TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

(An Autonomous Institute Affiliated to RTM Nagpur University)

DEPARTMENT OF BASIC SCIENCE & HUMANITIES

B.Tech First Year

Structure & Curriculum

From

Academic Year 2022-23

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 student and staff members by inculcating knowledge and profession as work practices

Program Outcomes (PO)

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex **engineering** problems reaching substantiated conclusions using first principles of mathematics, **natural** sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

12. **Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

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Scheme of Instruction for First Year of B. Tech. (UG) Programme

Semester – I Group A (CSE, ECE, AE, EE)

Mandatory 03-Weeks Induction Program in the First Semester for every student

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	**BSC**	**BSH1X01**	Algebra and Calculus	3	1	-	4	4	15	15	10	60	100
2	**BSC**	**BSH1X02**	Engineering Applied Physics	3	1	-	4	4	15	15	10	60	100
3	**ESC**	**BCE1X01**	Engineering Mechanics	3	-	-	3	3	15	15	10	60	100
4	**BSC**	**BSH1X03**	Engineering Applied Physics Lab	-	-	2	2	1	-	-	25	25	50
5	**ESC**	**BCE1X02**	Engineering Mechanics Lab	-	-	2	2	1	-	-	25	25	50
6	**ESC**	**BCS1X01**	Programming for Problem Solving using C Language Lab	-	-	4	4	2	-	-	50	50	100
7	**HSMC**	**BSH1X04**	Basics of Communication Skill Lab	-	-	2	2	1	-	-	25	25	50
8	**ESC**	**BME1X01**	Engineering Workshop	-	-	2	2	1	-	-	25	25	50
9	**MCC**	**BSH1X05**	Sports & Yoga	-	-	2	2	Audit	-	-	-	-	-
			Total	**9**	**02**	**14**	**25**	**17**	**45**	**45**	**180**	**330**	**600**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sci, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Professional Core Courses)	PEC (Professional Elective Courses)	OEC (Open Elective Courses)	MCC (Mandatory Courses)	Project / Seminar Industrial Training
Credits	1	9	7	--	--	--	Yes	--
Cumulative Sum	1	9	7	--	--	--	--	--

TOTAL CREDITS = 17

HOD
Science & Humanities
SCIENCE & HUMANITIES DEPARTMENT
T.G.P.C.E.T, NAGPUR

Dean Academic
Dean Academics
Tulsiramji Gaikwad-Patil College Of Engineering and Technology, Nagpur

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Scheme of Instruction for First Year of B. Tech. (UG) Programme

Semester – II Group A (CSE, ECE, AE, EE)

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	BSC	BSH1X06	Differential Equation and statistics	3	1	-	4	4	15	15	10	60	100
2	BSC	BSH1X07	Engineering Applied Chemistry	3	1	-	4	4	15	15	10	60	100
3	ESC	BEE1X01	Basics of Electrical & Electronics Engineering	3	-	-	3	3	15	15	10	60	100
4	HSMC	BSH1X08	Ethical Sciences & Business Ethics in Industry	2	-	-	2	2	7	7	6	30	50
5	BSC	BSH1X09	Engineering Applied Chemistry Lab	-	-	2	2	1	-	-	25	25	50
6	ESC	BEE1X02	Basics of Electrical & Electronics Engg. Lab	-	-	2	2	1	-	-	25	25	50
7	ESC	BME1X02	Engineering Graphics and Design Lab	-	-	4	4	2	-	-	50	50	100
8	ESC	CODE*	Programme Specific Workshop*	-	-	2	2	1	-	-	25	25	50
9	MCC	BSH1X10	Constitution of India	-	-	2	2	Audit	-	-	-	-	-
			Total	**11**	**02**	**12**	**25**	**18**	**52**	**52**	**161**	**335**	**600**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance

Course Category	HSMC (Hum., Soc. Sci, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Professional Core Courses)	PEC (Professional Elective Courses)	OEC (Open Elective Courses)	MCC (Mandatory Courses)	Project / Seminar Industrial Training
Credits	2	9	7	--	--	--	--	Yes
Cumulative Sum	3	18	14	--	--	--	--	--

* Indicates Programme Specific Workshop will be based on respective Programme /CODE* e.g. IT department will have IT Workshop

BAE1X01	BBT1X01	BEC1X01	BIT1X01
BME1X03	BEE1X03	BCE1X03	BCS1X02

PROGRESSIVE TOTAL CREDITS :17+18=35

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Program: B. Tech First Year Group-A & B

Semester-I	BSH1X01: Algebra and Calculus

Teaching Scheme		**Examination Scheme**	
Theory	3 Hrs/week	**CT-I**	15 Marks
Tutorial	1 Hrs/week	**CT-II**	15 Marks
Total Credits	**4**	**CA**	10 Marks
Duration of ESE: 3Hrs		**ESE**	60 Marks
Pre-Requisites: AICTE Bridge Course		**Total Marks**	**100 Marks**

Course Contents

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, Linear and Orthogonal Transformation, Eigen values and Eigen vectors, Consistency of a system of equations, Cayley Hamilton Theorem, Application of matrix to solve Simultaneous equation.
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**: Limit, continuity and differentiability of function of several variables, Partial Derivatives, Euler's theorem on homogeneous function, Implicit function, Jacobians 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 SurfaceIntegral.

Text Books

T.1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9yh Edition

T.2	Advance Engineering Mathematics by Ervin Kreysizing 9th Edition
T.3	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9th edition, Pearson, Reprint 2002.
Reference Books	
R.1	"Higher Engineering Mathematics" by Erwin Kreyszing 9th edition
R.2	A textbook of Engineering Mathematics by N.P. Bali, Manish Goyal, Laxmi Publication, Reprint 2010
R.3	Higher Engineering Mathematics by B. S. Grewal, Khanna Publisher 35th edition .
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/

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X01.1	**Solve** improper integrals using beta, gamma functions	PO1,PO2,PO3,PO12	3	10
BSH1X01.2	**Apply** the concept of matrices to check existence of solution of system of linear Simultaneous equation.	PO1,PO2,PO3,PO12	3	9
BSH1X01.3	**Apply** the concept of maxima, minima and successive differentiation in analysis of engineering problems.	PO1,PO2,PO3,PO12	3	10
BSH1X01.4	**Use** of Partial differentiation to Solve Jacobian and Chain Rule	PO1,PO2,PO3,PO12	3	10
BSH1X01.5	**Determine** line and surface integral by using the concept of vector calculus.	PO1,PO2,PO3,PO12	3	9

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X02: Engineering Applied Physics

Teaching Scheme		Examination Scheme	
Theory	3 Hrs/week	**CT-I**	15 Marks
Tutorial	1 Hrs/week	**CT-II**	15 Marks
Total Credits	**4**	**CA**	10 Marks
Duration of ESE: 3Hrs		**ESE**	60 Marks
		Total Marks	**100 Marks**

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

Course Contents

Unit I	**Crystallography:** Classification of Crystal structure, Elements of crystal, Unit cell and their types. .Characteristics of Unit cell, Effective number of atoms per unit cell, atomic radius, nearest neighbor distance, coordination number, atomic packing factor, void space, density; Bragg's law of diffraction and its equation.
Unit II	**Electron Optics:** Introduction of electric and magnetic field, Bethe's law, Electric and Magnetic focusing, Construction & working of Electrostatic lens, Devices: CRT, CRO, Block Diagram, Function & working of each block, Bainbridge mass spectrograph, Cyclotron.
Unit III	**Basic Semiconductor Physics**: Conduction-theory based classification of solids into Conductor, semiconductors and insulator, Types of Semiconductor Diode, Intrinsic semiconductors Fermi-energy, Doping and Extrinsic semiconductors, PN- junction diode, Zener diode, LED, Transistor (CB, CC& CE mode) Hall effect & voltage, Hall coefficient, its application.
Unit IV	**Interference in thin film:** Meaning of thin film, Plane Parallel thin film, Wedge shaped thin film, Newton rings, Applications: Determination of wavelength and Refractive index of liquid, test of surface finish. Antireflection coating, Numerical.
Unit V	**Basic of Momentum:** System of particles, Center of mass, Equation of motion, Conservation of linear and angular momentum, Conservation of energy, Single stage and multistage rockets, Elastic and inelastic collisions, Moments of inertia and their products, Moment of inertia of cylinder and sphere, Principal moments and axes.

Text Books

T.1	A textbook of Engineering physics: Hardas, Devashree S, 1st Edition, Das Ganu Prakashan, Nagpur

T.2	A textbook of Engineering physics: Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar, 8th Revised Edition, S. Chand Publication, New Delhi.
T.3	Applied Physics: Nandi K.C., 1st Edition, Tech Max Publication, Mumbai.
Reference Books	
R.1	Modern Physics: Theraja B.L., Reprint2nd Edition, S. Chand &CO,New Delhi.
R.2	Solid State Physics: DekkerJ., Reprint 1st Edition, 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/

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X02.1	**Differentiate** the Crystal geometry and the behavior of solids along with their mechanical, electrical, magnetic, optical and metallurgical activities.	PO1, PO2, PO12	2	9
BSH1X02.2	**Apply** the basic concept of motion of charged particle in electromagnetic fields to solve numerical problem.	PO1, PO2, PO12	3	10
BSH1X02.3	**Use** the semiconductors to develop device like Diode and transistors and their application in engineering.	PO1, PO2, PO12	3	10
BSH1X02.4	**Illustrate** the several limiting cases of simple and important wave types which establish the connection between the ray optics and wave optics.	PO1, PO2, PO12	3	10
BSH1X02.5	**Determine** the effect of Force, concept of inertia; laws of motion apply on body.	PO1, PO2, PO12	3	9

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Program: B. Tech First Year Group-A & B

Semester-I/II | BCE1X01: Engineering Mechanics

Teaching Scheme		Examination Scheme	
Theory	3 Hrs/week	**CT-I**	15 Marks
Tutorial	-	**CT-II**	15 Marks
Total Credits	**3**	**CA**	10 Marks
Duration of ESE: 3Hrs		**ESE**	60 Marks
		Total Marks	**100 Marks**

Pre-Requisites: Physics

Course Contents

Unit I	**Basic Fundamentals and Equivalent Force System:** Force system, moment of force about any point, couple moment as free vector, principle of transmissibility, resultant of two-dimensional distributed loads, Varignon's theorem, Resolution of forces.
Unit II	**Equilibrium:** Equilibrant and equation relating the magnitudes of three coplanar, concurrent and non-collinear vectors, analytical and graphical condition of equilibrium, non-concurrent and parallel force system, general spatial force system, free body diagram. Truss and beams – type of trusses, analysis of simple pin joints frames by method of joints and method of section, type of beams, type of load and type of end supports.
Unit III	**Centroid and Moment of Inertia:** Definition of centroid and moment of inertia, centroid of composite figures such as square rectangular, triangle, circle semicircle, quarter circle, moment of inertia of mass and product of inertia of plane areas, transfer theorem for moment of inertia, principal axes, Mohr's circle of inertia.
Unit IV	**Kinematics:** Kinematics of rectilinear motion, motion curves, Newton's motion Law, Projectile, relative velocity.
Unit V	**Method of Momentum and D'Alembert's Principle:** Linear impulse momentums, consideration for system of particles, elastic impact of two bodies, direct central impact. Principle work energy method (expression based on center of mass)

Text Books

T.1	Engineering Mechanics, S. S. Bhavikatti, New Age International Pvt. Ltd., 6th Edition.
T.2	Engineering Mechanics, R. K. Bansal and Sanjay Bansal, Jain Bros. Publishers, Delhi, 4thEdition.
T.3	Textbook of Applied Mechanics", Ramamrutham. S., Dhanpat Rai Publications, 1987 EngineeringMechanics (Statics and Dynamics), Palanichamy, M. S., and Nagan, S., 3rd Edition.

Reference Books	
R.1	Vector Mechanics for Engineers Vol.-I and II, F. P. Beer and E. R. Johnston, Tata Mc- Graw Hill Publication 9th Edition.
R.2	Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi,4th Edition.
R.3	Engineering Mechanics, Timoshenko and Goodier
R.4	Engineering Mechanics by S Ramamrutham
Useful Links	
1	NPTEL, www.nptel.ac.in
2	https://nptel.ac.in/courses/112/103/112103109/
3	https://nptel.ac.in/courses/112/106/112106286/

	Course Outcomes	PO/PSO	CL	Class Sessions
BCE1X01.1	**Apply** the forces on body**,** Force system, Characteristics of forces, moment of force about any point, couple moment as free vector, resultant of two-dimensional distributed loads.	PO1, PO2, PO3, PO4, PO12	3	10
BCE1X01.2	**Illustrate** the analytical and graphical condition of equilibrium, non-concurrent and parallel force system.	PO1, PO2, PO3, PO4, PO12	3	9
BCE1X01.3	**Demonstrate** the centroid of composite figures such as square rectangular, triangle, circle semicircle, quarter circle, product of inertia of plane areas.	PO1, PO2, PO3, PO4, PO12	3	10
BCE1X01.4	**Illustrate** the Kinematics of rectilinear motion, motion curves, Newton's motion Law, and relative velocity.	PO1, PO2, PO3, PO4, PO12	3	10
BCE1X01.5	**Apply** the system of particles, elastic impact of two bodies, direct central impact. Principle work energy.	PO1, PO2, PO3, PO4, PO12	3	9

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X03: Engineering Applied Physics-Lab

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	1	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Properties Of Matter, Electricity, Magnetism, Wave theory of light and optics.		**Total Marks**	**50 Marks**

List of Experiment

1	Demonstrate the Birefringence phenomenon in Double Image Prism.	CO1
2	Determination of Numerical Aperture for Optical Fiber.	CO2
3	Determine the Wavelength of Sodium Light By Using NEWTON Rings Experiment.	CO2
4	Determine the moment of inertia of a body about axis passing through the center of gravity and perpendicular to its length.	CO3
5	Study the Interference of Light Using Air Wedge Shape Thin Film.	CO4
6	Determination of e/m ratio of an electron by Thomson Method.	CO4
7	Determination of Dynamic Resistance and Current Gain of Transistor in CE and CB Mode.	CO5
8	Determine the Cut in Voltage and Dynamic Resistance of P-N Junction Diode in Forward and Reverse Biased.	CO5
9	Determine the ripple factor and rectification efficiency by Half Wave and Full Wave Rectifier.	CO5
10	Determine the Break Down Voltage and Dynamic Resistance of Zener Diode.	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,1st Edition, 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/

	Course Outcomes	PO/PSO	CL	Lab Sessions
BSH1X03.1	**Explain** the basic concept of optical fiber (NA, Acceptance angle) used for optical fiber Communication System.	PO1, PO2, PO12	2	2
BSH1X03.2	**Interpret** the several limiting cases of simple and important wave types which establish the connection between the ray optics and wave optics.	PO1, PO2, PO12	2	2
BSH1X03.3	**Illustrate** the effect of Force, concept of inertia and laws of motion apply on body.	PO1, PO2, PO12	2	2
BSH1X03.4	**Apply** the basic concept of motion of charged particle in electric –magnetic fields to solve numerical problems.	PO1, PO2, PO9,PO12	3	2
BSH1X03.5	**Apply** the basic ideas of semiconductor to develop the device such as Diode and transistors and their application in engineering.	PO1, PO2, PO9,PO12	3	2

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Program: B. Tech First Year Group-A & B

Semester-I/II BCE1X02: Engineering Mechanics-Lab

Teaching Scheme		Examination Scheme	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Physics.		**Total Marks**	**50 Marks**

List of Experiment

1	To determine the reactions of beams	**CO1**
2	To determine the law of machine and efficiency of Differential Axle and Wheel.	**CO2**
3	To determine the law of machine and efficiency of Single Purchase Crab.	**CO2**
4	To determine the law of machine and efficiency of Double Purchase Crab.	**CO2**
5	To determine the coefficient of friction between two surfaces by inclined plane	**CO3**
6	To construct the polygon law of forces and to interpret relation between resultant and equilibrant.	**CO4**
7	To determine the forces in the members of Jib Crane.	**CO4**
8	To determine graphically Concurrent and Non-Concurrent Force System.	**CO5**

Text Books

T.1	Engineering Mechanics, S. S. Bhavikatti, New Age International Pvt. Ltd, Revised Edition.
T.2	Engineering Mechanics, R. K. Bansal and Sanjay Bansal, Jain Bros. Publishers, Delhi, 8th edition.

Reference Books

R.1	Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi, 4thEdition.
R.2	Engineering Mechanics, S. N. Saluja, Satya Prakashan, New Delhi, 6thEdition.

Useful Links

1	http://www.schandpublishing.com
2	Study.com/directory/category/Engineering mechanics

	Course Outcomes	PO/PSO	CL	Lab Sessions
BCE1X02.1	**Solve** the load and support reactions forvarious types of loading condition.	PO1, PO2, PO3, PO5, PO12	3	2
BCE1X02.2	**Describe** the law of machine and efficiency of different types of machines.	PO1, PO2, PO3PO5, PO12	2	2
BCE1X02.3	**Determine** coefficient of friction using different surface conditions.	PO1, PO2, PO3, PO5, PO12	3	2
BCE1X02.4	**Measure** the forces in the all the members of Jib Crane, relation between resultant & equilibrium using polygon law of forces.	PO1, PO2, PO3, PO5, PO12	3	2
BCE1X02.5	**Formulate** the Concurrent and Non-Concurrent Force System using graphical representation.	PO1, PO2, PO3, PO5, PO12	4	2

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Program: B. Tech First Year Group-A & B

Semester-I | BCS1X01: Programming for Problem Solving Lab

Teaching Scheme		Examination Scheme	
Theory	-	**CT-I**	-
Practical	4Hrs/week	**CT-II**	-
Total Credits	**2**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Knowledge of Basic Mathematics, and Computer.		**Total Marks**	**50 Marks**

List of Experiment

1	Write a program to demonstrate use of all Arithmetic Operators in C.	CO 1
2	Write a program that uses all Bitwise Operators in C.	CO 2
3	Write a program of your choice that implements Switch Statement.	CO 2
4	Demonstrate the use of If-Else statement in the C Program. Also Write a C program that prints Armstrong Numbers between 1 to 500.	CO 3
5	Write a program to search for given number using binary search algorithm and if found, display its index otherwise display the message "element not found in the list".	CO 3
6	Develop a program to read the two matrices of dimension 3*3 and add them. Now Print the resultant matrix. Use 2-D array for the same.	CO 3
7	Build a program that demonstrates both i.e. call by value and call by reference in single program.	CO 4
8	Develop a program to check whether the entered string of numbers is palindrome or not.	CO 4
9	Design a structure for date (dd, mm, yyyy). Develop a program to read Birth date and Current date from user and print age of the person in Days, Month and Year.	CO 5
10	Prepare a list of books with Title, Pages and Price. Store information about 10 books. Print the list of books in ascending order of their price.	CO 5

Text Books

T.1	The C Programming Language: Brian Kernighan and Dennis Ritchie, 2nd Edition, Pearson Education.
T.2	C Programming: Balaguruswami, 8th Edition, McGraw Hill Publication.

Reference Books	
R.1	"C" the complete reference: Herber Schildt, 4th Edition, Tata McGraw Hill Publication.
R.2	Programming in C: Venugopal, Kindle Edition, MaGraw Hill (India) Private Limited.
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc21_cs54/preview
2	https://www.classcentral.com/course/udemy-c-programming-for-beginners--24028
3	https://www.classcentral.com/course/programming-languages-452

	Course Outcomes	PO/PSO	CL	Class Sessions
BCS1X01.1	**Learn** the components of CPU, Data types, Operators used in C programming Language.	PO1, PO2, PO3, PO4, PO5, PO10, PO12	1	2
BCS1X01.2	**Understand** the use of decision and loop control structure in basic programs.	PO1, PO2, PO3, PO4, PO5, PO10, PO12	2	2
BCS1X01.3	**Use** the arrays to store and sort data and stringlibrary functions for string processing.	PO1, PO2, PO3, PO4, PO5, PO10, PO12	3	2
BCS1X01.4	**Apply** the different functions for preparing program.	PO1, PO2, PO3, PO4, PO5, PO10, PO12	3	2
BCS1X01.5	**Compute** the structure for small real life objectsand use it for the programming.	PO1, PO2, PO3, PO4, PO5 , PO10, PO12	3	2

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X04: Basics of Communication Skills Lab

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Basic English Grammar		**Total Marks**	**50 Marks**

List of Experiment

1	Introduction to Communication: - Verbal & Non -verbal Communication.	C01
2	Describe Barriers to Communication: - Methods to Overcome Listening Barriers.	CO1
3	Acquire knowledge of Reading & Writing Skills.	CO2
4	Use of basic grammar in Verbal Communication.	CO2
5	Develop the Speaking Skills.	CO3
6	Learn the Presentational Skills.	CO4
7	Learn Skills of Group Discussion: Process & Techniques	CO5
8	Practice of Interview Technique.	CO5

Text Books

T.1	Public Speaking and Influencing Men in Business by Dale Carnegie
T.2	Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP

Reference Books	
R.1	Communication Skills by Dr. P. Prasad
R.2	Communication Skills by Sanjay Kumar and Pushpalata, OUP
Useful Links	
1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X04.1	**Understand** the importance of verbal and non-verbal communication and how to overcome barriers.	PO9, PO1O,PO12	2	4
BSH1X04.2	**Acquire** the knowledge of reading skill and writing skills.	PO9, PO1O,PO12	2	4
BSH1X04.3	**Apply** the skills required to communicate effectively with engineering community and society.	PO9, PO1O,PO12	3	2
BSH1X04.4	**Learn the** skills for effective presentation and Effective body language.	PO9, PO1O,PO12	1	2
BSH1X04.5	**Execute** the skills of effective communication required for Group Discussions and Interview.	PO9, PO1O,PO12	3	4

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Program: B. Tech First Year Group-A & B

Semester-I/II	BME1X01: Engineering Workshop

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Nil		**Total Marks**	**50 Marks**

List of Experiment

1	**Fitting:** Use and setting of fitting tools for chipping, cutting, filing, marking, centerpunching, drilling and tapping. **Job-1:** Fitting to size, male-female fitting.	CO1
2	**Carpentry**: Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood tuning and modern wood turning methods. **Job-2:** L Joint / T Joint / Cross joint	CO2
3	**Welding:** Use and setting of tools and equipments for edge preparation for welding jobsand Arc welding for different job. **Job-3:** Lap welding of two plates / butt welding of plates.	CO3
4	**Welding Simulation:** introduction to welding, types of welding process, types of joints, materials, application of different types of welding. **Job-4:** Job on Simulation Package Software	CO4
5	**Fasteners:** Types of fastening process, Screw threads, nut & bolt. Demonstration of thread forming/machining and its measurement.	CO5

Text Books

T.1	"Elements of Workshop Technology":Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K, 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
T.2	"Manufacturing Technology – I":Gowri P., Hariharan and A. Suresh Babu, Pearson Education, 2008.

Reference Books

R.1	"Process and Materials of Manufacture": Roy A. and Lindberg, 4th Edition, Prentice Hall India 1998.
R.2	"Elements of Workshop Technology": S K Hajra, Choudhury, A K Hajra, Choudhury, & Nirjhar Roy, Vol. I & II.
R.2	"A Course in Workshop Technology":B S Raghuwanshi, Vol. 1 & II.
R.2	"Workshop Technology":W A .I Chapman, , Part I, II& III

Useful Links	
1	https://nptel.ac.in/courses/112/103/112103305/
2	https://nptel.ac.in/courses/112/107/112107145/
3	https://nptel.ac.in/courses/112/107/112107144/
4	https://nptel.ac.in/courses/112/103/112103306/

	Course Outcomes	PO/PSO	CL	Class Sessions
BME1X01.01	**Identify** marking tools, hand tools, measuring instruments and to work to prescribed dimensions/tolerances on mating of two metal parts.	PO1,PO2,PO3,PO9,PO10,PO12	3	4
BME1X01.02	**Apply** carpentry tools for wooden joints, Simple exercise using jack plane.	PO1,PO2,PO3,PO9,PO10,PO12	3	4
BME1X01.03	**Build** the joint by Arc welding, Simple butt and Lap welded joints.	PO1,PO2,PO3,PO9,PO10,PO12	3	4
BME1X01.03	**Demonstrate** advance welding process on simulation package to obtain practical skills in the various trades.	PO1,PO2,PO3,PO5, PO9,PO10,PO12	2	4
BME1X01.04	**Understand** fasteners, its use, and selection of fastener as per the application.	PO1,PO2,PO3,PO9,PO10,PO12	2	4

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Program: B. Tech First Year Group-A & B

Semester-I	BSH1X05: Sports and Yoga

Teaching Scheme			**Examination Scheme**	
Theory	-		**CT-I**	-
Practical	2 Hrs/week		**CT-II**	-
Total Credits	**Audit**		**CA**	25 Marks
Duration of ESE: 2Hrs			**ESE**	25 Marks
Pre-Requisites: AICTE curriculum			**Total Marks**	**50 Marks**

Course Contents

Unit I	**Meditative Asanas**: Sukhasan, Swastikasan, Padmasan, Vajrasan and Siddhasan.
Unit II	**Cultural Asanas**: Bhujagasan, Ardha-Shalabhasana, Dhanurasan Naukasanc Padhasthasan, halasan, Matsyasan, Vakrasan, Chakrasan, and Lateral bend Tadasan, Utkratasan, Vrikshasan, Parvatasan, and Shavasan.
Unit III	**Pranayam**: Anuloma-Vilomaand Ujjai (Both without Khubhak) Bandh: Uddiyan Mudra: Vipritkarani Kriya Kapalbhati
Unit IV	**Outdoor Games:** Football, volley ball, Cricket, Kabbadi, kho-kho ,Lawn tennis
Unit V	**Indoor Games**: Table tennis, chess, carom.

Text Books

T.1	Chandanpat Dr. Rajesh Shamrao Education in India, Khel Sahitya,2007.
T.2	Sharma Dr. N. K., Teacher Education, Khel Sahitya, 2018.
T.3	Swami Vishnu Devananda, Complete Illustrated Book of Yoga, Bell Publishing/Julian Press,1960

Reference Books

R.1	B.K.S Iyengar, Light on yoga, Schocken books,1966
R.2	Nirmaljit Kaur Rathee, Sudesh Bhardwaj, contemporary yoga education: transforming the body, mind & soul, european scientific institute (esi).2017

Useful Links

1	http://www.yogaiya.in
2	http://www.divyayoga.com
3	https://www.yogajournal.com

4	http://www.indiankabaddi.org
5	https://www.fivb.com
6	https://www.volleyballindia.com

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X05.1	**Summarize** the concept of yoga in ancient and modern time application and importance of yoga in modern society and use of meditative Asanas	PO1,PO10,PO12	2	5
BSH1X05.2	**Illustrate** Cultural Asanas	PO1,PO10,PO12	2	5
BSH1X05.3	**Understand** process of Pranayam, Bandh, Mudra	PO1,PO10,PO12	2	5
BSH1X05.4	**Classify** outdoor games	PO1,PO10,PO12	2	5
BSH1X05.5	**Interpret** importance of indoor games	PO1,PO10,PO12	2	5

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Program: B. Tech First Year Group-A & B

Semester-II	BSH1X06: Differential Equation and Statistics

Teaching Scheme		**Examination Scheme**	
Theory	3 Hrs/week	**CT-I**	15 Marks
Tutorial	1 Hrs/week	**CT-II**	15 Marks
Total Credits	**4**	**CA**	10 Marks
Duration of ESE: 3Hrs		**ESE**	60 Marks
Pre-Requisites: AICTE Bridge Course		**Total Marks**	**100 Marks**

Course Contents

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 of linear D.E to Electrical circuit, Newton's law of cooling.
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.
Unit III	**Multivariable Calculus (Integration):** Double Integration (Cartesian and polar coordinates), Change of Order of Integration, Elementary Triple Integration, Application :Area by double integration and volume by triple integration.
Unit IV	**Complex Number:** Demoivers theorem and its Applications, Hyperbolic and inverse Hyperbolic functions, Separation of real and Imaginary parts, Logarithmic of Complex Number.
Unit V	**Statistics:** Measures of central tendency: Skewness and Kurtosis, Measures of dispersion, Coefficient of variation, Moments, Fitting of straight line, Fitting of parabola and exponential curves,Lines of regression and correlation, Rank correlation.

Text Books

T.1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9th edition

T.2	"Advance Engineering Mathematics" by Ervin Kreysizing 9th Edition
T.3	"GB Thomas and R.L. Finney", "Calculus and Analytic geometry" 9th edition, Pearson, Reprint 2002.
Reference Books	
R.1	"Higher Engineering Mathematics" by H. K. Das, Er. RajnishVermaChand Publication.
R.2	"A textbook of Engineering Mathematics" by N.P. Bali, Manish Goyal Laxmi Publication Reprint 2008.
R.3	"Higher Engineering Mathematics" by B.S. Grewal Khanna Publication, Delhi
Useful Links	
1	https://nptel.ac.in/courses/111/107/111107112/
2	https://nptel.ac.in/courses/111/107/111107111/

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X06.1	**Apply** different methods to solve Linear differential equation	PO1,PO2,PO3,PO12	3	10
BSH1X06.2	**Solve** problems by using Higher order differential equation.	PO1,PO2,PO3,PO12	3	10
BSH1X06.3	**Determine** area, mass and volume by using concept of integration.	PO1,PO2,PO3,PO12	3	9
BSH1X06.4	**Use** basic algebraic concept to solve the complex number and solution of simple polynomial equations.	PO1,PO2,PO3,PO12	3	10
BSH1X06.5	**Use** of statistical method to solve the problem on fitting of straight line and Parabola.	PO1,PO2,PO3,PO12	3	9

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X07: Engineering Applied Chemistry

Teaching Scheme		**Examination Scheme**	
Theory	3 Hrs/week	**CT-I**	15 Marks
Tutorial	1 Hrs/week	**CT-II**	15 Marks
Total Credits	**4**	**CA**	10 Marks
Duration of ESE: 3Hrs		**ESE**	60 Marks
Pre-Requisites: AICTE Bridge course, Thermodynamics and Equilibrium, Basics of Electrochemistry		**Total Marks**	**100 Marks**

Course Contents

Unit I	**Energy Sources:** Introduction of energy, types of Energy units of energy, conventional and non-conventional energy sources, Introduction of fuels, classification, types and application, Calorific value determination of calorific value. Classification of solid fuels, Analysis of solid fuels, Liquid fuels, Fractional distillation, Cracking, Knocking, CNG and Bio-Diesel.
Unit II	**Water Technology:** Introduction, Sources, Hardness, Alkalinity, Coagulation, Sterilization, Softening process, Zeolite process, Ion Exchange Process, Boiler trouble, Desalination of sea water.
Unit III	**Construction Material:** Introduction of Construction Material, Chemical composition of cement, Microscopic constituent of cement & role of microscopic constituent, manufacturing process of cement & types, properties, additives of cement and selection for various purpose. Fly ash as a cementing material, Ready-mix concrete.
Unit IV	**Laws of Thermodynamics& Battery Technology:** Basics of thermodynamics, Laws of thermodynamic, Concept of Enthalpy and free energy, Introduction of batteries, Types of batteries, Fuel cell, reserve battery.
Unit V	**Corrosion and its Control:** Definition of corrosion, Electrode potential, redox reaction, EMF series, Galvanic series, Chemical corrosion, Wet and Dry corrosion, and Electrochemical corrosion types of corrosion method of protection, design & material selection, Cathodic protection.

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
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/

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X07.1	**Interpret** the types of Energy sources and its properties and application	PO1, PO2, PO12	2	10
BSH1X07.2	**Differentiate** water treatment process and its application in industry.	PO1, PO2, PO12	2	9
BSH1X07.3	**Explain** the manufacturing of Cement, properties and different types of cement.	PO1, PO2, PO3	2	9
BSH1X07.4	**Illustrate** bulk properties and processes used in thermodynamics, Different types and application of batteries.	PO1, PO2, PO3	3	10
BSH1X07.5	**Predict** the causes of corrosion, its consequences and methods to minimize corrosion.	PO1, PO2, PO3	3	10

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Program: B. Tech First Year Group-A & B

Semester-I/II	BEE1X01: Basic Electrical & Electronics Engineering

Teaching Scheme			**Examination Scheme**	
Theory	3 Hrs/week		**CT-I**	15 Marks
Tutorial	-		**CT-II**	15 Marks
Total Credits	**3**		**CA**	10 Marks
Duration of ESE: 3Hrs			**ESE**	60 Marks
Pre-Requisites: HSC Physics , Basic Science Concepts , Mathematics			**Total Marks**	**100 Marks**

Course Contents

Unit I	**Electric Circuits:** Series & Parallel combination of resistances , Star Delta transformation& Classification of sources (Current & Voltage), Ideal and Practical Sources (Independent Sources only),Source transformation, Kirchhoff's Laws (KVL, KCL), Superposition theorem for DC circuits (Numerical on above topics)
Unit II	**Magnetic circuits & Electrostatics:** Concept of magnetism & Electromagnetism, flux, flux density, flux intensity, MMF, reluctance, permanence, permeability, analogy with electric circuit, B-H curve. Faradays Law of electromagnetic induction**,** Coulombs Law, Dielectric capacitance
Unit III	**AC Circuits:** Generation of single phase voltage, average and RMS value for sinusoidal waveform, phasor representation of sinusoidal electrical quantities, steady state behavior of RLC circuit with excitation, reactance, impedance, power and energy in AC circuit, simple numerical on series AC circuit, concept and importance of power factor, resonance in series circuits. Principle of Generation of three phase voltage, Phase sequence, Star & Delta Connected three phase systems, Voltage, Current & Power relations for Balanced three phase system only.
Unit IV	**Single Phase Transformer:** Construction, operating principle, Types, EMF equation, transformation ratio, equivalent circuit of transformer, OC & SC Test, losses, efficiency & Numerical on Efficiency

Unit V	**Diode Circuits**: P-N junction diode, its operation in forward bias & reverse bias, characteristics, Transistors (PNP & NPN) , Construction of SCR, its operation & characteristics, Rectifier circuits (Half wave & Full wave)
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	D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
T.3	"Power Electronics: Circuits Devices and Applications" M.H. Rashid, Pearson 3rd Edition , 2011.
Reference Books	
R.1	"Electrical and Electronics Technology", E. Hughes, Pearson, 2010.
R.2	"Basic Electrical Engineering", D. C. Kulshreshtha, McGraw Hill, 2009.
Useful Links	
1	https://nptel.ac.in/courses/117/106/117106034/
2	https://nptel.ac.in/courses/108108076/
3	https://nptel.ac.in/courses/108105062/

	Course Outcomes	PO/PSO	CL	Class Sessions
BEE1X01.1	**Solve** the basic electric circuits and develop numerical solutions to fundamental electrical and electronics engineering problems.	PO1,PO2,PO3, PO12	3	11
BEE1X01.2	**Classify** the magnetic circuits and its type.	PO1,PO2,PO3	3	9
BEE1X01.3	**Predict** the type of complex AC circuits with single phase & three phase voltage.	PO1,PO2,PO3	3	10
BEE1X01.4	**Utilize** the basic concepts of transformer & motors in electrical Engineering applications.	PO1,PO2,PO3, PO12,	3	9
BEE1X01.5	**Illustrate** the various types of electronic components & devices.	PO1,PO2, PO12	3	9

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X08: Ethical Science & Business Ethics in Industry

Teaching Scheme		**Examination Scheme**	
Theory	2Hrs/week	**CT-I**	7 Marks
Tutorial	-	**CT-II**	7 Marks
Total Credits	**2**	**CA**	6 Marks
Duration of ESE: 2Hrs		**ESE**	30 Marks
Pre-Requisites: General Ethics, Social sciences.		**Total Marks**	**50 Marks**

Course Contents

Unit I	**Human Values and Ethics:** Morals, Values, Ethics and Integrity, Concept of culture and civilization: Public Interest Litigation (PIL), Intellectual property rights (IPR) & parents, Indian Constitution and Federal System: Role of Bureaucracy in Modern Society.
Unit II	**Need for Value Education for Engineer:** Happiness, Prosperity & Harmony, Code of Ethics and Professionalism, Natural acceptance, Professional Ethics, Engineering Ethics, Environmental Ethics, Safety, Responsibility and Rights.
Unit III	**An Overview of Industrial Ethics:** Ethics in business world, Ethics in Industry, Ethics for Industry professionals, Ethical behavior, Industry professional malpractices Basics of business ethics - Corporate Social Responsibility – Issues of Management – Crisis Management

Text Books

T.1	A New Look into Social Science : Shabbir, Sheikh and Dwadashiwar,S. Chand Publisher
T.2	Constitution of India and Professional Ethics: Reddy, G.B. and Mohd. Suhaib, IK International Publishing House. 2006
T.3	Introduction to Engineering Ethics : Martin, Mik , Roland Schinzinger, 2nd edition (16 February 2009) McGraw-Hill Education;

Reference Books

R.1	Human Resource Development and Management : A. M. Sheikh, 3rd Revised Edition, S Chand & Co Ltd.
R.2	"A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet": Sara Baase, 3rd Edition PHI Publications.

R.3	"Case study in Information Technology Ethics" :Richard A. Spinello, 2nd Edition PHI Publications.
R.4	"Internet Ethics": Duncan Lanford, Macmillan Education UK.
R.5	"Computer and Ethics in the Cyber age": D. Micah Hester and Paul J. Ford.
Useful Links	
1	https://nptel.ac.in/courses/110/105/110105079/
2	https:://nptel/courses/video/1101323279/L54.html
3	https:://nptel/courses/video/110105079/L54.html

	Course Outcomes	PO/PSO	CL	Class Sessions
BFE1205.1	**Describe** Basic Human Values, Ethics and the importance of fundamental rights, role in Modern Society.	**PO6, PO8, PO12**	2	8
BFE1205.2	**Illustrate the** basic Ethics for Engineers, code of ethics and Professionalism.	**PO6, PO8, PO12**	2	8
BFE1205.3	**Classify** the Ethics for Industry Professionals, Corporate and Social Responsibility.	**PO6, PO8, PO12**	2	8

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Program: B. Tech First Year Group-A & B

Semester-I/II	BSH1X09: Engineering Applied Chemistry-Lab

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Energy and Parameters Water,		**Total Marks**	**50 Marks**

List of Experiment

1	Determination of Moisture Content of Coal sample.	**CO1**
2	Determination of Volatile Matter & Ash Content of Coal sample.	**CO1**
3	Determination of Flash Point of given Oil By Abel's Apparatus.	**CO2**
4	Determination of Flash Point of given Oil By Pensky Martine Apparatus.	**CO2**
5	Determination of Hardness Of Water Sample By Complexometric Method.	**CO3**
6	Determination of Calcium Ion & Magnesium Ion Separately.	**CO3**
7	Determination of Cation Exchange Capacity by Ion Exchange Resin.	**CO3**
8	Determination of Alkalinity of Water Sample By Warders Method.	**CO4**
9	Determination of pH of given Solution.	**CO4**
10	Determination of Heat of Hydration of Cement.	**CO5**

Text Books

T.1	Applied Chemistry Lab O.P Virmani
T.2	Laboratory manual on Engineering Chemistry By Suddharani

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/

	Course Outcomes	PO/PSO	CL	Lab Sessions
BSH1X09.1	**Examine** the analysis of coal & Applications	PO1,PO2, PO12	3	2
BSH1X09.2	**Identify** the Selection of Lubricating oil	PO1,PO2, PO12	3	2
BSH1X09.3	**Apply** the process of finding hardness.	PO1,PO2, PO12	3	2
BSH1X09.4	**Identify** the quality of water.	PO1,PO2, PO 10, PO12	3	2
BSH1X09.5	**Demonstrate** the Heat of Hydration of Cement.	PO1,PO2, PO12	3	2

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Program: B. Tech First Year Group-A & B

Semester-I/II	BEE1X02: Basic Electrical & Electronics Engineering Lab

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Physics.		**Total Marks**	**50 Marks**

List of Experiment

1	Introduction to Laboratory equipments of Electrical Engineering	**CO1**
2	To study and apply Kirchhoff's laws (KVL& KCL).	**CO1**
3	To study and apply Superposition theorem.	**CO1**
4	To study &plot B-H curve for given magnetic material	**CO2**
5	To study working of inductor and determination of resistance and inductance of choke Coil	**CO3**
6	To study RLC series circuit and to plot Phasor Diagram for it.	**CO3**
7	To study and perform open circuit test and short circuit test on single phase transformer	**CO4**
8	To study and perform direct loading test on single phase transformer.	**CO4**
9	To study characteristics of various electronics devices – Transistor & SCR	**CO5**
10	To study & demonstrate operation of various Logic gates.	**CO5**

Text Books

T.1	D.C. Kulshreshtha, Revised 1st edition, Tata Mc-Graw Hill Education Pvt. Ltd.
T.2	A Text Book of Electrical Technology: B. L. Thareja and A. K. Thareja, S. Chand Publication (Volume I, II & III). 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/117/106/117106034/
2	https://nptel.ac.in/courses/108108076/

	Course Outcomes	PO/PSO	CL	Class Sessions
BCE1207.1	**Solve** the basic electric circuits and develop numerical solutions to fundamental electrical and electronics engineering problems.	PO1, PO2, PO3, PO5, PO12	3	2
BCE1207.2	**Analyze** the magnetic circuits and its type.	PO1, PO2, PO3PO5, PO12	2	2
BCE1207.3	**Formulate and solve** complex AC circuits with single phase & three phase voltage.	PO1, PO2, PO3, PO5, PO12	5	2
BCE1207.4	**Realize** the requirement of transformer & motors in electrical Engineering applications.	PO1, PO2, PO3, PO5, PO12	5	2
BCE1207.5	**Articulate** the various types of electronic components & devices.	PO1, PO2, PO3, PO5, PO12	6	2

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Program: B. Tech First Year Group-A & B

Semester-I/II	BME1X02: Engineering Graphics and Design Lab

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	4 Hrs/week	**CT-II**	-
Total Credits	**2**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: AICTE Bridge course, introduction to drawing and projection method in CBSE		**Total Marks**	**50 Marks**

List of Experiment/Drawing sheets

1.	General applications of different lines, dimensioning & lettering	**CO1**
2.	Engineering Curves (Minimum four curves)	**CO1**
3.	Projection of Lines (Minimum four problems)	**CO2**
4.	Projection of Planes (Minimum four problems)	**CO2**
5.	Projections of solids (Minimum four problems)	**CO3**
6.	Development of lateral surfaces.(Minimum four problems)	**CO3**
7.	Orthographic Views (Minimum four problems; To draw orthographic views from given pictorial view, two of which should be free hand sketching/missing view)	**CO4**
8.	Orthographic views using CAD package (Auto-cad & Creo software)	**CO5**
9.	Isometric Views/Projection. (Minimum four problems) Two problems on Machine Element and two on combination of solids)	**CO4**
10.	Isometric views using CAD package. (Auto-cad & software)	**CO5**

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	Engineering Graphics with an introduction to AUTOCAD - A. R. Bapat, 6th reprint Edition, 2012, Allied Publishers, New Delhi.
T.4	Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, Revised Edition, 2010, PHI Publication.
T.5	Engineering Drawing - R.K. Dhawan, 1st Edition, 2012, S Chand Publications

T.6	Engineering Drawing, M.B. Shah, B.C. Rana, 2nd Edition, 2009, Pearson Publication
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	Fundamentals of Engineering Drawing - Luzadder Warren J, Duff John, 11th Edition, 2012, PHI Publications.
R.4	Machine Drawing -N.D. Bhatt, 46th Edition, 2014, Charotar Publishing house, Anand, India.
R.5	Engineering Graphics and Drafting - P.S. Gill, Reprint, 2013, S. K. Kataria and Sons
R.6	Engineering Graphics with AutoCAD, D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, PHI Publication, Revised edition, 2010.
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/

	Course Outcomes	PO/PSO	CL	Lab Sessions
BME1X02.1	**Interpret** and draw different types of engineering curves	PO1,PO2,PO4, PO9,PO10, PO12	3	8
BME1X02.2	**Apply** the concepts of orthographic projection to solve problems on projection of line and Plane	PO1,PO2,PO4, PO9,PO10, PO12	3	8
BME1X02.3	**Apply** the concepts of orthographic projection to solve problems on projection solid and development of surfaces.	PO1,PO2,PO4,PO5, PO9,PO10 PO12	3	8
BME1X02.4	**Develop** visualization and logical thinking to convert isometric figures into orthographic projection and vice-versa	PO1,PO2,PO4,PO5, PO9,PO10 PO12	3	8
BME1X02.5	**Utilize** the concepts of engineering graphics for developing 2D & 3D views of geometrical entities using CAD software packages.	PO1,PO2,PO4,PO5, PO9, PO12	3	8

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Program: B. Tech First Year Group-A & B

Semester- I/II | BCS1X02: CSE Workshop

Teaching Scheme		Examination Scheme	
Theory	-	**CT-I**	-
Tutorial	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
		Total Marks	**50 Marks**

Pre-Requisites: Nil

List of Experiment

1	To identify the peripherals of a computer, assemble and disassemble the system.
2	Introduction to hardware peripherals like RAM, ROM, keyboard, Mouse, processors, etc. Generation of processors. Working of SMPS. Study of various ports. Steps and precautions to assemble computer
3	To install Windows XP
4	Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.
5	To learn Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email
6	To Learn laptop hardware peripherals like RAM, ROM, keyboard, Mouse, Processors, etc. Generation of processors. Study of various ports. Steps and precautions to assemble laptop.
7	To learn various threats on the internet and configure the computer to be safe on the internet.
8	To create a your web page using HTML
9	Introduction to computer network. Study of various topologies. Preparing the network cable using crimping tools and connectors. Study of various network environments..
10	Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Text Books

T.1	Fundamentals of Computers by V. Rajaraman
T.2	Hardware and Software of Personal Computers by Sanjay K. Bose

Reference Books

R.1	Computer Studies - A first course by John Shelley and Roger Hunt
R.2	Computer Fundamentals, MS Office and Internet & Web Technology by Dinesh Maidasani
Useful Links	
1	https://nptel.ac.in/courses/106/106/106106090/
2	https://nptel.ac.in/courses/106/102/106102065/

	Course Outcomes	PO	CL	Lab Sessions
BCS1X02.1	Understand basic concepts of computer, System Software	PO1,PO2,PO3,PO4, PO5,PO12	6	4
BCS1X02.2	Implement installation of windows XP.	PO1,PO2,PO3,PO4, PO5,PO12	4	4
BCS1X02.3	Identify network topology on given network	PO1,PO2,PO3,PO4, PO5,PO12	6	4
BCS1X02.4	Develop web page using different tag in HTML	PO1,PO2,PO3,PO4, PO5,PO12	4	4
BCS1X02.5	Implement hyperlink and use excel sheet modern tools .	PO1,PO2,PO3,PO4, PO5,PO12	4	4

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Program: B. Tech First Year Group-A & B

Semester-I/II	BEC1X01: Electronics Component Workshop

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Tutorial	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Nil		**Total Marks**	**50 Marks**

List of Experiment

1	Introduction to Basic Electronics Component.	**CO1**
2	Introduction of Multimeter and How to use.	**CO2**
3	How to Calculate Value of Resister By using Colour coding &Multimeter.	**CO2**
4	Introduction Of Diodes & Transistor.	**CO3**
5	How to Work On Bread Board.	**CO4**
6	Design Circuit of Basic Gates on Bread Board With Diode and Transistor.	**CO4**
7	Introduction of Functions of CRO.	**CO5**
8	Design a Micro Project based on Logic Gates or Diode or Transistor on Bread Board.	**CO5**

Text Books

T.1	Electronics Circuits and Systems Author: Owen Bishop
T.2	“Basic Electronics” by D P Kothari and I Nagrath

Reference Books	
R.1	"Fundaments of Electronics: (Includes Solved Problems and MCQS)" by B Somanathan Nair and S R Deepa
R.2	"Basics of Electronics Engineering" by Wiley India
Useful Links	
1	nptel.ac.in/courses/122/106/122106025/
2	https://nptel.ac.in/courses/117/103/117103063/

	Course Outcomes	PO/PSO	CL	Lab Sessions
BEC1X01.1	**Identify** different electronics component and understand working.	PO1,PO2,PO3,	3	2
BEC1X01.2	**Understand** operation of multimeter and extend the use of multimeter by measuring basic electronics component.	PO1,PO2,	4	8
BEC1X01.3	**Apply** the knowledge of Diode & Transistor.	PO1,PO2,PO3	5	4
BEC1X01.4	**Explore** the knowledge of diode & transistor by experimenting on breadboard.	PO2,PO3	4	2
BEC1X01.5	**Design** micro project based on basic components.	PO1,PO2,PO3,	3	4

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Program: B. Tech First Year Group-A & B

Semester-I/II BAE1X01: Aeronautical Engineering Workshop

Teaching Scheme		Examination Scheme	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Nil		**Total Marks**	**50 Marks**

Sr. No.	List of Contains/Experiments	CO
1	**Machining in Lathe Machine:** Use and setting of tools & job in the lathe machine fordifferent machining operation in the job of lathe machine. **Job-1:** Facing /Turning/Drilling	CO1, CO2
2	**Machining in Shaper Machine:** Use and setting of tools & job in the Shaper machinefor different machining operation in the job of Shaper machine **Job-1:**Machining a horizontal Surfaces/Vertical Surfaces	CO1, CO2
3	**Machining in Milling Machine :** Use and setting of tools & job in the Milling machine fordifferent machining operation in the job of Milling machine **Job-3:** Face Milling /Slot Milling/End Milling.	CO1, CO2
4	**Workshop:** Use of cardboards, papers to model the aircraft. **Job-4:** Create the Model of simple aircraft using cardboards.	CO1, CO2

Text Books

T.1	"Elements of Workshop Technology", Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
T.2	"Manufacturing Technology – I", Gowri P., Hariharan and A. Suresh Babu, Pearson Education, 2008.

Reference Books

R.1	"Process and Materials of Manufacture", Roy A. & Lindberg, 4th Edition, Prentice Hall India, 1998.
R.2	"A Course in Workshop Technology", B S Raghuwanshi, Vol. 1 & II.
R.3	"Workshop Technology", W A .I Chapman, , Part I, II & III

Useful Links

1	http://www.digimat.in/nptel/courses/video/112105233/L13.html
2	https://nptel.ac.in/courses/112/107/112107144/
3	https://nptel.ac.in/courses/112/103/112103306/

CO	Course Outcomes	PO/PSO	CL	Lab Sessions
1.	**Identify** the basics tools and equipments used in Lathe, Shaper, Milling and foundry shop.	PO1, PO2, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12	3	4
2.	**Create** the jobs of multi-operation in lathe machine, Shaper Machine, Milling Machine, &sand mould job infoundry shop for engineering application.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12	5	4

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Program: B. Tech First Year Group-A & B

Semester-I/II	BEE1X03: Electrical Engineering Workshop

Teaching Scheme		**Examination Scheme**	
Theory	-	**CT-I**	-
Practical	2Hrs/week	**CT-II**	-
Total Credits	**1**	**CA**	25 Marks
Duration of ESE: 2Hrs		**ESE**	25 Marks
Pre-Requisites: Nil		**Total Marks**	**50 Marks**

List of Experiment

1	To understand & draw the symbols of various electrical devices.	**CO1**
2	To identify resistors by using different colour codes	**CO1**
3	To study digital multimeter and perform testing of various components.	**CO1**
4	To study cathode ray oscilloscope and perform measurements.	**CO2**
5	To demonstrate soldering- de-soldering techniques.	**CO3**
6	To study wiring diagram of ceiling Fan.	**CO3**
7	To study about stair case wiring two way switch	**CO4**
8	To study fuses , MCBS and importance of EARTHING	**CO4**
9	To study circuit and working of UPS	**CO5**
10	To Study& design Half – Wave& Full wave rectifier circuit	**CO5**

Text Books

T.1	D.C. Kulshreshtha, Revised 1st edition, Tata Mc-Graw Hill Education Pvt. Ltd. ,2010

T.2	A Text Book of Electrical Technology: B. L. Thareja and A. K. Thareja, S. Chand Publication (Volume I, II & III). 2011
T.3	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/108/108/108108076/
2	https://nptel.ac.in/courses/108/105/108105112/

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Program: B. Tech First Year Group-A& B

Semester-I/II	BSH1X10: Constitution of India

Teaching Scheme			**Examination Scheme**	
Theory	1Hrs/week		**CT-I**	-
Tutorial	-		**CT-II**	-
Total Credits	**Audit**		**CA**	25 Marks
Duration of ESE: 2Hrs			**ESE**	25 Marks
Pre-Requisites: AICTE curriculum			**Total Marks**	**50 Marks**

Course Contents

Unit I	Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Composition , function ,committees of the Constituent Assembly, Enforcement of the Indian Constitution and its Salient Features.
Unit II	Fundamental Duties, the Preamble of the Constitution, Fundamental Rights, the role of Dr.B R Ambedkar in the making of the Indian Constitution.
Unit III	Gandhian Principles, Liberal Principles, Socialistic Principles.
Unit IV	Panchyat Raj Institutions, Union Government, Powers of Indian Parliament, Functions of RajyaSabha, Functions of LokSabha, Powers and Functions of the Prime Minister, Powers and Functions of the President.
Unit V	Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Lok Pal , The Lokpal and Lokayuktas Act 2013, Lokayukta.

Text Books

T.1	A.G. Noorani (2000): Constitution questions in India: The President, Parliament and the States, New Delhi: Oxford University Press.
T.2	B. Chakravarthy& K.P Pandey (2006) Indian Government and Politics, New Delhi: Sage.
T.3	Bajpai. Kanti and Pant V. Harsh (2013) India's Foreign Policy: A Reader, New Delhi: Oxford University Press.
T.4	M. Laxmikanth (2016) Indian Polity for Civil Services Examinations, New Delhi: Tata McGraw Hills.
T.5	Singh, M.P &Saxena, R (2008) Indian Politics: Contemporary Issues and Concerns. New Delhi:PHI Learning.

Reference Books	
R.1	G. Austin (2004) Working of a Democratic Constitution of India, New Delhi: Oxford University Press.
R.2	Basu, D.D (2005), An Introduction to the Constitution of India, New Delhi, Prentice Hall.
R.3	N. Chandhoke&Priyadarshini (eds) (2009) Contemporary India: Economy, Society, Politics, New Delhi: Oxford University Press.
R.4	N.G Jayal and P.B. Maheta, (eds) (2010) Oxford Companion to Indian Politics, New Delhi: Oxford University Press.
R.5	A. Vanaik and R. Bharghava (eds) (2010) Understanding Contemporary India: Critical Perspectives, New Delhi: Orient Blackswan

	Course Outcomes	PO/PSO	CL	Class Sessions
BSH1X10.1	**Understand** Indian Constitution and its Salient Features.	PO10,PO12	2	2
BSH1X10.2	**Outline** the role of Dr. R Ambedkar in the making of the Indian Constitution and Preamble of the Constitution.	PO10,PO12	2	3
BSH1X10.3	**Summarize** Gandhian Principles, Liberal Principles, Socialistic Principles.	PO10,PO12	2	3
BSH1X10.4	**Compare** functions of Rajya Sabha, Lok Sabha, Powers and Functions of the Prime Minister, Powers and President.	PO10,PO12	2	2
BSH1X10.5	**Understand** Judiciary system of India.	PO10,PO12	2	2

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