



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Professional Core Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	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	Diode theory and Applications Ideal diode, Forward bias, Reverse bias of P-N Junction diode and V-I characteristics, second and third approximation, half wave rectifier, full wave rectifier, bridge rectifier, RC and LC filters, Design of un-regulated DC power supply, Clipping circuit, Clamping circuit.	9	20
2	Special purpose diodes Light emitting diode (LED), Zener diode, Zener diode circuit for voltage regulation, Photo diode, Varactor diode, Seven Segment display.	5	10
3	Bipolar Junction Transistors BJT operation, BJT voltages and currents, CE, CB and CC characteristics, DC load line and bias point, base bias, emitter feedback bias, collector feedback bias, voltage divider bias, Thermal stability, transistor power dissipation and switching time, Transistor as a switch, Transistor as an amplifier.	9	20
4	Field Effect Transistors (FET) and Applications Junction field effect transistors (JFET), Comparison of BJT and FET, JFET characteristics, FET, Biasing in ohmic region and active region, Trans-conductance, amplification and switching, MOSFETs (D-type and E-type MOSFET), CMOS introduction, E-MOSFET amplifier.	9	20
5	Number systems Number systems, Base Conversion (Binary, Decimal, Octal, Hexadecimal), Complements-R's Complement, (R-1)'s- Complement, 2's and 10's Complement, 1's and 9's Complement.	7	15
6	Digital Logic Gates Basic Logic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Building AND, OR Gate with diodes, NAND & NOR gate as a universal gate.	6	15
Total		45	100



List of Practical

1.	To Study Electronic Symbols and Units.
2.	To Study Characteristics of given P-N Junction Diode.
3.	To Obtain Characteristic of Zener Diode.
4.	To Verify Input & Output Characteristic of Transistor [Common Emitter] Configuration.
5.	To Study Half Wave Rectifier with & without filter.
6.	To Test Full Wave & Bridge Rectifier with & without Filter.
7.	To Test Clipper & Clamper circuits.
8.	To Test Characteristics of a Field Effect Transistor.
9.	To covert one number system to another number system.
10.	Verify the truth table of basic Digital Logic Gates.



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Basic Science Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	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	Basics of Semiconductors Introduction of Semiconductors: Types of materials : Conductors, semiconductors and insulators, Atomic structure and bonding in semiconductors, Intrinsic and Extrinsic semiconductors Semiconductor fundamentals : Electrons and holes, Carrier transport mechanism, Drift and diffusion, mobility and conductivity, Generation and recombination of carriers Charge carriers in semiconductors: Carrier concentration and Fermi level, Temperature dependence of carrier concentration, Numerical problems	10	20
2	Semiconductor Materials and Device Silicon, Germanium and compound semiconductor, Crystal structure and growth techniques (Czochralski process, Float zone process) P-N Junction: Formation of P-N Junctions, Depletion region and built-in potential, current – voltage characteristics , Types of diodes (Zener, Schottky, LED), Diode characteristics and applications Solar cell (Principle, Construction and Working), Numerical problem	8	20
3	NANOPHYSICS Nanoscale, Surface to volume ratio, Surface effects on Nanomaterials, Quantum size effects, Electron confinement, Nanomaterials and Nanotechnology, Unusual properties of Nanomaterials, Disadvantages of Nanomaterials, Synthesis of Nanomaterials (Sol Gel, Ball Milling, PVD), Carbon Nanotubes: Introduction, Structure, Synthesis, Properties and applications, Applications of Nanomaterials	6	10
4	Superconductivity Introduction of Superconductivity, Properties of superconductor, Effect of magnetic field, Meissner effect, Pressure effect, Impurity effect, Isotopic mass effect, Mechanism of Superconductivity : BCS Theory, Penetration depth : Magnetic field, Josephson's junction and its application, Applications of superconductors (SQUID, MagLev Train), Numerical problems	8	20
5	Dielectric and Optical Fibre Dielectrics : Introduction, Polar and Non-Polar Dielectric, Types of Dielectric Materials, Dielectric Insulator, Application Optical fibre-principle [TIR] – types material, mode, refractive index- Fibre loss-Expression for acceptance angle and numerical aperture, Application-Communication, Numerical problems	5	10
6	Photonics Einstein's theory of matter radiation interaction and A & B coefficients, Properties of laser, Spontaneous and stimulated emission, Amplification of light by population inversion, Types of lasers: solid- state laser (Neodymium), gas lasers (CO ₂).	8	20
Total		45	100



Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application
Weightage	30	40	30

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	Develop basic theoretical and mathematical concept of semiconductors
CO2	Extend the concept of semiconductor material and various devices.
CO3	Elucidate the fundamental of Nanophysics and its Application
CO4	Outline the fundamental overview of superconductivity their relevant application
CO5	Outline the fundamental overview of Dielectric and Optical fibre-their relevant application
CO6	Develop the fundamental concept of LASERs and their relevant 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						
PO - 4						
PO - 5	1	1	1	1	1	1
PO - 6						
PO - 7						
PO - 8	1	1	1	1	1	1
PO - 9						
PO - 10						
PO - 11	1	1	1	1	1	1

List of Practical

1.	Determine the wavelength of laser using diffraction grating
2.	Determine the divergence of laser
3.	To study the characteristics of Zener diode
4.	To study the characteristics of P-N Junction diode
5.	To study the characteristics of LED diode
6.	Study of the voltage and current of solar cells
7.	Study of the voltage and current of the Solar cells in series and parallel combination.
8.	Determination of the band gap of a Semiconductor : Germanium Chip : Four Probe Method
9.	Velocity measurement of Ultrasonic wave in given sample (liquid) using Ultrasonic Interferometer





Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Humanities, Social Science and Management Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	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	-	-	2	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	Introduction to value education & human values <ul style="list-style-type: none"> • Concept, Need and Role of Value Education and Human Values • Role of Education in Holistic Development • Introduction to Satisfy Basic Human Aspirations • Basic human aspirations and their fulfilment through value education. 	4	15
2	Harmony with self <ul style="list-style-type: none"> • Importance of self-awareness: Self reflection • Understanding & exploring needs of self and body • Self -Exploration – A Process of Fundamental Human Desires – Happiness, Peace and Contentment for Material, Behavioural and Intellectual well Being • Holistic understanding of mind & body • Famous anecdote and relevant case studies. 	7	20
3	Harmony with family <ul style="list-style-type: none"> • Basic unit of human interaction – The Family • Importance of happy relations/connections in family • Foundational value: Respect, Affection, Care, Guidance, Reverence, Glory, Gratitude, Love • Famous anecdote and relevant case studies. 	4	15
4	Harmony in the Society <ul style="list-style-type: none"> • Understanding Harmony in society and universal human order. • Goal of human being living in the society • Foundation of Human society: roles of social institutions and impact of societal values. • Community building through contributions - trust and cooperation, Community building, social cohesion, equality and social justice • Diversity and inclusivity - understanding and valuing diversity, promoting respect and inclusivity, resolving conflict to build a culture of peace. • Famous anecdote and relevant case studies 	7	20
5	Harmony with Nature	4	15



Course Content		T - Teaching Hours W - Weightage	
Sr.	Topics	T	W
	<ul style="list-style-type: none"> Understanding Co-existence with Nature Interdependence of all Living Being and Non-Living Being Environmental Ethics Understanding and exploring four orders of nature: Physical Order, Pranic Order, Animal Order, Human Order Famous anecdote and relevant case studies 		
6	Harmony for Global peace <ul style="list-style-type: none"> Understanding global peace Concept of -one earth one family Fostering Universal brotherhood and unity, collaborative problem solving, respecting cross cultural communication Famous anecdote and relevant case studies 	4	15
Total		30	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy			
Level	Remembrance	Understanding	Application
Weightage	30	35	35

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 concept, need, and role of value education and human values, and describe their significance in holistic development and fulfilment of basic human aspirations.
CO2	Comprehend the importance of self-awareness and self-exploration in understanding the self, mind, and body, and their role in achieving happiness, peace, and contentment.
CO3	Identify the basic unit of human interaction (family) and recall the foundational values required for harmonious family relationships.
CO4	Apply the principles of harmony in society and universal human order to promote trust, cooperation, social cohesion, justice, and inclusivity in community settings.
CO5	Recall the principles of coexistence, interdependence, and environmental ethics, and identify the four orders of nature.
CO6	Use real-life examples to implement universal values for achieving global peace and unity.



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

Reference Books

1.	A Foundation Course in Human Values and Professional Ethics (TextBook) By R R Gaur, R Asthana, G P Bagaria
2.	Rajayoga or conquering the Internal Nature (TextBook) By Swami Vivekananda AdvaitaAshrama



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Basic Science Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	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	INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATION Introduction to Partial differential equation, Formation of partial differential Equation, Partial differential Equation of first order, Linear partial differential equation of first order ($Pp + Qq=R$) and method of obtaining its general solution, Non-linear partial differential equation of first order $f(p, q)=0$, $f(z, p, q)=0$, $f(x, p)=g(y, q)$, $z=px + qy + f(p, q)$.	9	20
2	INTERPOLATION Finite Differences, Forward, Backward and Central operators and their relationships, Interpolation by polynomials: Newton's forward, Backward interpolation formulae, Newton's divided formulae and Lagrange's interpolation formulae for u	8	20
3	CURVE FITTING Curve fitting by of method of least squares, fitting of straight lines, second degree parabola and more general curves.	6	15
4	PROBABILITY Experiment, definition of probability, conditional probability, independent events, Bayes' rule, Bernoulli trials,	6	15
5	RANDOM VARIABLES Random variables, discrete random variable, probability mass function, continuous random variable, probability density function, cumulative distribution function, properties of cumulative distribution function.	8	15
6	STATISTICS Measure of central tendency: Moments, Expectation, dispersion, skewness, kurtosis, Bounds on probability, Chebyshev's Inequality.	8	15
Total		45	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application
Weightage	10	15	75

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	Solve linear and non-linear partial differential equations of the first order.
C02	Find unknown value of given data by using various interpolation methods.
C03	Understand the fitting of various curves by method of least square
C04	Use the concept of probability in engineering.
C05	Implement the concept of random variables in engineering.
C06	Apply the concept of statistics and the central tendency methods in engineering.

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



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Engineering Science Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
1	0	2	2	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	Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales – Plain and Diagonal Scales, Representative Fraction.		10
2	Engineering Curves : Conic sections including the Ellipse, Parabola, Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute and Spirals		20
3	Projection of points, lines : Introduction to principal planes of projection, Projections of the points located in the same and different quadrants, Projection of lines with its inclination to the reference planes, true length of the lines and its inclination with reference planes	6	20
4	Projection of planes & Computer Aided Drawing : Projection of planes : Projection of planes with its inclination with one reference planes and two reference planes. Computer Aided Drawing: Design concepts, Introduction to AutoCAD, Basic commands for 2D drawing like: Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dimension style, etc. Industrial Drawing symbols, Program specific commands and tools.		10
5	Projections of Solids, Section of Solids: Classification of solids. Projections of solids (Cylinder, Cone, Pyramid and Prism) along with frustum with its inclination to one reference plane and with two reference planes, Section of such solids and the true shape of the section.	6	20
6	Orthographic Projections: Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional view.	3	20
Total		15	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy				
Level	Remembrance	Understanding	Application	Analyze
Weightage	30	50	10	10

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	Remember the standards and techniques of engineering drawing.
CO2	Interpret engineering drawings using fundamental technical mathematics.
CO3	Construct basic and intermediate geometry and comprehend the theory of projection.
CO4	Understand the concepts and applications of projecting planes.
CO5	Understand and apply the principles of solid projections, interpreting solid sections.
CO6	Understand and apply the principles of solid projections, interpreting solid sections.

CO PO Mapping

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

CO PSO Mapping

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PSO - 1	Moderate (2)					

Reference Books

1.	Engineering Drawing By B. Agrawal and C M Agrawal Tata McGraw Hill 3rd Edition
2.	Engineering Graphics & Design By Jain, Maheshwari, Gautam 1st edition Khanna Book Publishing
3.	Engineering Drawing and Computer Graphics By M.B. Shah and B.C. Rana Pearson Publication 2nd edition
4.	A Text Book of Engineering Graphics (TextBook) By 5. P. J. Shah S. Chand & Company Ltd 6th edition
5.	Engineering Graphics with AutoCAD By Bethune, J. D. PHI Publication

**List of Practical**

1.	Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil).
2.	Plane scale, diagonal scale
3.	Engineering curves
4.	Projection of point and line.
5.	Projection of plane.
6.	Projection of solid, section of solid.
7.	Orthographic Projection.
8.	Prepare production drawing using AutoCAD commands.



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 1
Type of Course	Engineering Science Course	
Prerequisite	Basics of Computer Systems	
Rationale	Students are expected to learn the fundamentals of computer programming so they can apply these concepts in their everyday life. The course covers the many notations needed for the C programming language, which is utilized in many commercial and industrial applications, as well as for designing algorithms.	
Effective From A.Y.	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	Basics of C Introduction of programming languages, Flowcharts and Algorithms, Basic structure of C program, Types of constants, variables, basic data types, operators, Formatted Input and Output Statements, precedence and associativity, expressions, evaluation of expressions, type conversion.	5	10
2	Decision Making and Looping Decision making statement: if and if...else statement, nested and ladder if...else, elseif, conditional operator, switch statement, goto statement with warning. Looping: while, do...while, and for loops, nested loops, Single level Break and Multi level control Break statements, continue statements.	9	20
3	Array & String Array: Introduction to arrays, declaration, initialization and access of onedimensional and two-dimensional arrays, Introduction to multi-dimensional. String: Introduction to character array, declaration and initialization of strings, string handling functions.	8	20
4	Functions Function prototype and function declaration, function definition, function call, Category of functions, actual and formal parameters/arguments, return type and return statement, Function invocation: Call by value and Call by reference, Nesting of function, recursion, scope, visibility, and lifetime of variables.	9	20
5	Pointers, Structures and Union: Pointers: Introduction to Pointers, declaration and initialization of pointer variables, accessing variables using pointer, chain of pointers, Pointers and Array, Array of pointers, pointers as function arguments. Structures and Union: Defining structure, declaring and initializing structure variables, accessing structure members, copying and comparing structure variables, nested structures, arrays and structures, structures and functions, unions.	10	20
6	Dynamic memory allocation and File Handling:	4	10



Course Content		T - Teaching Hours W - Weightage	
Sr.	Topics	T	W
	Dynamic memory allocation: Introduction to Dynamic memory allocation, malloc(), calloc(), realloc(), free(). File Handling: Introduction to file, Defining and Opening a file, Closing a file, Input/ Output operation on files..		
		Total	45 100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy				
Level	Remembrance	Understanding	Application	Analyze
Weightage	20	30	30	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	
At the end of this course, students will be able to:	
C01	Describe the basic concepts of programming languages, flowcharts, and algorithms to develop problem-solving skills.
C02	Apply decision-making and looping constructs in C to develop programs that solve computational problems.
C03	Implement a programming solution using arrays and strings.
C04	Demonstrate the fundamental concepts of functions in programming and variable scope, to develop modular and reusable code.
C05	Develop efficient programs using pointers, structures, and unions for effective memory management and complex data representation.
C06	Utilize dynamic memory allocation and file handling techniques to efficiently manage memory and perform persistent data operations in programs.

**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.	Programming in ANCI C, Eighth edition, by Balagurusamy E, Tata McGraw-Hill Publishing Company Limited (TextBook)
2.	Programming with C By Byron Gottfried, Jitender Chhabra McGraw Hill Education
3.	How to Solve it by Computer By R.G. Dromey Pearson Education Fourth, Pub. Year 2007
4.	Programming in C By Reema Theraja Oxford
5.	C Programming Language By Kernighan B W and Ritchie D M PHI
6.	Let Us C By Kanetkar, Yashavant P BPB Publications
7.	Fundamentals of Computing and Programming in C By Pradip Dey, Manas Ghosh Oxford University Press First, Pub. Year 2009
8.	Computer programming By Ashok N. Kamthane Pearson Education

**List of Practical**

1.	Write a C program to print your complete address like Name, Flat no, apt./house name, street name, etc.
2.	Write programs using all unary, binary and ternary Operators in C.
3.	Write programs using Control Structures.
4.	Write programs using Looping Structures along with jumping statements.
5.	Write programs using different dimensions of Array and its types.
6.	Write programs using different types of Functions, its arguments and Return types.
7.	Write programs using recursive function.
8.	Write programs for various structures in C.
9.	Write programs for Pointer and Memory Management in C.
10.	Write programs to demonstrate File Management in C.