TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

Bachelor of Technology
SoE and Syllabus 2024

(Department of Science and Humanities)

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains ofScience, 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

Wardha Road, Nagpur - 441 108 Accredited with NAAC A+ Grade
Approved by AICTE, New Delhi, Govt. of Maharashtra
(An Autonomous Institution Affiliated to RTM Nagpur University)

Scheme of Instruction for First Year of B. Tech. (UG) Programme
Group-A Semester – I CSE/IT/DS/AIML
Mandatory 03-Weeks Induction Program in the First Semester for every student

SN	Sem	Type	BoS/ Dept.	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	SL	P	Hrs		CT/IA	CA	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	**BSC**	**S&H**	BSH31101	Algebra and Calculus	T	4	2	0	6	4	30	10	60	3
2	1	**BSC**	**S&H**	BSH31102	Quantum Physics & Optics	T	3	2	0	5	3	30	10	60	3
3	1	**BSC**	**S&H**	BSH31103	Quantum Physics & Optics-Lab	P	0	0	2	2	1	25	-	25	-
4	1	**ESC**	**ECE**	BEC31101	Principles of Electronics Engineering and Digital Circuits	T	3	2	0	5	3	30	10	60	3
5	1	**ESC**	**ECE**	BEC31102	Principles of Electronics Engineering and Digital Circuits-Lab	P	0	0	2	2	1	25	-	25	-
6	1	**ESC**	**IT**	BIT31101	Programming for Problem Solving	T	2	2	0	4	2	14	6	30	2
7	1	**ESC**	**IT**	BIT31102	'C' Language Lab	P	0	0	4	4	2	25	-	25	-
8	1	**VSEC**	**CSE**	BCS31101	Computer Workshop	P	0	0	4	4	2	25	-	25	-
9	1	**AEC**	**S&H**	BSH31X04	Communication for Personality Development-Lab	P	0	0	4	4	2	25	-	25	-
10	1	**CC**	**S&H**	BSH31X05	Integrated Personality Development Course-1	P	0	0	4	4	2	25	-	25	-
TOTAL FIRST SEM							**12**	**8**	**20**	**40**	**22**	254	36	360	11
SECOND SEMESTER (GROUP-A)															
1	2	**BSC**	**S&H**	BSH31201	Differential Equation and Statistics	T	4	2	0	6	4	30	10	60	3
2	2	**BSC**	**S&H**	BSH31206	Material Chemistry	T	3	2	0	5	3	30	10	60	3
3	2	**BSC**	**S&H**	BSH31207	Material Chemistry-Lab	P	0	0	2	2	1	25	-	25	-
4	2	**ESC**	**IT**	BIT31201	Logic Development and Programming Design	T	3	2	0	5	3	30	10	60	3
5	2	**ESC**	**IT**	BIT31202	Logic Development and Programming Design-Lab	P	0	0	2	2	1	25	-	25	-
6	2	**IKS**	**S&H**	BSH31X08	Introduction to Indian Knowledge System	T	2	2	0	4	2	14	6	30	2
7	2	**ESC**	**ME**	BME31X01	Engineering and Computer Graphics Lab	P	0	0	2	2	1	25	-	25	-
8	2	**PCC**	**CSE**	BCS31202	Web Designing-Lab	P	0	0	4	4	2	25	-	25	-
9	2	**VSEC**	**IT**	BIT31205	Python Programing-Lab	P	0	2	4	6	2	25	-	25	-
10	2	**CC**	**S&H**	BSH31X09	Business Communication	P	0	0	4	4	2	25	-	25	-
TOTAL SECOND SEM							**12**	**10**	**18**	**40**	**21**	254	36	360	11

Course Category	BSC/ ESC (Basic Science Course/ Engineering Science Course.)	PCC (Programme Core courses)	Multidisciplinary courses	VSEC (Skill Course)	Social Science & Management		Experiential Learning Courses	CC (Co-Curricular Courses)
					AEC (Ability Enhancement Course)	IKS (Indian Knowledge System)		
Credits SEM-I	08 / 08	–	–	02	–	–	–	02
Credits SEM-II	08 / 05	02	–	02	–	02		02
Cumulative Sum	16 / 13	02	–	04	02	02	–	04

PROGRESSIVE TOTAL CREDITS :22+21=43

				Aug, 2024	2.00	Applicable forAY 2023-24 Onwards
Chairperson	Dean Academics	Vice Principal	Principal	Date of Release	Version	

H.O.D.
SCIENCE & HUMANITIES DEPARTMENT
T.G.P.C.E T. NAGPUR

Vice Principal
Tulsiramji Gaikwad-Patil
College Of Engineering &
Technology, Nagpur

Principal
Tulsiramji Gaikwad-Patil
College Of Engineering &
Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441108

NAAC Accredited with A+ Grade

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

Semester-I | **Algebra & Calculus: BSH31101**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	4Hrs/week	**CT-I**	15 Marks	-	-
Practical (P)	-	**CT-II**	15 Marks	-	-
Total Credits	**4(Th) = 4**	**CA**	10 Marks	-	-
Duration of ESE:3Hrs		**ESE**	60 Marks	-	-
		Total Marks	**100Marks**	-	-

Pre-Requisites: NA

Course Objectives:

1	To expose students to understand the basic importance of Differential Calculus and Integral Calculus.
2	To identify algebraic problems from practical areas and obtain the solution in certain cases.
3	To Understand different solution techniques of solving Beta and Gama 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 introduce vector differential operator for vector function and important theorems on vector functions to solve engineering problems.

Unit I	**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.
Unit II	**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.
Unit III	**Differential Calculus:** Indeterminate Forms L'Hospital 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.
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.
Unit V	**Vector Calculus:** Vector triple product, product of four vectors Scalar and vector field, Gradient of scalar point function, Directional derivative, divergence and curl of vector point function, Solenoidal and Irrotational motion. Vector Integration: Line and Surface Integral

Text Books

1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9th Edition
2	Advance Engineering Mathematics by Ervin Kreysizig's 9th Edition
3	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9th edition, Pearson, Reprint2002.

Reference Books

1	"Advanced Engineering Mathematics" by Erwin Kreyszig's (Wiley India) 9th edition
2	A textbook of Engineering Mathematics by N.P. Bali, Manish Goyal, Laxmi Publication, Reprint 2010
3	Higher Engineering Mathematics by B. S. Grewal, Khanna Publisher 35th edition.

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Useful Links	
1	https://nptel.ac.in/courses/111/107/111107108/
2	https://nptel.ac.in/courses/111/105/111105121/
3	https://nptel.ac.in/courses/111/107/111107111/

CO	Course Outcomes	CL	Class Session
CO1	**Solve** improper integrals using beta, gamma functions	3	10
CO2	**Apply** the concept of matrices to check existence of solution of system of linear Simultaneous equation.	3	9
CO3	**Apply** the concept of maxima, minima and successive differentiation in analysis of engineering problems.	3	10
CO4	**Use** of Partial differentiation to Solve Jacobian and Chain Rule	3	10
CO5	**Determine** line and surface integral by using the concept of vector calculus.	3	9

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

Semester-I | **Quantum Physics & Optics: BSH31102**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	3Hrs/week	**CT-I**	15 Marks	-	-
Practical (P)	2Hrs/week	**CT-II**	15 Marks	-	-
Total Credits	**3(Th)+1(P) = 4**	**CA**	10 Marks	**CA**	25Marks
Duration of ESE:3Hrs		**ESE**	60 Marks	**ESE**	25Marks
		Total Marks	**100Marks**	-	**50Marks**

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.
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 analyze 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 demonstrate the concept of total internal reflection through optical fiber.

Course Contents

Unit I	**Quantum Mechanics:** The wave particle duality of light, The De-Broglie Hypothesis, Wave packet, Phase and group velocity, Heisenberg Uncertainty Principle and its application. Schrodinger equation.
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, Bethe's law, Devices: Cathode Ray tube, CRO, Block Diagram, Function & working of each block.
Unit III	**Semiconductor Physics**: Introduction, Intrinsic semiconductors and Extrinsic Semiconductor, PN-junction diode, Hall effect & voltage, Hall coefficient, its application, Zener diode, LED, Transistor (CB, CC&CE mode).
Unit IV	**Interference In Thin Film:** Introduction, thin film, Plane Parallel thin film, Wedge shaped thin film, Newton rings, Antireflection coating.
Unit V	**Optical Fibers**: Propagation of light by total internal reflection, structure and classification (based on material, refractive index and number of modes), Modes of propagation in fiber, Acceptance angle, Numerical aperture, Attenuation and dispersion. Applications of Optical fiber.

Text Books

T.1	A textbook of Engineering physics: Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar, 8th Revised Edition, S. Chand Publication, NewDelhi.
T.2	A textbook of Optics: N. Subrahmanyam, Brij Lal, M.N. Avadhanulu, 23rd Revised and EnlargedEdition2006,S. Chand Publication, NewDelhi.
T.3	Principles of Electronics :V. K. Mehta, Rohit Mehta, Multi colour Illustrate And Thoroughly Revised Tenth Edition 2006,S. Chand Publication, NewDelhi.

Reference Books

R.1	Modern Physics: Theraja B.L., Reprint 2nd Edition, S. Chand & CO, New Delhi.
R.2	Solid State Physics: Dekker J., Reprint1st Edition, McMillan India Ltd, Mumbai.

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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 Physics & Optics-Lab: BSH31103)		
1	Determination of acceptance angle and numerical aperture using optical fiber kit.	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 Break Down Voltage and Dynamic Resistance of Zener Diode.	CO3
6	Determination of Dynamic Resistance and Current Gain of Transistor in Common Base Mode.	CO3
7	Determination of Dynamic Resistance and Current Gain of Transistor in Common Emitter	CO3
8	Determination of the Wavelength of Sodium Light By Using Newton rings experiment.	CO4
9	Determination of Fringe width by using Wedge shaped thin film.	CO4
10	Determination of Planck's constant.	CO5

Text Books	
T.1	Experiments in Engineering Physics: M. N. Avadhanulu, A. A.Dani,2nd Edition S.Chand(G/L)&Company Ltd, New Delhi.
T.2	A text book of Practical Physics: Samir Kumar Ghosh,1stEdition, New Central Book Agency,Kolkata.
Reference Books	
R.1	Engineering Physics: Dattu Joshi, Tata McGraw Hill Education, New Delhi.
R.2	A textbook 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 behavior of wave particle duality, wave packet with their quantum application	3	9
CO2	**Illustrate** the concept of motion of charged particle in electric field, magnetic field and cross configured field. .	3	10
CO3	**Explain** PN junction diode, Zener diode, Light emitting diode and transistor with their application in engineering field.	4	10
CO4	**Differentiate** interference phenomenon in parallel and wedge-shaped thin film and their application in engineering field.	4	10
CO5	**Classify** types of optical fiber and their application in various fields.	4	9

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

Semester-I | **Principle of Electronics Engineering & Digital Circuit : BEC31101**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	3Hrs/week	**CT-I**	15 Marks	-	-
Practical (P)	2Hrs/week	**CT-II**	15 Marks	-	-
Total Credits	**3(Th)+1(P) = 4**	**CA**	10 Marks	**CA**	25Marks
Duration of ESE:3Hrs		**ESE**	60 Marks	**ESE**	25Marks
		Total Marks	**100Marks**	-	**50Marks**

Pre-Requisites: NA

Course Objectives:

1.	To Examine electrical circuits, R,L & C elements and voltage & current sources.
2.	To Implement Half Wave Rectifier , Full Wave Rectifier
3.	To Illustrate the number system, Number Base Conversion & applications.
4.	To Estimate Digital logics gates AND gate, OR gate, NOT gate, NAND gate & NOR gate, Ex-OR, Ex-NOR Symbol & truth table
5.	To Examine the Design procedure for Half adder, Full adder, Subtractor circuit. Multiplexer and Demultiplexer

Course Contents

Unit I	**Electrical circuits:** electrical circuits elements R,L & C Voltage & current sources , Kirchhoffcurrent &voltage law , analysis of simple circuits with dc excitation Superposition Theorem
Unit II	**Semiconductor Diodes:** Introduction, PN Junction diode, Characteristic sand Parameters, Diode Approximations, DC Load Line analysis. **Diode Applications:** Introduction, Half Wave Rectifier, Full Wave Rectifier **Zener Diodes:** Junction Breakdown, Circuit Symbol and Package, Characteristics and Parameters, Equivalent Circuit, Zener Diode Voltage Regulator
Unit III	**Number system and codes:** Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, BCD Conversion, signed and unsigned binary Basic Binary addition and subtraction, Complements, 1's and2's complement representation.
Unit IV	**Boolean Algebra:** Digital logics gates AND gate, OR gate, NOT gate, NAND gate& NOR gate. Ex-OR, Ex-NOR Symbol & truth table Universal Gates, Laws of Boolean algebra, De-Morgan's theorem Min term, Max term, POS, SOP, K Map, Simplification by Boolean theorems, don't care condition
Unit V	**Combinational Logic circuits:** Introduction, Design procedure Adders-Half adder, Full adder, Subtractorcircuit. Multiplexer and De multiplexer.

Text Books

T.1	1. Electronic Devices and Circuits David A Bell, 5th Edition, Oxford, 2016
T.2	2. Digital Logic and Computer Design M.Morris Mano,PHILearning,2008ISBN-978-81-203-0417-8

Reference Books

R.1	Electronics Instrumentation and Measurements (3rdEdition)– David A. Bell.
R.2	Fundamental of digital circuits by A. ANANDKUMAR

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Useful Links	
1	https://nptel.ac.in/courses/122106025
2	https://nptel.ac.in/courses/108105132
3	https://nptel.ac.in/courses/117104072

LIST OF EXPERIMENTS (Principles of Electronics Engineering and Digital Circuits-Lab : BEC31102)

1	To plot and draw the Forward and Reverse bias V-I Characteristics of a P-N Junction diode.	CO1
2	To observe and draw the static characteristics of a Zener Diode.	CO2
3	To examine the input and output waveforms of Half wave Rectifier.	CO2
4	To Examine the input and output waveforms of Full Wave Rectifier.	CO3
5	To Construct and verify the truth tables of different logic gates	CO3
6	To Design and implement Universal Gates NAND & NOR	CO3
7	To Verify proof of De-Morgan's theorem Boolean algebra	CO4
8	To Design and execute Adder and Subs tractor circuit	CO4
9	To Design and verify truth table of multiplexer and De multiplexer.	CO5
10	Explore the principles of insulation resistance measurement with a megger and clamp-on current measurement with a tong tester.	CO5

Text Books	
T.1	A Text Book of Electrical Technology: B. L. Thareja and A. K. Thareja, S. Chand Publication (Volume I, II & III). 2011
T.2	Rashid M.H, "Power Electronics: Circuits Devices and Applications", 3rd Edition, Pearson, 2011.

Reference Books	
R.1	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
R.2	D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

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
CO 1	**Analyze** electrical circuits and R L& C elements	3	9
CO 2	**Apply** Half Wave Rectification, Full Wave Rectification circuits	4	9
CO 3	**Solve** the number system, Number Base Conversion & applications.	3	9
CO 4	**Integrate** Digital logics gates & truth table	3	9
CO 5	**Examine** Half adder, Full adder, Subtractor circuit. Multiplexer and DE multiplexer.	4	9

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

Semester-I | **Programming for Problem Solving: BIT31101**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	3Hrs/week	**CT-I**	7 Marks	-	-
Practical (P)	-	**CT-II**	7 Marks	-	-
Total Credits	**2(Th) = 2**	**CA**	6 Marks	-	-
Duration of ESE:2Hrs		**ESE**	30 Marks	-	-
		Total Marks	**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.

Course Contents

Unit I	**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.
Unit II	**Operator and Expression**: Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional operator, Bitwise operators, size of operator, Arithmetic Expression, Evaluation expression. **Programming Basics:** Components of C language. Standard I/O in C, Format Specifies, Writing and executing C program, Syntax and logical errors in compilation, object and executable code.
Unit III	**Statements-Selection statements (Decision Making):** IF, IF-ELSE, Nested IF-ELSE and switch statements with examples, Repetition statements (loops) - while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

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.Forouzan and 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.

Useful Links

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

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CO	Course Outcomes	CL	Class Sessions
CO1	**Analyze** the problem and build an algorithm/flowchart to solve it	4	9
CO2	**Illustrate** basic structure of C also perform the compilation execution process.	3	9
CO3	**Prepare** the C code to perform the operation using the decision making statement	3	9

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Semester-I | **C Language-Lab: BIT31102**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	**CT-I**	-	-	-
Practical (P)	4Hrs/week	**CT-II**	-	-	-
Total Credits	**2(P)**	**CA**	-	-	25 Marks
Duration of ESE:2Hrs		**ESE**	-	-	25 Marks
		Total Marks		-	**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.

Course Contents

Unit I	**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.
Unit II	**Operator and Expression**: Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional operator, Bitwise operators, size of operator, Arithmetic Expression, Evaluation expression. **Programming Basics:** Components of C language. Standard I/O in C, Format Specifies, Writing and executing C program, Syntax and logical errors in compilation, object and executable code.
Unit III	**Statements-Selection statements (Decision Making):** IF, IF-ELSE, Nested IF-ELSE and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, go to statements with examples.

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.

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

Sr. No.	List of Experiment	
1	Design a program to calculate simple interest(SI) for a given principal (P), time (T), and rate of interest (R) (SI = P*T*R/100)	CO1
2	Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.	CO1
3	C program to read roll number and marks from user and display it on screen.	CO1
4	Implement computational problems using arithmetic expressions	CO2
5	C program to print 1 to 10 numbers using for loop.	CO2
6	C Program to check Armstrong number using while loop	CO3
7	Program to find greatest among 3 numbers using decision making statement	CO3
8	Write a C program to construct a pyramid of numbers as follows (using Looing Concept) a) 1 2 2 3 3 3 4 4 4 4 b) * * * * * * * * * *	CO3
9	Implement Problems involving if-then-else structures	CO3
10	Micro Project	CO3

CO	Course Outcomes	CL	Class Session
CO1	**Analyze** the problem and build an algorithm/flowchart to solve it	4	9
CO2	**Illustrate** basic structure of C also perform the compilation execution process.	3	9
CO3	**Prepare** the C code to perform the operation using the decision making Statement	3	9

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Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441108

NAAC Accredited with A+ Grade

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

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

Semester-I | **Computer workshop: BCS31101**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	CT-I	-	-	-
Practical(P)	4Hrs/week	CT-II	-	-	-
Total Credits	2(P)	CA	-	-	25 Marks
Duration of ESE: -		ESE	-	-	25 Marks
		Total Marks	-	-	50 Marks

Pre-Requisites: NA

Course Objectives:

1	Students will be able to proficiently identify and understand the hardware components of a computer system.
2	To equip students with a comprehensive understanding of the Windows XP / Linux operating system installation process.
3	To empower students with the knowledge of Local Area Networks (LANs) and Internet access.
4	Student will be able to achieve the different alignments.
5	To empower students with a comprehensive understanding of computer hardware, software, networking, and troubleshooting.

Course Contents

Unit I	**Introduction to Computer: -** Characteristics of Computers, Basic Applications of Computer, **Classifications of Computers**: Representation of data/Information concepts of data processing, Definition of Information and data, Basic data types Storage of data/Information as files
Unit II	**Components of Computer System:** Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software
Unit III	**Introduction to Operating System: -** Overview of Operating System, Booting Process of Operating System, Functions or Tasks of the Operating System, I/O Management, Data Management, Memory Management, Device Management.
Unit IV	**PC Troubleshooting, Maintenance and Tools**: - Preventive Maintenance: Active, Passive, periodic maintenance procedure, Preventive maintenance of peripherals of PCs. Fault finding and troubleshooting of the above peripherals, Diagnostic software.
Unit V	**Introduction of TCP/IP: -** Characteristics of TCP/IP, TCP/IP Layers, Application/Uses of TCP/IP, **Introduction of LAN, WAN and MAN** **Microsoft Office Installation and Document Formatting:-** Microsoft Office Installation, Introduction to Microsoft Word/Excel/Power Point Presentation, Document Formatting and Styling, Advanced Word Features

Text Books

1	Computer Organization Fifth edition – Carl Hamacher, Zvonko Vranesic, Safwat Zaky
2	Computer Fundamentals (Architecture and Organization) Fifth edition – B Ram, Sanjay Kumar
3	C.S. French "Data Processing and Information Technology", BPB Publications 1998

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Reference Books	
1	P.K Sinha `Computer Fundamentals`, BPB Publications, 1992
2	IT Workshop – H. Vamsi Krishna
Useful Links	
1	https://www.youtube.com/watch?v=leWKvuZVUE8&list=PL1A5A6AE8AFC187B7

List of Experiment		CO
1	To identify the computer hardware parts Procedure.	CO1
2	Assembling and disassembling the system hardware components of the personal computer Requirements: **1. CPU (Processor) 2. Mother Board 3. Floppy Disk Drive Monitor** **4. Cabinet 5. Speaker 6. Key Board** **7. Mouse 8. Bus Cables 9. RAM (SD or DDR** **10. Hard Disk Drive 11. Power 12. SMPS** **13. Monitor 14. Screw 15. Printer** **16. CD or DVD ROM Cables Driver**	CO2
3	The installation steps for the Windows operating system. **Requirement:** **1. Operating System CD 2. Computer**	CO3
4	The installation steps for the Linux operating system. **Requirement:** **1. Operating System CD 2. Computer**	CO3
5	To facilitate a software troubleshooting exercise, students will be provided with a malfunctioning CPU afflicted by system software issues. Their task will be to diagnose and resolve the problem to restore the computer to working condition.	CO4
6	To learn about Local Area Networks and Internet access, students will configure the TCP/IP settings. In the final step, students should demonstrate to the instructor how to access websites and email	CO5
7	To learn about various internet threats and configure their computer to be secure while online.	CO5
8	Installation MS Office Apply different alignments, correct formats in MS-Word, Excel and Power Point Presentation.	CO5
9	Create a Visiting Card of your college using page size as follows • **Page width="3.2"** • **Page height="2"** And use different font styles, sizes, alignments, and apply printed water mark on the paper.	CO5
10	Create a mail merge to call 10 members for an interview.	CO5

O	Course Outcomes	CL	Lab Sessions
CO1	**Apply** the characteristics of computers, including speed, accuracy, versatility, and automation.	3	4
CO2	**Demonstrate** the proper use of input devices like keyboards and mice to interact with a computer.	3	4
CO3	**Demonstrate** the ability to install and configure an operating system on a computer.	3	4
CO4	**Analyze** common hardware issues that occur with peripherals and develop systematic troubleshooting approaches.	4	4
CO5	**Utilize** advanced formatting tools and styles in Microsoft Word to create professionally styled documents.	5	4

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

Semester-I | **Communication for Personality Development Lab: BSH31X04**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	**CT-I**	-	-	-
Practical (P)	4Hrs/week	**CT-II**	-	-	-
Total Credits	**2(P)**	**CA**	-	-	25 Marks
Duration of ESE:2Hrs		**ESE**	-	-	25 Marks
		Total Marks		-	**50 Marks**

Pre-Requisites: NA

Course Objectives:

1	Understand the concept, process and importance of communication
2	Gain knowledge of media of communication
3	Develop skills of effective communication both written and oral
4	Pursuing the audience
5	Growing brand awareness

Course Contents

Unit I	**Introduction to Communication –** Definition of Communication**,** Process of Communication**,** Importance of Communication, Essentials of Good communication.
Unit II	**Different forms of communication -** Verbal communication**,** Non-Verbal communication**,** Written communication**,** Barriers to Communication.
Unit III	**Development of English Language skills -** Listening skills& it's types**,** Speaking skills it's elements**,** Reading skills& it's types**,** Writing skills
Unit IV	**Development of Personality: -** The concept of Personality, Body Language, Dimensions of Personality, Building Confidence, Presentational Skills, Group Discussion, Interview Techniques
Unit V	**Attitude and Motivation -** Concept of Attitude**,** Types of Attitude**,** Concept of Motivation**,** Importance of Self-motivation

Text Books

1	Public Speaking and Influencing Men in Business by Dale Carnegie
2	Technical Communication by Meenakshi Raman and Sangeeta Sharma ,OUP
3	Communication Skills by Dr. P.Prasad
4	Communication Skills by Sanjay Kumar and Pushpalata, OUP

Reference Books

1	Personality Development And Soft Skills by Barun K. Mitra.
2	**The Magic of Thinking Big by** David J. Schwartz

Useful Links

1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095

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List of Experiment		CO
1	Introduction to Communication: Process & Techniques	**CO1**
2	Demonstrate 7C'S of Communication.	**CO1**
3	Explain Verbal &Non-verbal Communication	**CO2**
4	Description of Barriers to Communication: Methods to Overcome Barriers.	**CO2**
5	Acquire knowledge of Listening and Speaking skills.	**CO3**
6	Acquisition of Reading & Writing Skills.	**CO3**
7	Execute the Skills of Body Language.	**CO4**
8	Learning the Presentational Skills and Interview Technique.	**CO4**
9	Discuss concept of Self-motivation and it's importance.	**CO5**
10	Development of Positive Attitude.	**CO5**

CO	Course Outcomes	CL	Lab Sessions
CO1	**Learn** the importance and process of Communication.	4	4
CO2	**Apply** the skills of Verbal and Non-verbal communication and how to Overcome the barriers.	4	4
CO3	**Execute** the skills of Learning, Speaking, Reading and Writing to communicate effectively with engineering community and society.	5	5
CO4	**Demonstrate** the Skills for effective presentation and effective body language.	5	4
CO5	**Acquire** the knowledge of positive attitude and self-motivation.	5	4

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

Semester-I | **Integrated Personality Development Course-I: BSH31X05**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	**CT-I**	-	-	-
Practical (P)	4Hrs/week	**CT-II**	-	-	-
Total Credits	**2(P)**	**CA**	-	-	25 Marks
Duration of ESE:2Hrs		**ESE**	-	-	25 Marks
		Total Marks		-	**50 Marks**

Pre-Requisites: NA

Course Objectives:

1.	Provide a holistic value - based education.
2.	Making more marketable when entering the workforce.
3.	Promote personal growth and improve wellbeing, stability and productivity.
4.	Effective communication and interpersonal skills.
5.	Overview of Competencies.

Course Contents

Unit I	Remaking Yourself, begin with the End in Mind, Being Addiction free, Stress Management, Better Health, Better Future, Impact of Company.
Unit II	Lessons of Seva, Selfless Service, Case Study: Bhuj earthquake: relief work.
Unit III	Soft Skills, Team work, Harmony, Financial Planning.
Unit IV	My India My Pride, Present Scenario, an ideal Citizen-1, An ideal Citizen-2, Learning from Legends, Leading attitude, Words of Wisdom.
Unit V	Facing Failures, Timeless Wisdom for Daily Life, From House to Home, Forgive & Forget.

Text Books

T.1	Awaken the Giant Within by Tony Robbins.
T.2	The 7 Habits of Highly Effective People by Stephen R. Covey
T.3	Think & Grow Rich by Napolean Hill
T.4	Power-Mind-Sight by Daniel J. Siegel

Reference Books

R.1	How to Win Friends and Influence People Author: Dale Carnegie Publish Year: 1936

Useful Links

1	https://nptel.ac.in/courses/109104107
2	https://onlinecourses.nptel.ac.in/noc21_hs02/preview
3	https://onlinecourses.nptel.ac.in/noc22_hs77/preview
4	https://archive.nptel.ac.in/noc/courses/noc20/SEM2/noc20-hs43/

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Sheet No.	List of Experiments/Drawing sheets	
1	Identify the Skills of Self-Improvement and Personal Growth	CO1
2	Build Positive Routines and Development of Good Habits	CO1
3	Collect Insights from Influential Personalities	CO2
4	Signify of Listening and Understanding	CO2
5	Learn Positive Perspectives and Welcoming Challenges	CO3
6	Accept Failure as Formative Learning Experiences	CO3
7	Inspired by the lives of the Legends	CO4
8	Plan Practical Financial Skills	CO4
9	Develop Soft Skills	CO5
10	Acquire Benefits for Life-Long Learning	CO5

CO	Course Outcomes	CL	Class Session
BSH31X05. 1	**Apply** soft skills that complement hard skills.	3	4
BSH31X05. 2	**Analyze** self and prepare for the modern challenges.	4	4
BSH31X05. 3	**Show** fortitude in the face of failures, unity amongst family discord, self-discipline amidst distractions, and many more priceless lessons.	4	5
BSH31X05. 4	**Analyze** morality and character development.	4	4
BSH31X05. 5	**Analyze** the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles as an ambitious student.	4	4

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

Semester-I | **Differential Equation and Statistics: BSH31201**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	4Hrs/week	**CT-I**	15 Marks	-	-
Practical (P)	-	**CT-II**	15 Marks	-	-
Total Credits	**4**	**CA**	10 Marks	-	-
Duration of ESE:2Hrs		**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.
Unit II	**Higher Order Differential Equation:** Higher order linear D.E. with constant coefficient, Methodof variations of Parameters, Cauchy's form, Legendre's Linear Equations. Application of second order differential equation to R-L-C CIRCUIT, Heat Equations.
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.
Unit IV	**Probability:** Conditional Probability, Discrete Random Variable, Continuous Random Variable, Probability Distribution function, Probability density function, Binomial Distribution ,Uniform Distribution
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.

Text Books

1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9th Edition
2	Advance Engineering Mathematics by Ervin Kreysizing 9th Edition
3	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9th edition, Pearson, Reprint2002.

Reference Books

1	"Higher Engineering Mathematics" by Erwin Kreyszing 9th edition
2	A textbook of Engineering Mathematics by N.P. Bali, Manish Goyal, Laxmi Publication, Reprint 2010

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Useful Links	
1	https://nptel.ac.in/courses/111/107/111107108/
2	https://nptel.ac.in/courses/111/105/111105121/
3	https://nptel.ac.in/courses/111/107/111107111/

CO	Course Outcomes	CL	Class Session
CO1	**Apply** different methods to solve Linear differential equation	3	10
CO2	**Solve** problems by using Higher order differential equation.	3	10
CO3	**Determine** area, mass and volume by using concept of integration.	3	9
CO4	**Apply** the Probability concepts to real-world Phenomena.	3	10
CO5	**Use** of statistical method to solve the problem on fitting of straight line and Parabola.	3	9

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

Semester-I | **Material Chemistry: BSH31206**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	4Hrs/week	**CT-I**	15 Marks	-	-
Practical (P)	-	**CT-II**	15 Marks	-	-
Total Credits	**4**	**CA**	10 Marks	-	-
Duration of ESE:2Hrs		**ESE**	60 Marks	-	-
		Total Marks	**100Marks**	-	-

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 enable to students to upgrade the existing knowledge of water technology.
3.	To inculcate knowledge about Advance material.
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, types of Energy(conventional and non-conventiona energy sources), Introduction of fuels, classification and application, Calorific value determinatior of solid, liquid and Gas, Analysis of solid fuels, Fractional distillation, CNG and Bio-Diesel.
Unit II	**Advanced Material and E-Waste Management:** Introduction of Advance material, Composite Material, Nano materials and Application in electronics devices. Introduction of E-waste, Types o E-Waste and its control.
Unit III	**Water pollution and Softening processes:** Introduction, Sources of pollution, Hardnes 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.
Unit IV	**Electrochemistry & Battery Technology:** Basics of Electrochemistry, Laws of Electrochemistry, Concept of Galvanic Series, Introduction of batteries, Types of Batteries (Carbon-Zn, Alkaline-Zinc, NICAD, Lead Acid battery) H_2-O_2 Fuel cell and its applications.
Unit V	**Polymer Science:** Introduction, Classification of Polymers, Uses of commercially important polymers with synthesis and applications, Conducting & Insulating Polymers

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, 15thEdition.Dhanpatrai publication Ltd

Reference Books

R.1	Applied Chemistry: Narkhede & Bhake, 1st Edition. Das Ganu Prakashan
R.2	Engineering Chemistry: Krishnamurti & Madhav, 2nd Edition. Prentice Hall of India
R.3	Text book of Applied Chemistry: W.K Pokale & M.D Chaudhari1st Edition. Tech Max Publication

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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/
4	https://nptel.ac.in/courses/105107207

List of Experiment(Material Chemistry-Lab: BSH31207)		
1	Determination of Moisture Content or Volatile Matter & Ash Content of 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 Insulating Polymer.	**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
CO 1	**Interpret** the types of Energy sources and its properties and application	2	9
CO 2	**Explain** properties and applications of advanced materials.	2	9
CO 3	**Differentiate** water pollution and its softening process.	2	9
CO 4	**Illustrate** different laws of Electrochemistry, types and applications of batteries.	3	9
CO 5	**Predict** the types and applications of commercial polymers.	3	9

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Semester-II | **Logic Development and Programming Design: BIT31201**

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory(Th)	3Hrs/week	**CT-I**	15 Marks	-	-
Practical(P)	2Hrs/week	**CT-II**	15 Marks	-	-
Total Credits	**3(Th)+1(P) = 4**	**CA**	10 Marks	**CA**	25Marks
Duration of ESE:3Hrs		**ESE**	60 Marks	**ESE**	25Marks
		Total Marks	**100Marks**	-	**50Marks**

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, Parameter Passing techniques, Storage classes.
Unit II	**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).
Unit III	**Strings:** Arrays of characters, variable length character strings, inputting character strings, character library functions, string handling functions.
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)
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.

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.

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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: BIT31202)	
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	C Program to Sort an Array in Ascending And Descending Order	CO2
4	Structure Program for Student details in C Programs using array.	CO2
5	Implement a C Program to Compare two Strings using string handling function	CO3
6	Write a program to find the length of the string using Pointer.	CO4
7	Write a program to copy the contents of one file to another.	CO5
8	Micro Project	CO5

CO	Course Outcomes	CL	Class Session
CO1	**Demonstrate** the concept of function using parameter passing, storage classes and recursion	3	9
CO2	**Examine** the process of array declaration, passing array and debug programs in C language.	4	9
CO3	**Ensure** the process of compile and debug string programs in C language.	4	9
CO4	**Implement** Programs with pointers, perform pointer arithmetic, and use the pre-processor	4	9
CO5	**Analyze** the file handling with the help of calling macros, File I/O Function	5	9

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

Semester-II	Introduction to Indian Knowledge System: BSH31X08

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory(Th)	2Hrs/week	CT-I	7 Marks	-	-
Practical(P)	-	CT-II	7 Marks	-	-
Total Credits	2(Th)	CA	6 Marks	-	-
Duration of ESE:2Hrs		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-

Pre-Requisites: NA

Course Objectives:

1.	**To explain** the information about the rich culture of the Indian Civilization & varied ancient knowledge systems.
2.	**To describe** the significance of the scientific concepts and achievements of ancient Indian scholars in fields of Science, Astronomy & Mathematics.
3.	**To illustrate** the traditional scientific, technical and architectural structures and their significance in traditional knowledge of Bhārata.

Course Contents

Unit I	**Indian (Bharatiya) Civilization & Development of knowledge System** Discovery of the Saraswatī River, the Saraswatī-Sindhu Civilization, Traditional Knowledge System, The Vedas, Main Schools of Philosophy, Ancient Education System, the Takṣaśilā University, the Nālandā University.
Unit II	**Science, Astronomy, and Mathematics** Concept of Matter, Life and Universe, Gravity, History and Culture of Astronomy, Sun, Earth, Moon, and Eclipses, Earth is Spherical and Rotation of Earth, Indian ancient Mathematics.
Unit III	**Engineering, Technology, and Architecture** Pre-Harappan and Sindhu Valley Civilization, Social & Economic Life, Metallurgy, Engineering Science and Technology in the Vedic Age and Post-Vedic Records, Ancient Architecture, Egyptian Civilization, Greek Civilization.

Text Books

1	Introduction to Indian Knowledge System; Concepts & Applications, by B. Mahadevan, Vinayak Rajat Bhat, Nagendra Pavana R.N. Eastern Economy Edition, PHI Learning PVT LTD, Delhi (2022)
2	A New Look into Social Sciences, by S. Shabbir, A.M. Sheikh, Jaya Dwadashiwar, S. Chand & Company LTD, Ramnagar, New Delhi-110055 (2006)

Reference Books

1	Encyclopedia of Indian History (from early times to the present)
2	Ancient Indian Architecture (From Blossom To Bloom), by Sanjay Maheshwari & Rajeev Garg, (2016)
3	Science in Ancient India: Reality versus Myth, by Breakthrough Science Society (BSS) (2020)

Useful Links

1	https://swayam-indian-knowledge-system-iks-concepts-and-applications-in-engineering-199649
2.	https://iksindia.org/

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CO	Course Outcomes	CL	Class Session
CO1	Students will be able **to explain** the information about Indian (Bharatiya) Civilization & Development of Knowledge System.	2	10
CO2	Students will be able **to describe** the significance of Science, Astronomy and Mathematics in Indian Knowledge System.	2	10
CO3	Students will be able **to illustrate** the structures of Engineering, Technology and Architecture in Indian Knowledge System.	3	10

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Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441108
NAAC Accredited with A+ Grade
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

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

Semester-I | **Engineering and Computer Graphics Lab: BME31X01**

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

Pre-Requisites: NA

Course Objectives:

1.	To develop drawing using bureau of Indians standers (BIS).
2.	To impart the knowledge on the projection of line, plane and solids.
3.	To develop the computer based design of vectors, graphic elemebts.
4.	To make the students understand the Polygon, segments.
5.	To utilize matrix transformation, windowing & clipping

Course Contents

UnitI	**Engineering Curves:** Ellipse, Parabola, Hyperbola (Minimum four curves) Define: Cycloid, Involute, Archimedean Spiral.
UnitII	**Projections of Lines**: Basics of Orthographic Projection. Projections of lines are inclined to one & parallel to other reference plane. (Minimum four problems) **Projections of Planes**: Basics of Orthographic Projection. Projections Plane is inclined to one & parallel to other reference plane. (Minimum four problems)
UnitIII	**Projection of Solid:** A solid has three dimensions, viz. length, breadth and thickness. To represent a solid on a flat surface having only length and breadth, at least two orthographic views
Unit IV	**Orthographic Projection:** A parallel projection that shows the top, front, and side of an object on perpendicular planes. The final sketch shows all three views. **Isometric Views/ Projection:** A single 3D image drawn on an isometric grid. It shows the top, side, and front of an object as if you are looking at it from a corner.
UnitV	**AutoCAD:** AutoCAD is computer-aided design (CAD) software that is used for precise 2D and 3D drafting, design, and modelling with solids, surfaces, mesh objects, documentation features, and more.

Text Books

T.1	Elementary Engineering Drawing - N.D. Bhatt, Charotor Publishing house, Anand, India.
T.2	Engineering Drawing - D. A. Johle, 1st Edition, 2017, Tata McGraw-Hill Publishing Co. Ltd.
T.3	Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
T.4	Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul, "Principle of Interactive Computer Graphics", McGraw Hill

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Reference Books	
R.1	Engineering Graphics by P.J.Shah, Revised edition 2014, S Chand and Company ltd., New Delhi, India.
R.2	Engineering Drawing by Basant Agarwal and C.M. Agarwal, 2nd edition 2015, Tata Magraw Hill Publication Company ltd., and New Delhi, India.
R.3	Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition
R.4	Rogar and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill.
Useful Links	
1	https://nptel.ac.in/courses/112/103/112103019
2	https://nptel.ac.in/courses/112/102/112102304/
3	https://nptel.ac.in/courses/112/105/112105294/

Sheet No.	List of Experiments/Drawing sheets	
1	Drawing of Engineering Curves (Minimum four curves)	**CO1**
2	Drawing of Engineering Curves (Auto-CAD Software)	**CO1**
3	Drawing of Projections of Lines (Minimum two problems) & Projections of Planes (Minimum two problems)	**CO2**
4	Drawing of projection of Lines & Projections of Planes (Auto-CAD Software)	**CO2**
5	Drawing of Projections of solids	**CO3**
6	Drawing of projection of Solid (Auto-CAD Software)	**CO3**
7	Orthographic Views	**CO4**
8	Orthographic Projection (Auto-CAD Software)	**CO4**
9	Isometric Views/ Projection	**CO5**
10	Isometric Views/ Projection (AutoCAD Software)	**CO5**

CO	Course Outcomes	CL	Class Session
CO1	**Sketch** the engineering curves using basics drawing skills.	3	6
CO2	**Apply** the knowledge of projection, methods to prepare the drawing for line and plane	3	6
CO3	**Understand** the projection of solid for various position in first quadrant	3	6
CO4	**Develop** visualization and logical thinking to convert pictorial view into two dimensional (2D) drawing.	3	6
CO5	**Interpret** the orthographic projection and convert into isometric View/Projection	3	6

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

Semester-II | **Web Designing: BCS31202**

Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory(Th)	-	**CT-I**	-	-	-
Practical(P)	4Hrs/week	**CT-II**	-	-	-
Total Credits	**2(P)**	**CA**	-	**CA**	25Marks
Duration of ESE:	-	**ESE**	-	**ESE**	25Marks
		Total Marks	-	-	**50Marks**

Pre-Requisites: NA

Course Objectives:

1.	Aware about different tools for Web Programming.
2.	Demonstrate competency in the use of common HTML code.
3.	Able to design efficient client as well as server side scripts.
4.	Construct efficient web pages with CSS and JavaScript.
5.	Aware about different tools for Web Programming.

Course Contents

Unit I	**Web Foundations:** The Evaluation 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, Colors - Color 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:- Netscaps 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., Dreamtech 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″ edition, Wiley Dreamtech
3	Java Server Pages —Hans Bergsten, SPD O'Reilly,

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/

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List of Experiment		CO
1	Demonstrate various tags in HTML.	CO2
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.	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.	CO2
5	Create a page to show different character formatting (B, I, U, SUB, SUP) tags. **viz : log b m^p= p logb m**	CO2
6	Using HTML, CSS create a staggered animation for the elements of a list. • Set opacity: 0 and transform: translate X (100%) to make list elements transparent and move them all the way to the right. • Specify the same transition properties for list elements, except transition-delay. • Use inline styles to specify a value for --i for each list element. This will in turn be used for transition-delay to create the stagger effect. • Use the: checked pseudo-class selector for the checkbox to style list elements. Set opacity to 1 and transform to translateX(0) to make them appear and slide into view.	CO3
7	Using HTML, CSS create display an image overlay effect on hover. a) Use the: before and: after pseudo-elements for the top and bottom bars of the overlay respectively. Set their opacity, transform and transition to produce the desired effect. b) Use the <figcaption> for the text of the overlay. Set display: flex, flex-direction: column and justify-content: center to center the text into the image. c) Use the: hover pseudo-selector to update the opacity and transform of all the elements and display the overlay.	CO3
8	Using HTML, CSS create a bouncing loader animation. • Use @keyframes to define a bouncing animation, using the opacity and transform properties. Use a single axis translation on transform: translate3d () to achieve better animation performance. • Create a parent container, bouncing-loader, for the bouncing circles. Use display: flex and justify-content: center to position them in the center. • Give the three bouncing circle elements the same width and height and border-radius: 50% to make them circular. • Apply the bouncing-loader animation to each of the three bouncing circles. • Use a different animation-delay for each circle and animation-direction: alternate to create the appropriate effect.	CO3
9	A sample html file with a submit button. Now modify the style of the paragraph text through javascript code.	CO5
10	Write a JavaScript function to get the values of First and Last names of the following form.	CO5

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CO	Course Outcomes	CL	Lab Sessions
CO1	**Apply** the basics fundaments for Web Foundations.	3	4
CO2	**Apply** the knowledge of formatting Tags for web developments in HTML	3	4
CO3	**Preparing** high level formatting by using Cascading style sheet.	3	4
CO4	**Apply** information exchange between computer systems such as websites, databases, and third-party applications.	3	4
CO5	**Validating** User's Input. JavaScript is very useful while using Forms	5	4

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

Semester-I | **Python Programming: BIT31205**

Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory (Th)	-	CT-I	-	-	-
Practical (P)	4Hrs/week	CT-II	-	-	-
Total Credits	2(P)	CA	-	-	25 Marks
Duration of ESE:2Hrs		ESE	-	-	25 Marks
		Total Marks		-	50 Marks

Pre-Requisites: NA

Course Objectives:

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 do input/output with files 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.

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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
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

List of Experiment		CO
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	Implement a python program to write the content "hi python programming" for the existing file.	CO5

CO	Course Outcomes	CL	Class Session
CO1	**Analyze** and understand the behavior of fundamental programming concepts	4	4
CO2	**Demonstrate** the knowledge concepts of Python Language	3	4
CO3	**Decompose** a Python program into functions.	3	4
CO4	**Analyze** compound data using Python lists, tuples, and dictionaries.	4	4
CO5	**Evaluate** read and write data from/to files in Python Programs	5	4

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

Semester-I	**Business Communication: BSH31X09**				
Teaching Scheme		**Examination Scheme (Th)**		**Examination Scheme(P)**	
Theory (Th)	-	**CT-I**	-	-	-
Practical (P)	4Hrs/week	**CT-II**	-	-	-
Total Credits	**2(P)**	**CA**	-	-	25 Marks
Duration of ESE :2Hrs		**ESE**	-	-	25 Marks
		Total Marks		-	**50 Marks**

Course Objective:

1	Understand the concept, process and importance of Business communication
2	Understand the Modes and Methods of Communication
3	Gain knowledge of Technical forms of Communication
4	Pursuing the public through Extra-Curricular Activities
5	Outreached Activities

Course Contents

Unit I	**Introduction to communication:** Meaning & Definition of communication, Characteristics of communication, Objectives of communication, , social understanding, behaviors traits, teamwork.
Unit II	**Communication Skills:** Importance of communication, types, barriers of communication, effective communication, Listening Skills, behaviors traits, teamwork. Barriers to communication, Essentials of effective communication**.**
Unit III	**Media of communication and Channels of communication:** Oral media, Written media, Non-verbal media**,** Downward channels of communication, Upward channels of communication, Horizontal communication.
Unit IV	**Technical Writing:** Features of Technical Writing, Writing Scientific Projects, Technical Report writing, Writing Manuals, Writing Project Proposals, Writing Research papers.
Unit V	**Presentation Skills:** Importance of oral presentation, preparing and planning the presentation, organizing your presentation, checklist for making presentation. Leadership skills, decision making, negotiation skills.

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Text Books

1	Effective Technical Communication by Barun K. Mitra, Oxford University Press
2	Technical Communication-Principles and Practice by Meenakshi Raman & Sharma, Oxford University Press,2011, ISBN-13-978-0-19-806529-
Reference Books	
1	Meenakshi Raman "Technical Communication: Principles and practice, "Oxfored University press, India."
2	**Basic Business Communication Skills for Empowering the Internet Generation,** Lesikar, R.V. & Flatley, M.E. (2005). Tata McGraw Hill Publishing Company Ltd. New Delhi.
Useful Links	
1	https://nptel.ac.in/courses/109104031
2	https://www.coursera.org/learn/business-english-skills-how-to-navigate-tone-formality- directness-in-emails
3	https://www.skillsyouneed.com/presentation-skills.html
4	https://nptel.ac.in/courses/109104031

List of Experiments		
1	Draw a rectangle or square to present Business Communication concept.	**CO1**
2	Represent through arrows and lines the Key components of Corporate and Global World Communication.	**CO1**
3	Draw a Tree Diagram to represent Channels of Communication.	**CO2**
4	Represent with the help of an Oval the Methods of Communication.	**CO2**
5	Draw a Pyramid Diagram to represent Technical Communication.	**CO3**
6	Design Icons and Symbols to highlight the Technology in Business Communication.	**CO3**
7	Explore Extra Curricular Activities through performance.	**CO4**
8	Present a graph on Awareness Programmes after performance.	**CO4**
9	Show the percentage of volunteers in the graph of Outreached Activities.	**CO5**
10	Colour the Circles to show the percentage of Effects of Outreached Activities.	**CO5**

CO	**Course Outcomes**	**CL**	**Class Session**
BSH1X09. 1	**Understand** the concept importance and process of Business Communication.	2	4
BSH1X09.2	**Analyze** the Channels and Methods of Communication.	4	4
BSH1X09.3	**Apply** the skills of Technical communication.	3	5
BSH1X09.4	**Evaluate** the Extra-Curricular Activities**.**	5	4
BSH1X09.5	**Develop** the skills of outreached activities with the academics.	6	4

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