calculus and numerical methods to solve Engineering Problems	<b>Apply</b>	<b>L3</b>
CO3	Analyze Engineering problems using vector calculus, integral calculus, transform calculus and numerical methods	<b>Analyse</b>	<b>L4</b>
CO4	Develop mathematical solutions to various real time problems using MATLAB	<b>Evaluate</b>	<b>L5</b>

**Mapping of Course Outcomes to Program Outcomes:**

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

**Weblinks and Video Lectures (e-Resources)**

1	<a href="https://youtube.com/playlist?list=PLMLsjhQWWIUoOGgo64vgzFfAcFpQeJzhX">https://youtube.com/playlist?list=PLMLsjhQWWIUoOGgo64vgzFfAcFpQeJzhX</a>
2	<a href="https://youtube.com/playlist?list=PLMLsjhQWWIUqGtORaLzBlvw_QkpYCgoBa">https://youtube.com/playlist?list=PLMLsjhQWWIUqGtORaLzBlvw_QkpYCgoBa</a>
3	<a href="https://youtube.com/playlist?list=PLMLsjhQWWIUrfmcsh0kJl8m6Esfz4TpU_">https://youtube.com/playlist?list=PLMLsjhQWWIUrfmcsh0kJl8m6Esfz4TpU_</a>
4	<a href="https://youtube.com/playlist?list=PLMLsjhQWWIUqSNC042WJpBS6zWFx9biwR">https://youtube.com/playlist?list=PLMLsjhQWWIUqSNC042WJpBS6zWFx9biwR</a>
5	<a href="https://youtube.com/playlist?list=PLhSp9OSVmeyKQu9bO27NN_2wlyiHUX2-f">https://youtube.com/playlist?list=PLhSp9OSVmeyKQu9bO27NN_2wlyiHUX2-f</a>

**Assessment Pattern (both CIE and SEE)**

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

SEE		Theory exam	Entire theory syllabus including questions from lab component	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	
				<ul style="list-style-type: none"> <li>• 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.</li> <li>• The Laboratory Component for the IPCC shall be for CIE only.</li> <li>• However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.</li> </ul>				

**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 7<sup>th</sup> week of the semester (syllabus completion of 50%)
- Second test after 14<sup>th</sup> 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 4<sup>th</sup> week and CCA2 after 9<sup>th</sup> 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 6<sup>th</sup> weeks of semester and review 2 after 12<sup>th</sup> 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 15<sup>th</sup> 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								
<b>Total</b>	<b>20</b>	<b>20</b>	<b>10</b>	<b>10</b>	<b>20</b>	<b>20</b>	<b>100</b>	



**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							
<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>50</b>	

**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	Gradient of a scalar and problems	1
3	Directional derivative and problems	1
3	Curl and divergence; physical interpretation	1
3	Solenoidal and irrotational vectors	1
3	Vector line integral and problems	1
3	Surface and volume integrals	1
3	Green's theorem and problems	1
3	Stoke's theorem and problems	1
3	Divergence theorem and problems	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
	<b>Total</b>	<b>50 Hrs</b>