



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Basic Science Course	
<b>Prerequisite</b>	Interest in natural systems for sustaining life on the earth.	
<b>Rationale</b>	To understand the importance of environment and inculcate the environmental values translating into pro-conservation actions. Also, to study the impact of pollution arising from different sources and the measures to be taken towards its reduction.	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	0	0	3	70	30	-	30	130

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
1	<p><b>Environment and Ecosystems</b></p> <p>Concept of an ecosystem - structure and functions of ecosystem, Components of an ecosystem - producers, consumers, decomposers, food chains, food webs, ecological pyramids, energy flow in an ecosystem, components of environment and their relationship, impact of technology on environment, environmental degradation, closed loop concept and sustainable development.</p>	5	10
2	<p><b>Environmental Pollution</b></p> <p><b>Water Pollution:</b> Introduction – Water quality standards, sources of water pollution, classification, effects and control of water pollutants. <b>Air Pollution:</b> Composition of air, structure of atmosphere, ambient air quality standards, classification, sources of common air pollutants like PM, SO<sub>2</sub>, NO<sub>x</sub>, auto exhaust, effects and control of air pollutants. <b>Noise Pollution:</b> Introduction, sound and noise, noise measurements, causes, effects and control. <b>Soil Pollution:</b> Sources, types and effect of soil pollution.</p>	9	20
3	<p><b>Waste Management and Concept of 4R's</b></p> <p><b>Solid Waste:</b> Types and sources of solid waste, causes and effect of solid waste pollution and solid waste management. <b>Liquid and gaseous waste:</b> Sources, effect and management. <b>Bio-medical Waste:</b> Generation, classification, treatment and management of bio-medical waste. <b>E-waste:</b> Generation, classification and management of e-waste. <b>Concept of 4R's:</b> Principles and applications of 4R's.</p>	9	20
4	<p><b>Global Environmental Issues and Its Management</b></p> <p>Climate change, global warming and greenhouse effect, acid rain, depletion of ozone layer, carbon footprint, concept of carbon credit and cleaner development mechanism (CDM)</p>	6	10
5	<p><b>Energy, Basic concept of green building and smart cities</b></p> <p><b>Energy:</b> Renewable and non-renewable sources of energy and their applications.</p> <p><b>Basic concept of green building and smart cities:</b></p> <p>Introduction, objectives, fundamental principles, benefits of green building, examples of green building and concept of smart cities.</p>	8	20



Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
6	<b>Legal and Policy Framework for Environmental Protection</b>  Scope and importance of environmental law, The Environment (Protection) Act, Water (Prevention and Control of Pollution) Act, Air (Prevention and Control of Pollution) Act, Hazardous waste rules, biomedical and E-Waste management rules, Public liability insurance act, circular economy and International steps for mitigating global change.	8	20
<b>Total</b>		<b>45</b>	<b>100</b>

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy			
Level	Remembrance	Understanding	Application
<b>Weightage</b>	40	40	20

*NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

Course Outcomes	
<b>At the end of this course, students will be able to:</b>	
CO1	Understand the components of ecosystems and steps to be considered for the sustainable development.
CO2	Identify the sources, types of pollution in environment and their preventive actions.
CO3	Study the various types of waste and their impact on environment along with the implementation of 4R's concept.
CO4	Study the various global environmental issues and their management.
CO5	Understand the concept of energy, green buildings and smart cities.
CO6	Understand the constitutional, legal and policy basis for environmental protection.

CO PO Mapping						
CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	3	2	1	2	2	2
PO - 2	1	1			1	1
PO - 3				1	1	1
PO - 4			1			1
PO - 5	1	1	1			
PO - 6	1	1	1	1	1	1
PO - 7	1	1	1	1	1	1
PO - 8		1	1	1		1
PO - 9			1		1	1
PO - 10				1		
PO - 11	1	1	1	1	1	1

**CO PSO Mapping**

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PSO - 1	1	1	1	1	1	1
PSO - 2	1	1	3	1	1	1

**Reference Books**

1.	<b>Environmental Pollution Control Engineering</b> By C. S. Rao   New Age International Publishers, Pub. Year 2018
2.	<b>Environmental Sciences</b> By Daniel B. Botkin & Edward A. Keller   John Wiley & Sons
3.	<b>Basics of Environmental Studies</b> By Prof Dr N S Varandani   LAP -Lambert Academic Publishing, Germany
4.	<b>Environmental Studies</b> By R. Rajagopalan   Oxford University Press, Pub. Year 2015
5.	<b>Environmental Pollution</b> By R. K. Khitoliya   S Chand & Co Ltd., Pub. Year 2004
6.	<b>Basics of Environmental Studies by U K Khare</b> By U K Khare   Tata McGraw Hill
7.	<b>Textbook of Environmental Studies</b> By Deeksha Dave & S. S. Kateva   Cengage Publishers
8.	<b>Environmental Science</b> By B. R. Shah & Dr. Snehal Popli   Mahajan Publishing House, Pub. Year 2020



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Engineering Science Course	
<b>Prerequisite</b>	High School Education & Physics	
<b>Rationale</b>	Electricity has been the main source of energy for the developing and developed countries. Per capita consumption of electricity of a country can be considered as an indicator of the development of the country. In view of this, it is essential for all engineering graduates to know the basic aspects of electrical engineering. This subject deals with basic circuit solution methods and basics of domestic electrical installations.	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	-	2	4	70	30	50	50	200

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
1	<b>D. C. Circuits</b> Introduction of Electrical Current, Voltage, Power and Energy; Sources of Electrical Energy ; Ideal electrical circuit elements - Resistor, Inductor and Capacitor; Fundamental laws of electric circuits - Ohm's Law and Kirchhoff's Laws; Analysis of series and parallel; Star – Delta conversion; Node and Mesh analysis	10	20
2	<b>Electromagnetism:</b> Faradays Laws; Lenz's Law; Fleming's Rules; Magnetic circuits; Statically and dynamically induced EMF; Concepts of self-inductance, mutual inductance and coefficient of coupling; Inductance in series and parallel; Hysteresis and Eddy current losses; Energy stored in magnetic fields.	8	15
3	<b>Electrostatics</b> Electric charge and Laws of electrostatics; Definitions - Electric field, lines of force, electric field intensity, electric flux and flux density; Capacitor; Capacitor in series and parallel, Energy stored in a capacitor.	5	15
4	<b>Single Phase AC Circuit</b> Generation of sinusoidal voltage; Average value, R.M.S value, form factor, peak factor, Phasor representation of alternating quantities; Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Series and parallel resonance. Concepts of Real power, Reactive power, Apparent power, Power factor and power factor improvement methods	10	20
5	<b>Three Phase AC Circuit</b> Necessity and Advantages of three phase systems, Generation of three phase power, Phase sequence, Balanced supply and Balanced load; Relationship between line and phase values of balanced three phase circuit; Power Measurement in balanced three phase circuits.	6	15
6	<b>Electrical Installations</b> Single line diagram of domestic wiring, Safety precautions for electrical appliances. Types of Wires and Cables, Safety devices: Switch Fuse Unit (SFU), MCB, Earthing – Types of earthing and its importance. Types of Batteries, calculations of electricity bill.	6	15
<b>Total</b>		<b>45</b>	<b>100</b>



**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
<b>Weightage</b>	30	30	20	10	10	0

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

**At the end of this course, students will be able to:**

CO1	Explain the fundamental electrical laws and its application to electrical circuits.
CO2	Describe principles of electromagnetism.
CO3	Describe principles of electrostatics.
CO4	Analyze AC circuit theory to single-phase circuits with different combinations of elements and resonance.
CO5	Analyze three phase circuits with their voltage and current relationship with phasor diagram.
CO6	Comprehend electrical safety devices their installations, protection and personnel safety.

**CO PO Mapping**

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	3	3	2	3	3	3
PO - 2	2	2		2	1	1
PO - 3						
PO - 4	1	1		1		
PO - 5	1	1		1	1	1
PO - 6	1	1	1	1	1	1
PO - 7						
PO - 8	1	1		1	1	1
PO - 9	1	1		1	1	1
PO - 10						
PO - 11	1	1	1	1	1	1

**Reference Books**

1.	<b>Electrical Technology – Part I and II</b> By B. L. Theraja   S. Chand and Co.
2.	<b>Basic Electrical Engineering</b> By Nagsarkar and Sukhija   Oxford University Press
3.	<b>3. D C Kulshreshtha, Basic Electrical Engineering, Tata McGraw Hill, 2010.</b>
4.	<b>Basic Electrical Engineering</b> By D. P. Kothari and I. J. Nagrath   Tata McGraw Hill
5.	<b>Fundamentals of Electrical Engineering</b> By L. S. Bobrow   Oxford University Press
6.	<b>Electrical and Electronics Technology</b> By E. Hughes   Pearson
7.	<b>Electrical Engineering Fundamentals</b> By V. D. Toro   Prentice Hall India

**List of Practical**

1.	To study and understand different symbols and units used in electrical circuits.
2.	To verify the ohm's law.
3.	To verify the Kirchoff's current and voltage laws.
4.	To verify Series and Parallel connection of Resistor.
5.	To verify BH-curve
6.	To verify response of RL circuit and its impedance calculation.
7.	To verify response of RC circuit and its impedance calculation.
8.	To verify the current and voltage relationships in three phase star and delta connections.
9.	Demonstration of domestic installations like Fuse, MCB, ELCB, MCCB etc.
10.	Understanding of various safety precautions for electrical installations.
11.	Demonstration of various types of wires and cables.
12.	Understanding of various electricity bills and calculations for energy consumption.

**Miscellaneous****Activities suggested under self-learning**

**Sl. No. Name of the activity No. of hours Evaluation Criteria**

1. Industry/Research laboratory visit Visit = 5h, Report preparation = 5h  
Total = 10h Based on report submitted. Report should contain observations and calculations based on industry/ lab data.

2. Technical Video based learning related to the subject(NPTEL) Duration of video = 5h  
Report preparation = 5h Total = 10h Report /presentation based on the video learning outcomes.

3. Assignment writing. Numerical based assignment is preferable. 5 assignments of 2h each. Total = 10h Based on the assignment submitted.

4. Self learning on-line course (SWAYAM) Minimum duration of the course should be 10h. Examination based assessment at the end of course. Based on the certificate produced.

5. Complex problem solving Maximum 2 problem. Study of the problem and solution finding, Total = 10h Based on the depth of the solution submitted.

6. Videos on Industrial safety aspects based on subject Duration of video = 5h Report preparation = 5h Total = 10h Based on quiz/report submitted

7. Poster/chart/power point preparation on technical topics Duration = 6 h Based on poster/chart preparation



and presentation skills 8 Working/non-working model on technical topics Working = 12 h Non- working = 8 h Based on inter department/external evaluation 9 Industrial exposure for 2-3 days to observe and provide tentative solutions Duration = 15 h for industrial exposure Problem identification and tentative solution = 10 h Total = 20 h Based on evaluation of critical problems and solutions 10 Group Discussion on emerging/trending technical topics based on subject Duration = 1 h each Based on performance in group discussion, technical depth, knowledge etc 11. Real world case studies based learning Duration of data collection/study = 5h Report preparation = 5h Total = 10h Based on in-depth study, technical depth, data collected, fact finding, etc. 12 Blog or Technical Article Writing 10h (Research – 6h, Writing – 4h) Based on originality, technical content, references cited, and clarity of communication. 13 Annotated Video Explanation of Concept/Problem 10h (Preparation + Recording + Submission) Based on accuracy of explanation, clarity, and presentation style. 14 Online Technical Quizzes/Simulations Multiple quizzes summing up to 10h Based on quiz scores and reflection report after each quiz. 15 Tech Blog/YouTube Channel Curation 10h (Content curation + Analysis) Summary report on curated content and learning outcomes. 16 Patent Search and Innovation Gap Identification 10h (Search + Report) Based on number of relevant patents analyzed and identification of innovation scope. 17 Maintenance or Troubleshooting Logbook 10h (For example: lab instruments, computer hardware) Based on documented cases, approach, and resolution. 18 Involvement in Student Chapter (IEI/SPE /IEEE/ISTE) Organizing student chapter activities/workshops (5h)+ Report /writing articles for the chapter newsletter(5h) Based on short activity report and reflection

**List of Laboratory/Learning Resources Required:**

1. Voltmeter, Ammeter, Multimeter, Rheostate, wires.
2. BH-curve kit.
3. RL and RC circuit kit.
4. Power Supply(DC and AC)
5. Fuse, MCB, ELCB,MCC

**Useful Links**

1. <https://nptel.ac.in/courses/108105112>
2. [www.vlabs.co.in](http://www.vlabs.co.in)



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Engineering Science Course	
<b>Prerequisite</b>	Fundamental knowledge of Electrical Power Generation	
<b>Rationale</b>	The course will provide understanding of power generation technology using conventional and non - conventional energy sources which will be useful for understanding the operation and working of power plants.	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	1	-	4	70	30	-	50	150

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
1	<b>Steam Power Station</b>  Schematic arrangement, advantages and disadvantages, choice of site, efficiency of steam power station, types of prime movers, characteristic, auxiliaries, environmental aspects for selecting sites and locations of thermal power stations.	8	20
2	<b>Nuclear Power Station</b>  Schematic arrangement, advantages and disadvantages, selection of site, types of reactors, environmental aspects for selecting sites and locations of nuclear power stations.	7	15
3	<b>Diesel and Gas Based Power Plant</b>  Diesel Power Station: Introduction, Schematic arrangement, advantages and disadvantages, choice and characteristic of diesel engines, auxiliaries. Gas Based Power Plant: Schematic arrangement, advantages and disadvantages, open cycle and closed cycle gas turbine power plant, combined cycle power plant, comparison of various power plants.	9	20
4	<b>Hydro Power Station</b>  Schematic arrangement, advantages and disadvantages, choice of site constituents of hydro power plant, hydro turbine, environmental aspects for selecting sites and locations of hydro power stations.	6	10
5	<b>Power Generation by Non - Conventional Energy Sources:</b>  Solar – Merits and limitations of solar energy conversion and utilization, solar pond and binary cycle solar thermal power plant. Wind – Applications, Merits and demerits of wind energy, types of wind energy system.	6	15
6	<b>Power Generation Economics and Tariff</b>  Important terms used in system operation, various factors affecting cost of generation: load curves, load duration curves, connected load, maximum load, peak load, base load and peak load power plants, load factor, plant capacity factor, plant use factor, demand factor, diversity factor, cost of power plant, Tariffs and examples.	9	20
<b>Total</b>		<b>45</b>	<b>100</b>

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
<b>Weightage</b>	30	30	20	10	10	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.



**Course Outcomes**

At the end of this course, students will be able to:

CO1	Understand the schematic arrangement, site selection criteria, efficiency, components, and environmental considerations of steam power stations.
CO2	Explain the working of a nuclear power plant using a single line diagram and state the functions of the major equipment and auxiliaries.
CO3	Develop skill and identify the key point to improve the performance of diesel and gas-based power plant.
CO4	Describe the components, working, and site selection of hydro power stations along with their environmental impact.
CO5	Knowledgeable about modern energy generation technologies, including wind and solar energy.
CO6	Analyze load curves which enables the optimization of generating unit selection and operation in power systems.

**CO PO Mapping**

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	3	3	2	2	3	3
PO - 2	2	2	3	2	2	3
PO - 3	1	1	2	1	1	2
PO - 4	1	1		1	1	2
PO - 5	1	1	2	1	3	3
PO - 6	2	2	1	3	2	
PO - 7	1	1	1	1	1	1
PO - 8	1	1	1	1	1	1
PO - 9	1	1	1	1	1	1
PO - 10						2
PO - 11	1	1	2	1	3	3

**Reference Books**

1.	<b>Principles of Power System</b> By V. K. Mehta, Rohit Mehta   S. Chand Publications
2.	<b>Electrical Power Systems</b> By Dr. S. L. Uppal, Prof. S. Rao   Khanna Publications
3.	<b>Non-conventional Energy Resources</b> By Shobh Nath Singh   Pearson India
4.	<b>A Course in Power Systems</b> By J.B. Gupta   S.K. Kataria & Sons
5.	<b>Electrical Power systems</b> By C. L. Wadhwa   New Age International Publishers
6.	<b>Renewable Energy Resources</b> By John Twidell, Tony Weir   Routledge
7.	<b>Elements of Power Systems Analysis</b> By W. D. Stevenson   McGraw Hill

**Miscellaneous**

**Sr. No. Name of the activity No. of hours Evaluation Criteria**

1 Industry / research laboratory visit Visit (5Hr) + Report Preparation (5Hr) = Total 10 Hours Based on the report

2 Technical video learning related to subject (Video (5Hr) + Report Preparation (5Hr) = Total 10 Hours) Report/presentation based on the video learning outcomes.

3 Assignment writing Assignment of 2Hr each = Total 10 Hours Based on the assignment submitted.

4 Self-learning online courses. Minimum duration of course 10Hr = Total 10 Hours Based on understanding

5 Videos on Industrial safety aspects based on subject Video (5Hr) + Report Preparation (5Hr) = Total 10 Hours Based on understanding

6 Poster/chart/power point preparation on technical topics Poster Preparation (5Hr) = Total 6 Hours Based on poster/chart preparation and presentation skills

7 Working/non-working model on technical topics Working model 12Hr and Non-working model 8Hr Based on the understanding, implementation and results

8 Industrial exposure for 2-3 days to observe and provide tentative solutions on society/environment/health/any other issue Industrial exposure duration (15Hr) + problem identification and tentative solutions (10Hr) = Total 20 Hours Based on evaluation of critical problems and solutions

9 Group Discussion on emerging/trending technical topics based on subject Duration 1Hr each= Total 2 Hours Based on performance in group discussion, technical depth, knowledge etc.

10 Real world case studies-based learning Duration of data collection (5Hr) + Report Preparation (5Hr) = Total 10 Hours Based on in-depth study, technical depth, data collected, fact finding, etc

11 Problem solving/Coding using SCILAB, MATLAB, MS-EXCEL or any other relevant software five small coding based problem 2hr each = Total 10 Hours Based on the understanding, implementation and results

12 Technical quiz related to topics Total 6 Hours Based on evaluation

13 Online Certification Courses (NPTEL / SWAYAM / Coursera / edX) in power system Complete one MOOC (Massive Open Online Course) from NPTEL/SWAYAM

Total 20 Hours Certificate + a1 page summary or review

Presentation of the course. Certificate of the course

**Note:-**

- Above activities are suggestive, faculty can choose any of these activities and cover up the rest of the Self Learning Hour.
- The number of hours is suggestive. Faculty can sub-divide the number of hours based on the activity. However, the total number of hours is fixed.
- All records pertaining to the evaluation and assessment of self-learning activities must be properly maintained and preserved at the institute level. These records should be made available to the university upon request.
- Institutes are encouraged to utilize digital platforms, such as Microsoft Teams, for effective record-keeping and to ensure transparency in the evaluation and assessment of self-learning activities.

**Useful Links**

1. MATLAB/SCILAB
2. Solar cell/module/Array modelling and I-V curve
3. Power World Simulator



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Engineering Science Course	
<b>Prerequisite</b>		
<b>Rationale</b>	-	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
-	-	2	1	-	-	80	20	100

*SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation*



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Engineering Science Course	
<b>Prerequisite</b>		
<b>Rationale</b>	-	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
-	-	2	1	-	-	80	20	100

*SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation*



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Basic Science Course	
<b>Prerequisite</b>		
<b>Rationale</b>	-	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	1	-	4	70	30	-	50	150

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
1	<b>MATRICES</b> Elementary row operations in matrix, Row echelon and Reduced row echelon forms, Rank by echelon forms, Inverse by Gauss-Jordan method, Solution of system of linear equations by Gauss elimination and Gauss-Jordan methods. Eigen values and Eigen vectors, Cayley-Hamilton theorem (Statement only).	9	20
2	<b>PARTIAL DIFFERENTIATION</b> Partial differentiation, Mixed derivative theorem, differentiability, Chain rule, Implicit differentiation, Euler's theorem for homogeneous function, Modified Euler's theorem, Tangent plane and Normal line, Extreme values of function of two variables, Lagrange's methods of undetermined multipliers	9	20
3	<b>FIRST ORDER DIFFERENTIAL EQUATIONS</b> Reorientation of differential equation of first order first degree, Exact differential equation and Integrating factors, linear and non-linear differential equation,	5	10
4	<b>HGHER ORDER DIFFERENTIAL EQUATIONS</b> Solution of homogenous equations of higher order, Complementary functions, Particular Integrals, Method of variation of parameters, Method of Undetermined Coefficients	6	15
5	<b>MULTIPLE INTEGRALS</b> Reorientation of concepts of integrals, Double integrals and Triple integrals, Evaluation techniques, change of order of integration, Change of variable, Evaluation of area and volume.	8	15
6	<b>VECTOR CALCULUS:</b> Scalar and vector fields. Gradient, directional, derivative, Curl and Divergence- physical interpretation, Solenoidal and Irrotational Vector fields, Line integrals, Applications to work done by a force and flux, Green's theorem (Statement only)	8	20
<b>Total</b>		<b>45</b>	<b>100</b>

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
<b>Weightage</b>	10	25	35	0	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.



**Course Outcomes**

At the end of this course, students will be able to:

C01	Apply the knowledge of linear algebra to solve problem of engineering.
C02	Compute directional derivative, rate of change and optimum value of functions of several variables.
C03	Find solution of first order differential equations.
C04	Apply various methods for solving Higher ordinary differential equations and understand their importance to solve engineering problems.
C05	Find area and volume by double and triple integration.
C06	Apply vector calculus in Engineering Applications.

**CO PO Mapping**

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	1	1	1	1	1	1
PO - 2	1	1	1	1	1	1
PO - 3	1	1	1	1	1	1
PO - 4	1	1	1	1	1	1
PO - 5	1	1	1	1	1	1
PO - 6	1	1	1	1	1	1
PO - 7	1	1	1	1	1	1
PO - 8	1	1	1	1	1	1
PO - 9	1	1	1	1	1	1
PO - 10	1	1	1	1	1	1
PO - 11	1	1	1	1	1	1



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	Humanities, Social Science and Management Course	
<b>Prerequisite</b>		
<b>Rationale</b>	-	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
2	1	-	3	70	30	-	50	150

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
1	<b>Essentials of Grammar</b> Tenses Active-passive voice Subject verb agreement Modal auxiliary Prepositions Direct indirect speech	6	20
2	<b>Vocabulary Building</b> Types of word formation process-compounding, clipping, blending, derivation, creative respelling, coining borrowing Acquaintance with prefixes, suffixes, antonyms, synonyms and standard abbreviation	4	10
3	<b>Basics of Communication</b> Introduction Learning effective communication Definition and Process of communication Verbal and non-verbal communication Importance of interpersonal and intercultural communication in today's Organisation	5	20
4	<b>Basic Writing Skills</b> Sentence Structures Use of phrases and clauses in sentences Importance of proper punctuation Creating coherence Organizing principles of paragraphs in documents	5	20
5	<b>Reading and Writing Practices</b> Comprehension Précis writing Email writing Report writing Notice Writing	5	15
6	<b>Speaking Skill</b>	5	15



Course Content		T - Teaching Hours   W - Weightage	
Sr.	Topics	T	W
	Need and importance of effective speaking Barriers of effective speaking Short speeches Dialogue on various situation		
<b>Total</b>		<b>30</b>	<b>100</b>

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
<b>Weightage</b>	30	40	30	0	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes	
<b>At the end of this course, students will be able to:</b>	
C01	Comprehend the dynamics of various rules of grammar and check its validation while they speak and write language correctly.
C02	Use various forms of vocabulary in varied situations in oral and written communication.
C03	Harness strategies to minimize barriers of effective communication. This structured mapping ensures learners build foundational knowledge, comprehend communication dynamics, and apply them effectively in real-world organizational contexts.
C04	Apply grammar effectively to make themselves competent writer by exposing to various set of situations.
C05	Demonstrate the qualities of writing in diverse situation by using the nuances such as conciseness, clarity, accuracy, organization, and coherence.
C06	Speak effectively in various situations.

CO PO Mapping						
CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1						
PO - 2						
PO - 3						
PO - 4						
PO - 5						
PO - 6						
PO - 7						
PO - 8						
PO - 9						
PO - 10						
PO - 11						

**Reference Books**

1.	<b>Communication Skills For Engineer</b> By Yogesh Ramani
2.	<b>Technical English</b> By Dr. M. Hemamalini   Wiley
3.	<b>Spoken English</b> By R K Bansal and J B Harrison   Orient Longman
4.	<b>Basic Communication Skills for Technology</b> By Andrea J. Rutherford   Pearson Education
5.	<b>Basic Communication Skills for Technology</b> By Andrea J. Rutherford   Pearson Education   Latest Edition



<b>Program</b>	BACHELOR OF TECHNOLOGY (B.Tech)	<b>Semester - 1</b>
<b>Type of Course</b>	-	
<b>Prerequisite</b>		
<b>Rationale</b>	-	
<b>Effective From A.Y.</b>	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
-	-	2	3	-	-	-	-	0

*SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation*