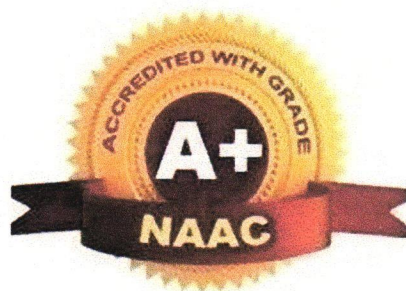




TULSIRAMJI GAIKWAD-PATIL

College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108



Bachelor of Technology

SoE and Syllabus 2026

(Department of Basic Science and Humanities)

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

- M1- To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
- M2- To provide facilities and services to meet the challenges of Industry and Society.
- M3- To facilitate socially responsive research, innovation and Entrepreneurship.
- M4- To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.



Tulsiramji Gaikwad - Patil College of Engineering and Technology

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Scheme of Instruction for B. Tech First Year (UG) Programme Group-A CSE/DS/AIML/IT/CyS Scheme 2026-27

Scheme 2020-21																	
S N	Se m	Type	Bo/ Dept	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage				ESE Duration Hours	
							L	P	SL	Hrs		CT/IA	CA	ESE	TOTAL		
FIRST SEMESTER (GROUP-A)																	
1	1	BSC	S&H	BSH51101	Linear Algebra and Calculus	T	4	0	2	6	4	30	10	60	100	3	
2	1	BSC	S&H	BSH51102	Quantum Optics & Computing	T	3	0	2	5	3	30	10	60	100	3	
3	1	BSC	S&H	BSH51103	Quantum Optics & Computing-Lab	P	0	2	-	2	1	25	-	25	50	-	
4	1	ESC	ECE	BEC51101	Digital Circuits and Design	T	3	0	2	5	3	30	10	60	100	3	
5	1	ESC	ECE	BEC51102	Digital Circuits and Design Lab	P	0	2	-	2	1	25	-	25	50	-	
6	1	ESC	CSE	BCS51101	Programming for Problem Solving	T	2	0	2	4	2	18	2	30	50	1	
7	1	ESC	AIML	BAIML51101	Fundamentals of Generative AI-Lab	P	0	2	2	4	1	50	-	-	50	-	
8	1	VSEC	CSE	BCS51102	'C' Language Lab	P	0	4	-	4	2	25	-	25	50	-	
9	1	PCC	DS	BDS51101	Web Designing-Lab	P	0	4	-	4	2	50	-	-	50	-	
10	1	CC	S&H	BSH51X01-12	Liberal Learning Module I	P	0	4	-	4	2	50	-	-	50	-	
TOTAL FIRST SEM							12	18	10	40	21	333	32	285	650	10	
SECOND SEMESTER (GROUP-A)																	
1	2	BSC	S&H	BSH51201	Differential Equation and Statistics	T	4	0	2	6	4	30	10	60	100	3	
2	2	BSC	S&H	BSH51202	Advance Material	T	3	0	2	5	3	30	10	60	100	3	
3	2	BSC	S&H	BSH51203	Advance Material -Lab	P	0	2	-	2	1	25	-	25	50	-	
4	2	ESC	CSE	BCS51201	Logic Development and Programming Design	T	3	0	2	5	3	30	10	60	100	3	
5	2	ESC	CSE	BCS51202	Logic Development and Programming Design-Lab	P	0	2	-	2	1	25	-	25	50	-	
6	2	IKS	S&H	BSH51204	Indian Ancient Technology	T	2	0	2	4	2	18	2	30	50	1	
7	2	ESC	IT	BIT51201	Cyber Security & Ethics Lab	P	0	2	-	2	1	50	-	-	50	-	
8	2	AEC	S&H	BSH51205	Basics of Career Development	P	0	4	-	4	2	50	-	-	50	-	
9	2	VSEC	DS	BDS51201	Python Programing-Lab	P	0	4	-	4	2	25	-	25	50	-	
10	2	CC	S&H	BSH51Y01-12	Liberal Learning Module-II	P	0	4	-	4	2	50	-	-	50	-	
TOTAL SECOND SEM							12	18	08	38	21	333	32	285	650	10	

Course Category	BSC/ ESC (Basic Science Course/ Engineering Science Course.)	PCC (Program me Core courses)	Multidisci plinary courses	VSE C (Skill Cour se)	Social Science & Management		Experientia l Learning Courses	CC (Co- Curricular Courses)
					AEC (Ability Enhancement Course)	IKS (Indian Knowledge System)		
Credits SEM-I	08 / 07	02	--	02	-	--	--	02
Credits SEM-II	08 / 05	-	--	02	02	02		02
Cumulative Sum	16 / 12	02	--	04	02	02	--	04

PROGRESSIVE TOTAL CREDITS: 21+21=42

				July, 2026	5.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean Academics	Vice Principal	Principal/Director (Administration)	Date of Release	Version	



TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING & TECHNOLOGY

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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIIML/IT/CyS)

Semester-I Linear Algebra & Calculus: BSH51101

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	4 Hrs./week	CT-I	12 Marks	-	-
Practical (P)	-	CT-II	12 Marks	-	-
Total Credits	4 (Th) = 4	CT-III	6 Marks	-	-
Duration of ESE: 3Hrs		CA	10 Marks	-	-
		ESE	60 Marks	-	-
		Total Marks	100 Marks	-	-

Pre-Requisites: NA

Course Objectives:

- 1 To identify algebraic problems from practical areas and obtain the solution in certain cases.
- 2 To expose students to understand the basic importance of Differential Calculus and Integral Calculus.
- 3 To understand different solution techniques of solving Beta and Gamma Function and also understand solution of simultaneous equation by matrix method.
- 4 To apply your understanding of the concepts, formulas, and problem-solving procedures.
- 5 To analyze and apply properties of sequences and series, including their convergence and sums, in mathematical and real-world problems.

Unit I	Matrices: Introduction to rank of a matrix; Rank nullity theorem, Eigen values and Eigen vectors, Consistency of a system of equations, Cayley Hamilton Theorem, Sylvester's theorem
	Activity 1: Perform basic operations of matrices by Sage math Activity 2: Illustrate Eigen values and Eigen Vectors by Sage math
Unit II	Differential Calculus: Indeterminate Forms L'Hôpital Rule, Taylor's and Maclaurin's series (for one variable), Maxima and Minima, Successive differentiation, Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem
	Activity 1: To Learn Calculus with Sage Math Activity 2: Differential Calculus and its Application by Sage math
Unit III	Integral Calculus: Introduction to Gamma Function & Properties of Gamma Function, Introduction to Beta Function & Properties of Beta Function, Relation between Beta & Gamma Function, Leibnitz's rule for differentiation under integral sign, Tracing of Cartesian and Polar curves
	Activity 1: To trace the curve with Scilab Activity 2: To trace the curve with Maple
Unit IV	Calculus of Function of several variables: Differentiability of function of several variables, Partial Derivatives, Euler's theorem on homogeneous function, Implicit function, Jacobian and their applications, Chain Rule
	Activity 1: To solve partial derivative by Sage math
Unit V	Sequence & Series: Sequence, types of sequence, test of convergence of sequences, Cauchy sequence, infinite series, power series, Alternating series, tests of convergence and absolute convergence of series.
	Activity 1: Find the missing term based on logic or arithmetic rules

Chairperson

Text Books	
T.1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9 th Edition
T.2	Advance Engineering Mathematics by Ervin Krevsizig 's 9 th Edition
T.3	H. K. Dass, Advanced Engineering Mathematics, S. Chand, Reprint, 2014.
T.4	Outline Series, McGraw Hills, 4th Edition, 2016.
T.5	P.N. Wartikar and J.N. Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.
T.6	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9 th edition, Pearson, Reprint2002.
Reference Books	
R.1	Gilbert Strang: Linear Algebra and Its Applications (Paperback), Nelson Engineering (2007)
R.2	Advanced Engineering Mathematics by Erwin Kreyszig 's (Wiley India) 9 th edition
R.3	A textbook of Engineering Mathematics by N.P. Bali, Manish Goyal, Laxmi Publication, Reprint 2010
R.4	Higher Engineering Mathematics by B. S. Grewal, Khanna Publisher 35 th edition.
Useful Links	
1	https://archive.nptel.ac.in/courses/111/108/111108157/
2	https://archive.nptel.ac.in/courses/111/104/111104144/
3	https://archive.nptel.ac.in/courses/111/104/111104092/

CO	Course Outcomes	CL	Class Sessions
CO1	Implement the concept of matrices to check existence of solution of system of linear Simultaneous equation.	3	9
CO2	Apply the concept of maxima, minima and successive differentiation in analysis of engineering problems.	3	9
CO3	Solve improper integrals using beta, gamma functions	3	9
CO4	Use of Partial differentiation to Solve Jacobian and Chain Rule	3	9
CO5	Utilize the concepts of sequences and series to address problems across mathematical and scientific domains	3	9


 Chairperson



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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIIML/IT/CyS)

Semester-I Quantum, Optics & Computing (BSH51102)

Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory (Th)	3Hrs/week	CT-I	12 Marks	-	-
Practical(P)	2Hrs/week	CT-II	12 Marks	-	-
Total Credits	3(Th)+1(P)=4	CT-III	6 Marks		
Duration of ESE:3Hrs		CA	10Marks	CA	25 Marks
		ESE	60Marks	ESE	25 Marks
		Total Marks	100Marks	-	50 Marks

Pre-Requisites: AICTE Bridge Course, Basics of Physics.

Course Objectives:

1.	To explain the concept of wave particle duality, wave packet through the De-Broglie hypothesis and Heisenberg uncertainty Principle, basic concepts of quantum computing.
2.	To interpret the motion of charged particle in electric field, magnetic field and cross configured field through Bethe 's law, Cathode ray tube (CRT) and Cathode ray Oscilloscope (CRO).
3.	To analyse the concept of cut in voltage, voltage regulator and current gain in PN junction diode, Zener diode and transistor respectively.
4.	To compare the interference in parallel and wedge-shaped thin film and their application in engineering field.
5.	To explain the characteristics, properties of laser and optical fibre with their applications.

Course Contents

Unit I	Quantum Mechanics & Computing: Plank's Hypothesis, Properties of Photon, wave particle duality of light, De-Broglie Hypothesis, Wave packet, Phase and group velocity, Heisenberg Uncertainty Principle and its application.
	Introduction of Quantum computing, bits, qubits, superposition and entanglement with its applications.
	Activity 1: Game Pedagogy - Crossword Puzzle based on quantum mechanics and quantum computing Activity 2: Open Book Test
Unit II	Electron Ballistics and Electron Optics: Introduction of electric and magnetic field, Uniform Electric Field parallel to electron motion, Uniform Electric Field perpendicular to electron motion, Uniform Magnetic Field parallel to electron motion, Uniform Magnetic Field perpendicular to electron motion, Electric and Magnetic fields in cross configuration, Velocity Selector, Bethe's law, Devices: Cathode Ray tube, CRO, Block Diagram, Function & working of each block.
	Activity 1: PPT on CRO with their Application Activity 2: Multiple choice questions on Electron Ballistics and Electron Optics.
	Semiconductor Physics: Introduction, Intrinsic semiconductors and Extrinsic Semiconductor, PN-junction diode, Zener diode, LED, Hall effect & voltage, Hall coefficient, its application, Transistor (CB, CC & CE mode).
Unit III	Activity 1: Circuit model making of P-N Junction Diode/ light emitting diode/ Zener Diode / Transistor. Activity 2: Case Study on Semiconductor Material & its application.

Chairperson

Unit IV	Interference In Thin Film: Introduction, thin film, Plane Parallel thin film, Wedge shaped thin film, Newton rings, Antireflection coating.
	Activity 1: Context based learning & document making based activity. Activity 2: Preparation of Video clips / Build model
Unit V	Laser & Optical Fiber: Introduction of Laser and its characteristics, Interaction of radiation with matter, Meta stable state, Active Medium, Condition of Light amplification, Population Inversion, pumping, Three and four level laser, Ruby laser, Properties and engineering applications. Propagation of light by total internal reflection, structure and classification, Modes of propagation in fibre, Applications of Optical fibre.
	Activity 5: Poster Presentation.
Text Books	
T.1	Avadhanulu, M.N., & Kshirsagar, P.G. (8th Revised Edition). A Textbook of Engineering Physics. S. Chand Publication. New Delhi.
T.2	Subrahmanyam, N., Brij Lal, & Avadhanulu, M.N. (23rd Revised and Enlarged Edition, 2006). A Textbook of Optics. S. Chand Publication. New Delhi.
T.3	Mehta, V.K., & Mehta, Rohit. (Multicolour Illustrative and Thoroughly Revised Tenth Edition, 2006). Principles of Electronics. S. Chand Publication. New Delhi.
T.4	Chris Bernhardt, Quantum computing for everyone, Justi fit, 2025
Reference Books	
R.1	Theraja. B.L. (Reprint 2nd Edition). Modern Physics. S. Chand & Co. New Delhi.
R.2	Dekker, J. (Reprint 1st Edition). Solid State Physics. McMillan India Ltd. Mumbai.
Useful Links	
1	https://nptel.ac.in/courses/115/102/115102124/
2	https://nptel.ac.in/courses/115/106/115106128/
3	https://nptel.ac.in/courses/104/101/104101130/

LIST OF EXPERIMENTS (Quantum, Optics & Computing (BSH51103))		
1	Determination of Plank's constant using LED	CO1
2	Determination of e/m ratio of an electron by Thomson method.	CO2
3	Determination of ripple factor and rectification efficiency by Half Wave and Full Wave Rectifier with CRO.	CO2
4	Determine the Cut in Voltage and Dynamic Resistance of P-N Junction Diode in Forward and Reverse Biased	CO3
5	Determine the Cut in Voltage and Dynamic Resistance of P-N Junction Diode in Forward and Reverse Biased	CO3
6	Determination of Dynamic Resistance and Current Gain of Transistor in Common Emitter	CO3
7	Determination of the Wavelength of Sodium Light By Using Newton rings experiment.	CO4
8	Determination of Fringe width by using Wedge shaped thin film.	CO4
9	Determination of divergence of laser beam.	CO5
10	Determination of acceptance angle and numerical aperture using optical fibre kit.	CO5



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Text Books	
T.1	Avadhanulu, M.N., & Dani, A.A. (2007). Experiments in Engineering Physics (2nd ed.). S. Chand & Company Ltd.
T.2	A textbook of Practical Physics: Samir Kumar Ghosh, 1 st Edition, New Central Book Agency, Kolkata.
Reference Books	
R.1	Engineering Physics: Dattu Joshi, Tata McGraw Hill Education, New Delhi.
R.2	A text book of Engineering physics: Dr.M.N.Avadhanulu, Dr. P.G.Kshirsagar, S.Chand Publication.
Useful Links	
1	https://nptel.ac.in/courses/115/106/115106128/
2	https://nptel.ac.in/courses/104/101/104101130/

CO	Course Outcomes	CL	Class Sessions
CO1	Interpret the behaviour of wave particle duality, wave packet and quantum computing with their quantum application.	2	9
CO2	Illustrate the concept of motion of charged particle in electric field, magnetic field and cross configured field.	3	9
CO3	Explain PN junction diode, Zener diode, Light emitting diode and transistor with their application in engineering field.	3	9
CO4	Differentiate interference phenomenon in parallel and wedge-shaped thin film and their application in engineering field.	3	9
CO5	Explain the characteristics, working of laser and optical fibre with their applications.	3	9


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIML/IT/CyS)

Semester-I Digital Circuits and Design (BEC51101)

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	3Hrs/week	CT-I	12 Marks	-	-
Practical(P)	2Hrs/week	CT-II	12 Marks	-	-
Total Credits	3(Th)+1(P)=4	CT-III	6 Marks		
Duration of ESE:3Hrs		CA	10Marks	CA	25 Marks
		ESE	60Marks	ESE	25 Marks
		Total Marks	100Marks	-	50 Marks

Pre-Requisites: Bridge Course.

Course Objectives:

1. To understand different number systems such as Binary, Decimal, Octal, and Hexadecimal.
2. To develop and analyze logical expressions and circuits using logic gates, Boolean algebra, and Karnaugh Maps.
3. To impart knowledge of fundamental combinational logic circuits such as adders, subtractors, multiplexers, encoders, and decoders.
4. To understand the working principles and types of flip-flops used in sequential circuit design and their role in memory elements.
5. To introduce various types of counters and shift registers, and their application in digital timing and display systems.

Course Contents

Unit I	Number system: Binary, Decimal, Octal & Hexadecimal, Conversion of one number system to another, BCD number system, Addition & Subtraction of Binary number system, 1's complement, 2's Complement
	Activity 1: MCQ Test/ Digital Number System Conversion Race
Unit II	Logic Gates: Symbol & truth table of AND gate, OR gate, NOT gate, NAND gate, NOR gate, Ex- OR, Ex-NOR Gate, Laws of Boolean algebra, De-Morgan's theorem, POS, SOP, Min term, Maxterm and Karnaugh Maps (K-map)
	Activity 2: Game Pedagogy
Unit III	Combinational Logic circuits: Introduction, Half adder, Full adder, Half subtractor, Full subtractor circuit. Multiplexer and DE-multiplexer, Encoder & Decoder
	Activity 3: Technical Poster Presentation
Unit IV	Flip Flops: R-S Flip-Flop, J-K Flip-Flop, Master-Slave Flip-Flops, D Flip-Flop, J-K Flip-Flop as D Flip-Flop, T- Flip-Flop
	Activity 4: Mind Mapping/Open Book Test
Unit V	Counter: Introduction, Asynchronous counter, Synchronous counter, Bushing, Type T Design, Ring counter & Johnson counter
	Shift Register: Introduction, parallel and shift register, Seven Segment displays.
	Activity 1: Story Board Writing/ Paper Presentation

Text Books

- | | |
|-----|--|
| T.1 | Electronic Devices and Circuits David A Bell |
| T.2 | Digital Logic and Computer Design McMorris Mano, PHI Learning. |

Reference Books

- | | |
|-----|---|
| R.1 | Electronics Instrumentation and Measurements (3rd Edition) – David A. Bell. |
| R.2 | Fundamental of digital circuits by A. ANAND KUMAR |

Chairperson

Sr. No.	List of Experiment (Digital Circuits and Design Lab BEC51102)	
1	Design different logic gates and verify its truth table.	CO
2	Design universal gates and verify its truth table.	CO1
3	Design Half Adder and Full Adder and verify its truth table.	CO1
4	Design Half Sub tractor and Full Sub tractor and verify its truth table.	CO2
5	Verify proof of De-Morgan 's theorem Boolean algebra with its truth table	CO2
6	Design 4:1 multiplexer and 1:4 demultiplexer and verify its truth table.	CO3
7	Design 8:3 encoders & 3:8 decoder logic circuits and verify its truth table.	CO3
8	Design different flip-flops and verify its truth table.	CO4
9	Design of 3-bit synchronous counter and verify its truth table.	CO4
10	Design of shift register and shift register counter and verify its truth table.	CO5

Text Books

T.1	A Text Book of Modern Digital Electronics by R.P.Jain:Mc Graw Hill
T.2	Digital Electronics: Principles, Devices and Applications by Anil K. Maini, Mc Graw Hill

Reference Books

R.1	E. Hughes, —Electrical and Electronics Technology, Pearson,2023.
R.2	Digital Logic and Computer Design by M.Morris Mano: Pearson

CO	Course Outcome	CL	Class Session
CO1	Summarize the number system & its conversion	2	9
CO2	Interpret the truth table of Logic gates and simplify its logical Expression	2	9
CO3	Implement combinational logic circuit by using half and full adder.	3	9
CO4	Illustrate the functional behavior of flip-flops	3	9
CO5	Apply the working principles of asynchronous and synchronous counters	3	9



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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIIML/IT/CyS)

Semester-I Programming for Problem Solving using "C": BCS51101

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	2Hrs/week	CT-I	5 Marks	-	-
Practical(P)	-	CT-II	5 Marks	-	-
Total Credits	2 (Th)	CT-III	4 Marks	-	-
Duration of ESE: 2Hrs		CA	6 Marks	-	-
		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-

Pre-Requisites: NA

Course Objectives:

1. To understand the basics, history, and structure of the C programming language.
2. To Apply control structures like decision-making, loops, and unconditional statements to solve programming problems.
3. To describe the techniques for creating program modules in C using Array and Pointer

Course Contents

Unit I	<p>Introduction to C: History of C, Features of C, Structure of C program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, data types, Operators, variable declaration, Assigning Value to variable, Introduction to Computing: Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.</p> <p>Operator and Expression: Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional operator, Bitwise operators, size of operator, Arithmetic Expression, Evaluation expression. Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, typedef, enum.</p> <p>Activity:</p> <ol style="list-style-type: none"> 1) Write and Submit a Flowchart & Algorithm 2) Create a C Program with All Basic Tokens
	<p>Programming Basics: Components of C language. Standard I/O in C, Format Specifiers, Writing and executing C program, Syntax and logical errors in compilation, object and executable code.</p> <p>Control Structures: Selection Statements (Decision Making) – if and switch statements.</p> <p>Statements (Loops): while, for, do-while statements, Unconditional Statements – break, continue, goto with Example.</p> <p>Activity:</p> <ol style="list-style-type: none"> 1) Debugging Challenge 2) Conditional Control Flow Mini Project
Unit III	<p>Basic Arrays: Definition, declaration of array, Initialization, storing values in array.</p> <p>Type of Array: Two dimensional arrays, multi-dimensional arrays. Arrays and Pointers, Array of pointers</p> <p>Basics of Algorithm: - Introduction, Types of algorithms, Sorting Algorithm, Bubble & Insertion sort.</p> <p>Activity:</p> <ol style="list-style-type: none"> 1) 2D Array Matrix Operations 2) Sorting Visual Report

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Text Books

T.1	Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
T.2	Computer Science: A Structured Programming Approach Using C, B.A.Forouzanand R.F. Gilberg, Third Edition, Cengage Learning.

Reference Books

R.1	Let us C, Yashwanth Kanethkar, 13th Edition, BPB Publications.
R.2	Computer Programming, E. Balagurusamy, First Edition, TMH.
R.3	The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.

Useful Links

1	https://youtu.be/-wv-OERJK3M
2	https://youtu.be/IdXrCPzNnkU
3	https://youtu.be/5AHRXOtn9bY

CO	Course Outcomes	CL	Class Session
CO1	Understand the use of algorithms and flowchart to represent computational logic	2	9
CO2	Apply the concept of subprograms and Loops for programming.	3	8
CO3	Use arrays, multidimensional arrays and array of pointers in C.	3	8

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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIIML/IT/CyS)

Semester-I Fundamental of Generative-AI-Lab (BAIML51101)

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	-	-	-	-
Practical (P)	2 Hrs/week	-	-	-	-
Total Credits	1(P)	-	-	IA	50 Marks
		-	-	ESE	-
		-	-	Total Marks	50 Marks

Pre-Requisites: NA

Course Objectives:

1. **Understand** the fundamental concepts, applications, and popular tools of Generative AI.
2. **Demonstrate** the use of prompt engineering techniques and Generative AI tools for creating text, images, code, presentations, and chatbots.
3. **Apply** Generative AI technologies to solve simple real-world problems while practicing ethical and responsible use of AI.

Course Contents

Unit I	Fundamentals of Generative AI: Introduction to Artificial Intelligence, Machine Learning, Deep Learning and Generative AI, Evolution of Generative AI, Large Language Models (LLMs): Basic Concepts, Transformer Architecture, Applications of Generative AI in Engineering, Education, Healthcare and Industry, Overview of Popular AI Tools, Introduction to Prompt Engineering, Types of Prompts:
Unit II	Generative AI Applications: Advanced Prompt Engineering: Few-shot Prompting, Chain-of-Thought Prompting, Context-based Prompting AI-assisted Content Generation, Text Summarization, Translation using AI, AI-assisted Code Generation, AI-based Image Generation, AI-assisted Presentation Creation, AI for Data Analysis and Visualization
Unit III	AI Applications, Ethics and Mini Project: Introduction to AI APIs and No-Code AI Platforms, Building Simple AI Chatbots, AI Productivity Tools, Responsible AI, AI Ethics, AI Bias and Hallucinations, Privacy, Security and Copyright Issues, Prompt Optimization, Future Trends in Generative AI, Mini Project Development and Demonstration

Text Books

T.1	Introduction to Artificial Intelligence , Cengage Learning, 2021.
T.2	Artificial Intelligence Basics: A Non-Technical Introduction , Apress, 2nd Edition.
T.3	Artificial Intelligence: Principles and Applications , PHI Learning, 2nd Edition, 2024.

Reference Books

R.1	Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig.
R.2	Generative AI For Dummies , Wiley, 2024
R.3	AI for Everyone: A Beginner's Handbook for Artificial Intelligence , Pearson, 2025

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Useful Links	
L.1	ChatGPT: ChatGPT (OpenAI)
L.2	Google AI: Google AI Studio
L.3	Google Colab: Google Colab
L.4	Hugging Face: Hugging Face
L.5	NPTEL Courses: NPTEL Online Courses

LIST OF EXPERIMENTS		
1	Identify the fundamental concepts, applications, and tools of Generative AI.	CO1
2	Recognize the capabilities of conversational AI using ChatGPT or similar Large Language Models (LLMs).	CO1
3	Describe basic prompt engineering techniques using simple and role-based prompts.	CO1
4	Explain advanced prompt engineering techniques including Chain-of-Thought and Few-shot prompting.	CO2
5	Interpret AI-generated outputs for content summarization, translation, and document analysis.	CO2
6	Apply AI-assisted code generation using GitHub Copilot or ChatGPT to solve programming problems.	CO3
7	Generate images using AI tools such as DALL·E, Adobe Firefly, or similar platforms.	CO3
8	Create presentations using AI-powered presentation generation tools.	CO3
9	Develop a simple chatbot using no-code AI platforms.	CO3
10	Implement a mini project using Generative AI tools to solve a real-world problem.	CO3

CO	Course Outcomes	CL	Class Sessions
CO1	Remember the fundamental concepts, terminology, popular tools, prompt engineering basics, and applications of Generative AI.	1	10
CO2	Understand advanced prompt engineering techniques and the applications of Generative AI for content generation, summarization, translation, document analysis, and code generation.	2	10
CO3	Apply Generative AI tools to create images, presentations, chatbots, and AI-enabled solutions while demonstrating responsible and ethical use of Generative AI.	3	10


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AI/ML/IT/CyS)

Semester-I 'C' Language Lab: BCS51102

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	-	-	-	-
Practical (P)	2 Hrs./week	-	-	-	-
Total Credits	1	-	-	IA	25 Marks
-	-	-	-	ESE	25 Marks
-	-	-	-	Total	50 Marks

Pre-Requisites: NA

List of Experiments

1.	Write a program to demonstrate the structure of a C program, use of print (), scan (), and different format specifiers by accepting and displaying student details.	CO1
2.	Implement a program that includes all the arithmetic operators and evaluates arithmetic expressions.	CO1
3.	Execute a program to swap two variables' values with and without using third variable	CO1
4.	Write a program to find the greatest among three number using if-else.	CO2
5.	Write a menu-driven program using the switch statement to perform arithmetic operations.	CO2
6.	Design a program using Loops and print the following star pattern. * * * * * * * * * *	CO2
7.	Implement a program using array and contract two matrix of 3*3 and store the sum in resultant matrix.	CO3
8.	Develop a program to swap a values of a variable using pointers.	CO3
9.	Implement a program that include bubble sort.	CO3
10.	Micro Project Based on Programming.	CO3

Text Books

T.1	Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
T.2	Computer Science: A Structured Programming Approach Using C, B.A. Forouzanand R.F. Gilberg, Third Edition, Cengage Learning.

Reference Books

R.1	Let us C, Yashwanth Kanethkar, 13th Edition, BPB Publications.
R.2	Computer Programming, E.Balagurusamy, First Edition, TMH.
R.3	The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.

Useful Links

1	https://youtu.be/-wv-OERJK3M
2	https://youtu.be/ldXrCPzNnkU
3	https://youtu.be/5AHRXOtn9bY

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CO	Course Outcomes	CL	Class Session
CO1	Understand the use of algorithms and flowchart to represent computational logic	2	9
CO2	Apply the concept of subprograms and Loops for programming.	3	8
CO3	Use arrays, multidimensional arrays and array of pointers in C.	3	8



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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (CSE/DS/AIIML/IT/CyS)

Semester-I | Web Designing Lab: BDS51101

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	-	-	-	-	-
Practical (P)	2 Hrs/week	-	-	-	-
Total Credits	1(P)	-	-	IA	50 Marks
		-	-	ESE	-
		-	-	Total Marks	50 Marks

Pre-Requisites: NA

Course Objectives:

1. To aware about different tools for Web Programming.
2. To demonstrate proficiency in writing and applying HTML code.
3. To design efficient client side and server-side scripts for dynamic web applications.
4. To Understand XML structure, tags, validation, and Document Object Model.
5. To construct web pages using CSS and JavaScript.

Course Contents

Unit I	Web Foundations: The Evolution of the Web, History of the Web, Internet Application, Networks, TCP/IP, Higher Level Protocols, Components of the Web, Web Search Engines, Web Servers, Application Servers
Unit II	HTML - History of HTML, Title and Footers, Text Formatting, Emphasizing Material in a Web Page List, Text Styles, Other Text Effects, Lists, Adding Graphics to HTML Documents, Tables, Linking Documents, images, forms, Frames, Global Attributes <sup>Tag, <svg>Tag.
Unit III	Cascading Style Sheets: Introduction CSS, Creating Style Sheets, Common Tasks with CSS, Colours - Colour Properties, Image Properties, Position Properties, Background Properties, The Font Family, Layer Tag
Unit IV	XML: Introduction to XML, Features of XML, Defining XML tags, their attributes and Values, Document Type Definition, XML Schemes, Document Object Model.
Unit V	JavaScript: Introduction JavaScript, JavaScript in Web pages: -Netscape and JavaScript, Client-side JavaScript, Data Types and Literal, Boolean, String, Null, Type Casing, Operators and Expressions in JavaScript.

Text Books

1	Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Kogent Learning Solutions Inc., Dream tech Press, 2009
2	M. Srinivasan, Web Technology: Theory and Practice, Pearson India, 2012.
3	The Complete Reference PHP—Steven Holzner, Tata McGraw-Hill

Reference Books

1	Internet and World Wide Web—How to program. Dietel and Nieto, Pearson.
2	Web Programming, building internet applications, Chris Bates 2 nd edition, Wiley Dreamtech
3	Java Server Pages—Hans Bergsten, SPD O'Reilly,

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Useful Links	
1	https://nptel.ac.in/courses/106/105/106105084/
2	https://nptel.ac.in/courses/106/105/106105084/
3	https://nptel.ac.in/courses/106/105/106105084/

List of Experiment		
1	Demonstrate various tags in HTML	
2	Design a page having suitable background color and text color with title —My First Web Page using all the attributes of the Font tag.	CO1 CO2
3	Create a HTML document giving details of your [Name, Age], [Address, Phone] and [Register Number, Class] aligned in proper order using alignment attributes of Paragraph tag.	CO2
4	Write HTML code to design a page containing some text in a paragraph by giving suitable heading style.	CO3
5	Create a page to show different character formatting (B, I, U, SUB, SUP) tags. viz : log b m^p= p logbm	CO3
6	Create a staggered slide-in animation for list elements using HTML, CSS, and transition-delay with a checkbox trigger	CO4
7	Create an image overlay effect on hover using pseudo-elements, flexbox for text alignment, and CSS transitions.	CO5
8	Design a bouncing loader animation using HTML, CSS @key frames, and transform properties with staggered animation delays	CO5
9	Create a sample HTML file with a submit button, and use JavaScript to modify the style of the paragraph text.	CO5
10	Write a JavaScript function to get the values of first and last names of the following form.	CO5

CO	Course Outcomes	CL	Lab Sessions
CO1	Explain the basic fundamentals of Web Foundations.	2	4
CO2	Describe the usage of formatting tags in HTML for web development.	2	4
CO3	Implement high-level formatting using Cascading Style Sheets (CSS).	3	4
CO4	Apply methods of information exchange between computer systems such as websites, databases, and third-party applications.	3	4
CO5	Use JavaScript to integrate with web pages, applying scripts and handling data types and expressions effectively.	3	4

				July, 2026	5.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean Academics	Vice Principal	Principal/Director (Administration)	Date of Release	Version	



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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS/IT/CyS)

Semester-II	Differential Equation & statistics: (BSH51201)				
Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	4 Hrs./week	CT-I	12 Marks	-	-
Practical (P)	-	CT-II	12 Marks	-	-
Total Credits	4 (Th) = 4	CT-III	6 Marks	-	-
Duration of ESE:3Hrs		CA	10 Marks	-	-
		ESE	60 Marks	-	-
		Total Marks	100 Marks	-	-

Pre-Requisites: NA

Course Objectives:

1	To utilize consistency of system of equations.
2	To make students acquainted with advance techniques to evaluate integrals.
3	Identify the type of a given differential equation and select and apply the appropriate analytical Technique for finding the solution of first order and selected higher order ordinary differential equations.
4	To gain Statistical knowledge that helps to use the proper methods to collect the data, employ the Correct analyses and find the result.
5	To introduce students to Discrete and Continuous Random Variables concepts and their use in real world phenomena.

Unit I	Differential Equation: Order and Degree of D.E, Linear and Exact Differential Equations, First order & First degree D.E. solvable for p, Equations solvable for y, Equations solvable for x, Application: Newton 's law of cooling, Data Analysis through Programming. Activity 1. Mathematically Verification of Newton's law of Cooling Practically. Activity 2. To solve Linear Differential Equation by Sage math.
Unit II	Higher Order Differential Equation: Higher order linear D.E. with constant coefficient, Method of variations of Parameters, Cauchy's form, Legendre's Linear Equations. Application of second order differential equation to R-L-C CIRCUIT, Heat Equations. Activity 1. Perform basic operations of Differential equation by Sage math. Activity 2. To solve higher Order Differential Equation by using Sage math
Unit III	Multivariable Calculus (Integration): Double Integration (Cartesian and polar coordinates), Change of Order of Integration, Elementary Triple Integration, And Application: Area by double integration and volume by triple integration. Activity 1. Application of integration by using Sage math Activity 2. Evaluation of Integration by using Sage math.
Unit IV	Probability: Conditional Probability, Discrete Random Variable, Continuous Random Variable, Probability Distribution function, Probability density function, Binomial Distribution, Uniform Distribution, Poisson 's Theorem, Moment Generating Function (Discrete random Variable and Continuous Random variable). Activity 1. Mathematical model based on Probability. Activity 2. To Evaluate Random variable by using Sage math.
Unit V	Statistics: Measures of central tendency: Skewness and Kurtosis, Coefficient of variation, Moments, fitting of straight line, Fitting of parabola and exponential curves, Lines of regression and correlation, Rank correlation. Activity 1. To Determine mean, mode & median by sage math. Activity 2. To Fit the straight line, Parabola and Exponential curves by using Scilab.

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Text Books	
T.1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9 th Edition
T.2	Advance Engineering Mathematics by Ervin Kreyszig's 9 th Edition
T.3	H. K. Dass, Advanced Engineering Mathematics, S. Chand, Reprint, 2014.
T.4	Outline Series, McGraw Hills, 4th Edition, 2016.
T.5	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.
T.6	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9 th edition, Pearson, Reprint2002.
Reference Books	
R.1	Gilbert Strang: Linear Algebra and Its Applications (Paperback), Nelson Engineering (2007)
R.2	Advanced Engineering Mathematics by Erwin Kreyszig's (Wiley India) 9 th edition
R.3	A textbook of Engineering Mathematics by N.P. Bali, Manish Goyal, Laxmi Publication, Reprint 2010
R.4	Higher Engineering Mathematics by B. S. Grewal, Khanna Publisher 35 th edition.
Useful Links	
1.	https://onlinecourses.nptel.ac.in/noc23_ma61/preview
2	https://onlinecourses.nptel.ac.in/noc21_ma74/preview
3	https://archive.nptel.ac.in/courses/111/107/111107108/

Course Code	Course Outcomes	CL	Class Sessions
CO1	Implement appropriate methods to solve first order differential equation and apply it to find solution of engineering problems.	3	9
CO2	Execute appropriate methods to solve higher order differential equation	3	9
CO3	Utilize fundamental theorems to compute integrals of both single-variable and multivariable functions.	3	9
CO4	Apply Probability concepts to interpret real-world Phenomena.	3	9
CO5	Inspect scientific data, use proper curve fitting and find correlation, regression of variables.	3	9


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS/IT/CyS)

Semester-II Advance Material: BSH51202

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	4 Hrs./week	CT-I	12 Marks	-	-
Practical (P)	-	CT-II	12 Marks	-	-
Total Credits	4 (Th) = 4	CT-III	6 Marks	-	-
Duration of ESE:3Hrs		CA	10 Marks	CA	25 Marks
		ESE	60 Marks	ESE	25 Marks
		Total Marks	100 Marks	-	50 Marks

Pre-Requisites: AICTE Bridge Course, Energy sources, Thermodynamics and Equilibrium, Basics of Electrochemistry.

Course Objectives:

1. To gain the knowledge of Energy sources, types & Application.
2. To inculcate knowledge about Advance material.
3. To enable to students to upgrade the existing knowledge of water technology.
4. To enlighten the students to the basic process and laws in Electrochemistry.
5. To gain the knowledge on synthesis, properties and applications of polymers.

Course Contents

Unit I	Energy Sources: Introduction of energy, units of energy, types of Energy (conventional and non-conventional energy sources), Introduction of fuels, classification and application, Calorific value determination of solid, liquid, and Gas, Analysis of solid fuels, Fractional distillation, CNG and Bio-Diesel, Numerical on Dulong's Formula, Bomb Calorimeter and Boys Calorimeter.
	Activity: Creative poster making on futuristic lookout of non-conventional energy source.
Unit II	Smart Material and E-Waste Management: Introduction of Advanced material, Composite Material, their properties and application, polymer matrix. Metal matrix, ceramic matrix, Nanomaterials and Application in electronics devices. Introduction of E-waste, Types of E-Waste and its Control, Reduce-Reuse-Recycle, Numerical on E-Waste Management.
	Activity: Students match waste items (e.g., batteries, printers, circuit boards, smart phones) to categories like large/small equipment, ICT, hazardous components. Use real/dummy items or flashcards.
Unit III	Water pollution and Softening processes: Introduction, Sources of pollution, Hardness, Coagulation, Sterilization, Softening process (Zeolite process and Ion Exchange Process) Boile trouble due to scale and sludge, Desalination of water by Reverse osmosis, Demineralization techniques, Numerical on Hardness of water.
	Activity: Visit to Domestic/Municipal water treatment Plant and Recycling industry.
Unit IV	Electrochemistry & Battery Technology: Basics of Electrochemistry, Laws of Electrochemistry, Concept of Galvanic Series, Electrochemical cell, Introduction of batteries, Types of Batteries (Carbon-Zn, Alkaline- Zinc, NICAD, Lead Acid battery), H ₂ -O ₂ Fuel cell and its applications Numerical on Faradays law and Electrode potential.
	Activity: Open Book test
Unit V	Polymer Science: Introduction, Classification of Polymers (on the basis of source, origin, structure), Uses of commercially important polymers (Polyethylene), Biodegradable polymer (Polylactic acid) with synthesis and applications, Conducting (polyaniline, polypyrrol) & Insulating Polymers (polyvinyl chloride), Numerical on molecular weight calculation.
	Activity: Prepare the chart of types of polymers with their monomers, properties and application.

Chairperson

Text Books	
T.1	Engineering Chemistry by S.S. Dara, 10th Edition. S. Chand & Co
T.2	Engineering Chemistry Dr. Avinash Bharti, V.K. Walekar, 1st Edition. Tech Max.
T.3	Textbook of Engineering Chemistry: P.C Jain & Monica Jain, 15 th Edition. Dhanpatrai publication Ltd
Reference Books	
R.1	Applied Chemistry: Narkhede & Bhake, 1st Edition. Das Ganu Prakashan.
R.2	Engineering Chemistry Dr. Avinash Bharti, V.K. Walekar, 1st Edition. Tech Max
Useful Links	
1	https://nptel.ac.in/courses/103/103/103103206/
2	https://nptel.ac.in/courses/103/108/103108162/
3	https://nptel.ac.in/courses/104/105/104105124/

LIST OF EXPERIMENTS (Advanced Material: BSH51203)		
1	Determination of Moisture, Volatile Matter & Ash Content of given Coal sample.	CO1
2	Determination of Flash Point of given Oil by Pensky Martine or Abel's Apparatus	CO1
3	Determination of Cation Exchange Capacity by Ion Exchange Resin.	CO2
4	Determination of Heat of Hydration of Given Material.	CO2
5	Determination of Hardness of Water Sample by Complexometric Method.	CO3
6	Determination of Calcium Ion & Magnesium Ion Separately.	CO3
7	Determination of pH of given Solution.	CO4
8	Determination of Electrode Potential by Galvanic Cell	CO4
9	Determination of saponification value of Bio-Degradable Polymer.	CO5
10	Synthesis of Conducting Polymer (Polyaniline)	CO5

Text Books	
T.1	Applied Chemistry Lab O.P Virmani
T.2	Laboratory Manual on Engineering Chemistry by Suddharani
T.3	Experiments and Calculations in Engineering Chemistry by S. Chand
T.4	Practical Engineering Chemistry: By S.N. Narkhede, Dr. R.T. Jadhav, Dr. A.B. Bhake
Reference Books	
R.1	A textbook on experiment and calculation By S.S. Dara
R.2	Inorganic Quantitative analysis, Vogel
Useful Links	
1	https://nptel.ac.in/courses/108/104/10810412345/
2	http://nptel.ac.in/courses/1171012546/

CO	Course Outcomes	CL	Class Sessions
CO1	Interpret the types of Energy sources and its properties and application	2	9
CO2	Explain properties and applications of smart materials.	2	9
CO3	Differentiate water pollution and its softening process.	2	9
CO4	Illustrate different laws of Electrochemistry, types and applications of batteries.	3	9
CO5	Predict the types and applications of commercial polymers.	3	9


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS/IT/CyS)

Semester-II Logic Development and Programming Design: BIT51201

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	3Hrs/week	CT-I	12 Marks	-	-
Practical(P)	2Hrs/week	CT-II	12 Marks	-	-
Total Credits	3(Th)+1(P)=4	CT-III	6 Marks		
Duration of ESE:3Hrs		CA	10Marks	CA	25 Marks
		ESE	60Marks	ESE	25 Marks
		Total Marks	100Marks	-	50 Marks

Pre-Requisites: NA

Course Objectives:

1. The course aims to provide exposure to problem-solving through programming.
2. It aims to train the student to the basic concepts of the C-programming language.
3. This course involves a lab component which is designed to give the student hands-on experience with the concepts.
4. To express algorithms and draw flowcharts in a language independent manner.
5. To describe the techniques for creating program modules in C using functions.

Course Contents

Unit I	Functions: Introduction, Uses of function, Designing Structured Programs, Scope rule of Function, Return type, Types of Functions-User defined functions, Standard functions, Categories of functions, Call by value and call by reference, Parameter Passing techniques, Storage classes, Recursion.
	Activity 1: Function Detective (Identify & Categorize Functions) Activity 2. Build and Test – Recursive vs Iterative
Unit II	Advance Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays. Character arrays and strings, declaring Structure, union, enumerated data types, array of structures, passing arrays to functions. Basic Algorithms: Searching & Basic Sorting Algorithms (Bubble, Insertion and Selection).
	Activity 1: "Matrix Walk" – Understanding 2D Arrays Activity 2. "Sorting Showdown" – Bubble, Selection, Insertion
Unit III	Strings: Arrays of characters, variable length character strings, inputting character strings, character library functions, string handling functions.
	Activity 1: "String Puzzle Race" – Build and Compare Strings Activity 2. "String Talk Show" – Character Classification Game
Unit IV	Pointers: Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free), Use of pointers in self-referential structures, notion of linked list (no implementation)
	Activity 1: "Pointer Chain" – Visualizing Pointer Variables and References Activity 2. "Dynamic Memory Allocation Role Play"
Unit V	File handling: Data organization, File operation, and File I/O functions, File opening modes, Reading, Trouble in opening file, Standard C preprocessors, defining and calling macros, command-line arguments.
	Activity 1: "File Operation Role Play" Activity 2. "Macro & Command-line Arguments Puzzle"

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Text Books	
1	Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2	Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
Reference Books	
1	Let us C, Yashwanth Kanethkar, 13th Edition, BPB Publications.
2	Computer Programming, E.Balagurusamy, First Edition, TMH.
3	The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
Useful Links	
1	https://youtu.be/-wv-OERJK3M
2	https://youtu.be/IdXrCPzNnkU
3	https://youtu.be/5AHRXOtn9bY

Sr. No.	List of Experiment (Logic Development and Programming Design-Lab: BIT51202)	
1	Design a program using user defined functions to determine whether the given string is palindrome or not	CO1
2	Convert string to integer without using library functions	CO1
3	Write a C program to sort an Array in ascending and descending order	CO2
4	Structure C Program to manage student details using array.	CO2
5	Implement a c program to compare two strings using string handling function	CO3
6	Write a program in c to reverses a string manually and using strrev().	CO3
7	Demonstrates the use of malloc to allocate memory dynamically using C.	CO4
8	Write a program to find the length of the string using Pointer.	CO4
9	Write a name into a file and read the name from the file using file handling in C.	CO5
10	Micro Project	CO5

CO	Course Outcomes	CL	Class Session
CO1	Demonstrate the concept of function using parameter passing, storage classes and recursion	2	9
CO2	Explain the process of array declaration, passing array and debug programs in C language.	2	9
CO3	Illustrate the process of compile and debug string programs in C language.	3	9
CO4	Use the concept of pointers , perform pointer arithmetic, and use the pre-processor	3	9
CO5	Apply calling macros and file I/O function for efficient data handling in C .	4	9


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS/IT/CyS)

Semester-II Indian Ancient Technology: BSH51204

Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory (Th)	2Hrs/week	CT-I	5 Marks	-	-
Practical(P)	-	CT-II	5 Marks	-	-
Total Credits	2 (Th)	CT-III	4 Marks	-	-
Duration of ESE: 2Hrs		CA	6 Marks	-	-
		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-

Pre-Requisites: NA

Course Objectives:

1. To understand the foundational concepts and key developments in ancient Indian technology.
2. To summarize ancient Indian innovations in metallurgy, architecture, agriculture, and medicine.
3. To paraphrase the ecological and societal impact of these technologies and their relevance today.

Course Contents

Unit-I	Foundations of Indian Ancient Technology - Definition and scope, Sources: archaeological, literary (Vedas, epics, treatises), Chronological overview (Indus Valley to Gupta period and beyond)
	Activity 1: Group presentation on selected ancient technology or scientist. Activity 2: Quiz format with speed challenges.
Unit-II	Technological Innovations & Metallurgy: Wootz steel and its global influence, Iron Pillar of Delhi and corrosion resistance, Zinc smelting at Zawar mines, Bronze and copper tools in the Harappan civilization.
	Activity 1: Poster creation on sustainability in ancient Indian technology. Activity 2: Group discussion on Why did the Iron Pillar resist rust for over 1600 years?
Unit-III	Science, Medicine & Sustainability - Astronomy and ancient scientific instruments, Ayurveda and ancient surgical techniques, Ecological practices and sustainable technology, Revival and modern applications of ancient technology.
	Activity 1: Discussion on integrating traditional technologies in modern practices. Activity 2: Prepare a chart of Tridosha (Vata, Pitta, Kapha) and match herbs to body types.

Text Books:-

T.1	Aspects of Science and Technology in Ancient India Edited by Arun Kumar Jha and Seema Sahay
T.2	The Ancient Engineers by L. Sprague de Camp
T.3	The Golden Road: How Ancient India Transformed the World by William Dalrymple

Reference Books:-

R.1	"The Wonder That Was India" - A. L. Basham
R.2	"Iron and Steel in Ancient India" - B. R. Pant
R.3	"Indian Medicine in the Classical Age" - P. Kutumbiah

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Useful Links:-

1.	https://onlinecourses.nptel.ac.in/noc20_ae10/preview
2.	https://archive.nptel.ac.in/courses/101/104/101104065/
3.	https://hits.digimat.in/nptel/courses/video/101104065/L08.html

Course Code	Course Outcomes	CL	Class Sessions
CO1	State major ancient Indian technologies and their principles.	1	4
CO2	Describe the processes and applications of metallurgy, architecture, and agriculture in ancient India.	1	4
CO3	Explain the sustainability and modern relevance of ancient Indian technologies.	2	4

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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS /IT/CyS)

Semester-II Cyber Security & Ethics Lab: BIT51201

Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory (Th)	-	-	-	-	-
Practical (P)	2 Hrs/week	-	-	-	-
Total Credits	1(P)	-	-	IA	50 Marks
		-	-	ESE	-
		-	-	Total Marks	50 Marks

Pre-Requisites:

Course Objectives:

1. Understand the fundamentals of cyber security, cyber threats, cyber laws, and the importance of cyber governance.
2. Identify cyber security vulnerabilities, attacks, and implement appropriate security safeguards for computer systems and networks.
3. Develop basic skills to secure web applications, services, and servers using standard cyber security practices and tools.

Course Contents

Unit-I	Introduction to Cyber Security: Introduction to Cyber Security – Definition, Objectives, Need and Importance of Cyber Security, CIA Triad (Confidentiality, Integrity and Availability), Types of Cyber Attacks, Cyber Threats and Vulnerabilities, Cyber Crimes, Cyber Security Best Practices. Introduction to Computer and Linux: Computer Fundamentals, Hardware and Software Components, Introduction to Linux Operating System, Features of Linux, File System Structure, Booting Process, Basic Linux Commands, Files and Directories.
Unit-II	Introduction to Linux Operating System: Overview of Linux, Features of Linux, Linux File System, Booting Process, Basic Linux Commands, File and Directory Management, File Permissions, User Account Management, Password Management, Process Management, System Information Commands. Linux System Administration and Security: Software Installation and Package Management using APT, Software Updates, Basic System Monitoring, Disk and Memory Information, User Authentication, Access Control, Basic Security Configuration, Backup and Restore Concepts, Safe Computing Practices.
Unit-III	Cyber Security Tools and Safe Computing: Introduction to Security Tools, Antivirus Software, Firewall, Nmap (Basic Network Scanning), Wireshark (Basic Packet Analysis), System Logs, Software Updates, Backup and Recovery. Cyber Security Awareness: Common Cyber Threats – Virus, Worm, Trojan Horse, Ransomware, Spyware, Phishing, Social Engineering, Password Security, Safe Internet Browsing, Email Security, Data Backup, Cyber Ethics and Digital Safety.

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Text Books :-	
T.1	William Stallings – <i>Network Security Essentials: Applications and Standards</i> , Pearson Education.
T.2	Charles P. Pfleeger & Shari Lawrence Pfleeger – <i>Security in Computing</i> , Pearson Education.
Reference Books:-	
R.1	Michael E. Whitman & Herbert J. Mattord – <i>Principles of Information Security</i> , Cengage Learning.
R.2	S. Srinivasan – <i>Cyber Security Essentials</i> , Wiley India.
R.3	Michael Miller – <i>Absolute Beginner's Guide to Computer Basics and Cyber Security</i> , Pearson.

Useful Links:-	
1.	https://youtu.be/eEo_aacpwCw
2.	https://youtu.be/dOiA2nNJpc0
3.	https://youtu.be/gxsFmFU4al0

Sr. No.	List of Experiment	
1	Installation and Basic Configuration of the Kali Linux Operating System.	CO1
2	Study and Execution of Basic Linux Commands for File System Navigation and Directory Management. (pwd, ls, cd, mkdir)	CO1
3	Performing File and Directory Operations in Linux Including Creating, Copying, Renaming, Moving, and Deleting Files.	CO2
4	Creation and Management of User Accounts, Passwords, and Basic User Administration in the Linux Operating System.	CO2
5	View and Verify Basic System Information Using Linux Commands. (whoami, hostname, date, uname)	CO2
6	Check Network Connectivity Between Systems Using the Ping Command.	CO3
7	Display and Verify IP Address and Network Configuration Using ip a or ifconfig Commands.	CO3
8	Install, Update, and Manage Software Packages Using the apt Command.	CO3
9	View and Monitor Running Processes Using ps and top Commands in Linux.	CO3
10	Study of Common Cyber Security Threats Including Virus, Worm, Trojan Horse, and Phishing Attacks.	CO3

CO	Course Outcomes	CL	Class Session
CO1	Explain the fundamentals of Linux operating system, basic Linux commands, file management, user account management, and system administration concepts required for cyber security.	1	4
CO2	Describe the Linux operating system, system information, software package management, process management, and basic cyber security concepts, including common cyber threats and safe computing practices.	2	4
CO3	Apply Linux administration skills by performing file management, user account management, software installation, system monitoring, and basic cyber security practices to secure computer systems.	3	4


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Department of Basic Sciences and Humanities

Program: B. Tech First Year (AE/CE/ME/BT)

SEMESTER-I Basics of Career Development - BSH51205

Teaching Scheme	Examination Scheme (Th)	Examination Scheme (P)
Theory (Th)	-	-
Practical (P)	2 Hrs/week	-
Total Credits	1(P)	-
	-	IA
	-	ESE
	-	Total Marks
		50 Marks

Pre-Requisites: -

Course Objectives: -

1.	To develop career etiquette, self-presentation, and professional behavior.
2.	To demonstrate effective communication and workplace etiquette.
3.	To apply functional grammar and professional writing skills.
4.	To develop personality, self-confidence, and interpersonal skills.
5.	To demonstrate presentation, group discussion, and public speaking skills.

Course Contents

Unit-I	Introduction to Career Etiquette: Greeting Etiquette, Body Language, Professional Grooming, Self-Awareness, Personal Identity, Family Values, Self-Presentation, Career Vision, Goal Setting, and Presentation Skills.
Unit-II	Fundamentals of Communication: Communication Process, Elements of Communication, Types of Communication, Verbal and Non-Verbal Communication, Listening Skills, Interpersonal Communication, Communication Barriers, Feedback, and Effective Communication Strategies.
Unit-III	Functional Grammar and Written Communication- Sentence Formation, Functional Grammar, Tenses, Subject-Verb Agreement, Articles, Prepositions, Error Correction, Writing Process, Applications, Official Letters, Report Writing, and Writing Formats.
Unit-IV	Workplace Etiquette and Personality Development- Workplace Etiquette, Digital Etiquette, Email Etiquette, Meeting Etiquette, Workplace Behavior, Self-Confidence, Emotional Intelligence, Interpersonal Skills, Teamwork, Leadership, and Personality Development.
Unit-V	Professional Communication and Presentation Skills – Newspaper Reading, Listening Skills, Observation Skills, Vocabulary Development, Public Speaking, Group Discussion, Presentation Skills, Audience Interaction, Seminar Presentation, and Career Readiness.

Text Books: -

T1.	Sanjay Kumar & Pushp Lata, Communication Skills , Oxford University Press, New Delhi.
T2.	Meenakshi Raman & Sangeeta Sharma, Technical Communication: Principles and Practice , Oxford University Press, New Delhi.
T3.	Ashraf Rizvi, Effective Technical Communication , McGraw Hill Education, New Delhi.

Reference Books: -

R1.	Stephen R. Covey, The 7 Habits of Highly Effective People , Simon & Schuster.
R2.	Dale Carnegie, How to Win Friends and Influence People , Simon & Schuster.
R3.	Norman Lewis, Word Power Made Easy , Goyal Publishers & Distributors Pvt. Ltd.

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Useful Links:-

1.	https://www.grammarly.com/blog/
2.	https://www.bbc.co.uk/learningenglish

Sr. No.	LIST OF EXPERIMENTS (Basics of Career Development - BSH51205)	CO
1	Understanding Essential Etiquette and Its Applications.	CO1
2	Demonstration of Self-presentation skills in day-to-day life.	CO1
3	Exploring the Fundamentals and Types of Communication for Career Development	CO2
4	Developing General Communication Skills for Effective Personal and Professional Interaction	CO2
5	Using Functional Grammar for Effective Oral and Written Communication	CO3
6	Developing Writing Skills through Applications, Official Letters, and Report Writing	CO3
7	Understanding Workplace Etiquette and Appropriate Professional Behavior.	CO4
8	Exploring the Foundations of Personality Development for Career Growth	CO4
9	Enhancing Communication Skills through Reading, Listening, Observation, and Media Analysis	CO5
10	Building Confidence through Group Discussions and Presentations	CO5

CO	Course Outcomes	CL	Class Sessions
CO1	Identify the principles of essential etiquette, self-awareness, self-presentation, and career planning.	1	4
CO2	Outline the fundamentals of communication and effective communication strategies.	1	4
CO3	Understand the concepts of functional grammar and written communication for professional documentation.	2	4
CO4	Explain the importance of workplace etiquette, personality development, and interpersonal skills for professional growth.	2	4
CO5	Apply communication and presentation skills effectively in group discussions, public speaking, and career-related interactions.	3	4


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Department of Basic Sciences and Humanities

Program: B. Tech First Year Group-A (AIML/ CSE/ DS/IT/CyS)

Semester-II Python Programming (BBS51201)

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	-	-	-	-
Practical (P)	2 Hrs/week	-	-	-	-
Total Credits	1(P)	-	-	IA	25 Marks
		-	-	ESE	25 Marks
		-	-	Total Marks	50 Marks

Course Objective:

1	To read and write simple Python programs.
2	To develop Python programs with conditionals and loops
3	To define Python functions and call them.
4	To use Python data structures lists, tuples, and dictionaries.
5	To Apply file and exception handling to manage I/O and runtime errors in Python.

Course Contents

Unit I	Introduction to Python Programming Language: Introduction to Python Language, python interpreters, working with python, Numeric Data Types: int, float, Boolean, complex and string and its operations, Standard Data Types: List, tuples, set and Dictionaries, Data Type conversions, commenting in python.
Unit II	Variables and Operators: Python variables, Multiple variable declarations, Python basic statements, Python basic operators: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.
Unit III	Control Flow and Loops: Conditional (if), alternative (if-else), chained conditional (if- elif -else), Loops: For loop using ranges, string, Use of while loops in python, Loop manipulation using pass, continue and break
Unit IV	Functions: Calling Functions, passing parameters and arguments, Python Function arguments: Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda functions in python.
Unit V	File Handling and Exception handling: Overview, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods introduction to Errors and Exceptions, Handling IO Exceptions, Run Time Errors, Handling Multiple Exceptions.

Text Books

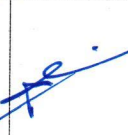
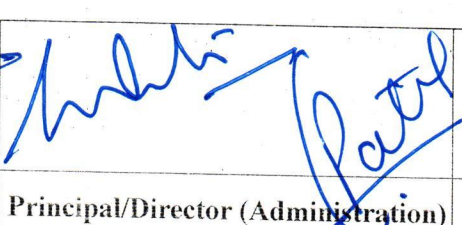
1	R. Nageswara Rao, —Core Python Programming, dreamtech
2	Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O_Reilly Publishers, 2016.
3	Python Programming: A Modern Approach, Vamsi Kurama, Pearson

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Reference Books	
1	Core Python Programming, W.Chun, Pearson.
2	Introduction to Python, Kenneth A. Lambert, Cengage
3	Learning Python, Mark Lutz, Orielly
Useful Links	
1	https://nptel.ac.in/courses/106106182
2	https://nptel.ac.in/courses/106106212
3	https://nptel.ac.in/courses/106107220

Sr. No.	List of Experiment	
1	Installation of Python path setting and its testing.	CO1
2	Design a python program to get string, int, float input from user and observe the output	CO1
3	Implementation of Python programming on various conditional operators	CO1
4	Implement a program to find the smallest and largest number in the list?	CO2
5	Implement a code to perform arithmetic, assignment, logical and comparison operators?	CO2
6	Write a Program to read a number and display corresponding day using if _elif _else?	CO3
7	Design a python program using with any one of python function argument?	CO4
8	Create a List and Perform the following methods. 1. insert () 2. remove () 3. append () 4.len () 5.pop () 6. clear ()	CO4
9	Implement a python program to write the content —hi python programming for the existing file.	CO5
10	Mini Project	CO5

	Course Outcomes	CL	Class Session
CO1	Understand the behavior of fundamental programming concepts	2	4
CO2	Explain the fundamental concepts and syntax of the Python programming language.	2	4
CO3	Construct a Python program by breaking it into logically structured, reusable functions.	3	4
CO4	Use Python lists, tuples, and dictionaries to handle and manipulate compound data.	3	4
CO5	Implement file handling operations to read from and write data to files in Python programs.	3	4

				July, 2026	5.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean Academics	Vice Principal	Principal/Director (Administration)	Date of Release	Version	