



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.



Tulsiramji Gaikwad-Patil College of Engineering and Technology

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

Semester – I Group B (DS, IT, BT, CE, ME)

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	BSH1X07	Engineering Applied chemistry	3	1	-	4	4	15	15	10	60	100
3	ESC	BEE1X01	Basic 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	Basic 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	2	9	7	--	--	--	--	--

* Indicates Programme Specific Workshop will be based on respective Programme /CODE*

e. g. IT department will have IT Workshop

TOTAL CREDITS : 18

BAE1X01	BBT1X01	BEC1X01	BIT1X01
BME1X03	BEE1X03	BCE1X03	BCS1X02

HOD
Science & Humanities
T.G.P.C.E.T. NAGPUR

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College Of Engineering
and Technology, Nagpur

Principal
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Nagpur



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

Semester – II Group B (DS, IT, BT, CE, ME)

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	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	3	18	14	--	--	--	--	--

PROGRESSIVE TOTAL CREDITS :18+17=35

HOD
Science & Humanities
T.G.P.C.E.T. NAGPUR



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	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 NAAC Accredited with A+ Grade (An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)			
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 Surface Integral.			
Text Books				
T.1	Higher Engineering Mathematics by Bali Lyenger (Laxmi Prakashan) 9yh Edition			



T.2	Advance Engineering Mathematics by Ervin Kreysizing 9 th Edition
T.3	GB Thomas and R.L. Finney, Calculus and Analytic geometry 9 th edition, Pearson, Reprint 2002.
Reference Books	
R.1	“Higher Engineering Mathematics” by Erwin Kreyszing 9 th 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 35 th 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		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, 10 th Edition. S.Chand& Co
T.2	Engineering chemistry, Dr.AvinashBharti, V.K.Walekar,1 st Edition. Tech Max
T.3	Textbook of Engineering Chemistry: P.C Jain& Monica Jain, 15 th Edition.Dhanpatrai publication Ltd
Reference Books	
R.1	Applied Chemistry: Narkhede & Bhake ,1 st Edition. Das Ganu Prakashan
R.2	Engineering Chemistry: Krishnamurti & Madhav, 2 nd Edition. Prentice Hall of India
R.3	Text book of applied chemistry: W.K Pokale& M.D Chaudhari1 st 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) & patents, 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, 2 nd edition (16 February 2009) McGraw-Hill Education;			
Reference Books				
R.1	Human Resource Development and Management : A. M. Sheikh, 3 rd Revised Edition, S Chand & Co Ltd.			
R.2	“A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet”: Sara Baase, 3 rd Edition PHI Publications.			



R.3	“Case study in Information Technology Ethics” :Richard A. Spinello, 2 nd 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 & Creo software)			CO5
Text Books				
T.1	Elementary Engineering Drawing - N.D. Bhatt, Charotor Publishing house, Anand, India.			
T.2	Engineering Drawing - D. A. Johle, 1 st 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, 2 nd 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, 46 th 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 (DS) 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	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	BIT1X01: IT 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 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/PSO	CL	Lab Sessions
BIT1X01.1	Understand basic concepts of computer, System Software	PO1,PO2,PO3,PO4, PO5,PO12	6	4
BIT1X01.2	Implement installation of windows XP.	PO1,PO2,PO3,PO4, PO5,PO12	4	4
BIT1X01.3	Identify network topology on given network	PO1,PO2,PO3,PO4, PO5,PO12	6	4
BIT1X01.4	Develop web page using different tag in HTML	PO1,PO2,PO3,PO4, PO5,PO12	4	4
BIT1X01.5	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 BBT1X01: Biotechnology 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 Contains/Experiments

1	Introduction to lab safety: making students aware about biotechnology department labs and safety. They will be guided about biohazardous materials and waste.	CO1
2	Aseptic techniques: Students will be educated about maintaining the aseptic and sterile lab work environment. Sterilization of work area to be demonstrated. Good lab practices (GLP) will be introduced	CO2
3	Microscopes: Lab microscope principle and handling will be demonstrated and student will be asked to fix and focus the slides.	CO4
4	Units and measurements: introduction to unit systems, units and quantities used in biochemical measurements. Molarity, normality and their calculations will be studied	CO3
5	Buffer preparation: Preparation of acidic, basic and neutral buffer will be demonstrated and students will be expected to prepare the buffer for given pH.	CO4

Text Books



T.1	"Biosafety in Microbiological and Biomedical Laboratories": 5 th edition, US Department of health and Human Services
T.2	"Buffer Solutions": R. J. Benyon, J. S. Esterby.

Reference Books

R.1	“Biotechnology Laboratory Methods & Techniques”: Linnea Fletcher, Evelyn Goss, Patricia Phelps, Angela Wheeler, and Shelley O.,Grady
R.2	“Basic Practical Microbiology”: Society for General Microbiology (SGM)

R.3	“Quantities, Units and Symbols in Physical Chemistry”: Ian Mills, Tomislav Cvitas, Kalus Homann, Nicola Kallay and Kozo Kuchitsu Second Edition.
R.4	“Calbiochem Buffers- A guide for preparation and use of buffers in biological systems”: Chandra Mohan
Useful Links	
1	https://nptel.ac.in/courses/102/103/102103015/
2	https://nptel.ac.in/courses/104/106/104106121/
3	https://biosafety.utk.edu/biosafety-program/waste/
4	https://micro.magnet.fsu.edu/primer/anatomy/introduction.html

	Course Outcomes	PO/PSO	CL	Lab Sessions
BBT1X01.01	Identify the errors in fixing the microscopic slides, buffer preparation and rectify them with usage of appropriate tools or various techniques	PO1, PO2,PO3,PO5,PO12	3	4
BBT1X01.02	Apply the knowledge and concepts of biochemistry for preparation of buffers.	PO1,PO2,PO3,PO9,PO12	3	4
BBT1X01.03	Judge the hazardous and non-hazardous materials and processes in order to ensure the safety against biohazards	PO1,PO2,PO3, PO7, PO8,PO12	5	4
BBT1X01.03	Demonstrate the well-focused slides on the microscope with identification of the subject.	PO1,PO2,PO3,PO5,PO12	3	4
BBT1X01.04	Understand the units and measurements to interpret and expressthe data.	PO1, PO2, PO3,PO6,PO12	2	4

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Program: B. Tech First Year Group-A & B						
Semester-I/II		BCE1X03: Common Hardware 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: Building Materials					Total Marks	50 Marks
List of Experiment						
1	Assemble a corner brick wall in six courses by arranging bricks in Stretcher bond. Ensure that wall is in line, plumb and at right angle to an existing wall (In Group)					CO1
2	Identify types of bent up bar and stirrups at site during the field visit for the reinforcement for beams, column and slab					CO2
3	Assemble the pipes, joints, taps, fixtures and accessories used in plumbing.					CO3
4	Draw the Planforwatersupplyandsanitarysystemforasimpleresidentialbuilding.					CO3
5	Construction of Brick wall for plastering and white wash					CO4
6	Study of various instrument use for construction of residential building					CO4
7	Test the quality of cement & Bricks on site/Laboratory					CO5
8	Identify the substructure construction activities and the equipment's/tools being used at site during the visit.					CO5
Text Books						
T.1	Building Construction” Authored by B C Purnima and Ashok Kumar Jain Kindle Edition 2002					
T.2	Basic Plumbing with Illustrations Revised Edition Authored by Howard Cassey. 2001					
T.3	Modern Plumbing Authored by Keith Blan Ken Banker.2003					
T.4	Building Construction Authored by N. L. Arora and B.R. Gupta Satya Prakashan 2007					

Reference Books	
R.1	The Practical design of Structural Elements in Timber Authored by Bull, J. W. GowerPress,1989
R.2	Foundation Engineering Authored by Pradeep Kumar Gupta Kindle Edition
R.3	Masonry Construction Manual Authored by Rolf Romcke Ergode book Publication 2000
R.4	PWD- Standard Data Book for Building Work Authored by PWD
Useful Links	
1	https://nptel.ac.in/courses/105/102/105102088/
2	https://nptel.ac.in/courses/124/105/124105013/
3	https://onlinecourses.nptel.ac.in/noc20_ar04/preview

	Course Outcomes	PO/PSO	CL	Lab Sessions
BCE1X03.1	Identify the technical aspects involved in workmanship and Safety precautions	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12	1	2
BCE1X03.2	Classify quality control measures	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12	2	2
BCE1X03.3	Discover appropriate tools and equipment's involved in various activities for specific uses	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12	3	4
BCE1X03.4	Judge the technical aspects involved in workmanship of various plumbing tasks	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12	5	4
BCE1X03.5	Invent the construction activities on site	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12	6	4



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

Semester-I/II BME1X03: Mechanical Hardware

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
Contains/Experiments**



1	Machining in Lathe Machine: Demonstration of Use and setting of tools & job in the lathe machine for facing machining operation in the job of lathe machine. Job-1: Facing Operation	CO1
2	Machining in Shaper Machine: Demonstration of Use and setting of tools & job in the Shaper machine for Machining a horizontal Surfaces operation in the job of Shaper machine Job-1: Machining a horizontal Surfaces Operation.	CO2
3	Machining in Milling Machine : Demonstration of Use and setting of tools & job in the Milling machine for Face Milling machining operation in the job of Milling machine Job-3: Face Milling Operation	CO3
4	Foundry: Demonstration of Utilization of foundry tools during preparation of sand mould. Job-4: Sand Mould preparation.	CO4

Text Books

T.1	“Elements of Workshop Technology”:Hajra Choudhury S. K., Hajra Choudhury A.K. and Nirjhar Roy S. K, 2008 and Vol.II2010, 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, 4 th 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.3	“A Course in Workshop Technology”: B S Raghuwanshi, Vol. I & II.
R.4	“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://www.youtube.com/watch?v=0IUd5MkMOAg
3	https://nptel.ac.in/courses/112/107/112107144/


	Course Outcomes	PO/PSO	CL	Class Sessions
BME1X03.1	Demonstrate the working of lathe machine.	PO1, PO2, PO3, PO9, PO10, PO11, PO12	3	4
BME1X03.2	Demonstrate the working of Shaper Machine.	PO1, PO2, PO3, PO9, PO10, PO12.	3	4
BME1X03.3	Demonstrate the working of Milling Machine.	PO1, PO2, PO3, PO9, PO10, PO11, PO12	3	4
BME1X03.4	Illustrate the basics of sand molding processes.	PO1, PO2, PO3, PO9, PO10, PO12.	4	4

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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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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) 9 th edition					

T.2	“Advance Engineering Mathematics” by Ervin Kreysizing 9 th Edition
T.3	“GB Thomas and R.L. Finney”, “Calculus and Analytic geometry” 9 th edition, Pearson, Reprint 2002.
Reference Books	
R.1	“Higher Engineering Mathematics” by H. K. Das, Er. Rajnish Verma Chand 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		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
Pre-Requisites: AICTE Bridge Course, Basics of Physics.				Total Marks	100 Marks
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, 1 st Edition, Das Ganu Prakashan, Nagpur				

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

**Tulsiramji Gaikwad-Patil College of Engineering and Technology**

Wardha Road, Nagpur-441 108

NAAC Accredited with A+ Grade**(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)****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
Pre-Requisites: Physics		Total Marks	100 Marks

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., 6 th Edition.
T.2	Engineering Mechanics, R. K. Bansal and Sanjay Bansal, Jain Bros. Publishers, Delhi, 4 th Edition.
T.3	Textbook of Applied Mechanics”, Ramamrutham. S., Dhanpat Rai Publications, 1987 Engineering Mechanics (Statics and Dynamics), Palanichamy, M. S., and Nagan, S., 3 rd 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 9 th Edition.
R.2	Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi, 4 th 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,2 nd Edition S.Chand(G/L) & Company Ltd, New Delhi.				
T.2	A text book of Practical Physics: Samir Kumar Ghosh,1 st Edition, New Central Book Agency, Kolkata.				

Reference Books	
R.1	Engineering Physics: Dattu Joshi, Tata McGraw Hill Education, New Delhi.
R.2	A 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, 8 th edition.			
Reference Books				
R.1	Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi,4 th Edition.			
R.2	Engineering Mechanics, S. N. Saluja, SatyaPrakashan, New Delhi,6 th Edition.			
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 for various 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/II		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, 2 nd Edition, Pearson Education.				
T.2	C Programming: Balaguruswami, 8 th 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.				CO1
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.				CO3
7	Learn Skills of Group Discussion: Process & Techniques				CO4
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, PO10,PO12	2	4
BSH1X04.2	Acquire the knowledge of reading skill and writing skills.	PO9, PO10,PO12	2	4
BSH1X04.3	Apply the skills required to communicate effectively with engineering community and society.	PO9, PO10,PO12	3	2
BSH1X04.4	Learn the skills for effective presentation and Effective body language.	PO9, PO10,PO12	1	2
BSH1X04.5	Execute the skills of effective communication required for Group Discussions and Interview.	PO9, PO10,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 with drilling and tapping.			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 jobs and 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, 4 th 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,P O9,PO10,PO12	3	4
BME1X01.02	Apply carpentry tools for wooden joints, Simple exercise using jack plane.	PO1,PO2,PO3,P O9,PO10,PO12	3	4
BME1X01.03	Build the joint by Arc welding, Simple butt and Lap welded joints.	PO1,PO2,PO3,P O9,PO10,PO12	3	4
BME1X01.03	Demonstrate advance welding process on simulation package to obtain practical skills in the various trades.	PO1,PO2,PO3,P O5, PO9,PO10,PO12	2	4
BME1X01.04	Understand fasteners, its use, and selection of fastener as per the application.	PO1,PO2,PO3,P O9,PO10,PO12	2	4

	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 NAAC Accredited with A+ Grade (An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)			
Program: B. Tech First Year Group-A & B				
Semester-I/II	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 Objectives:				
1.	To acquaint students with historic and traditional roots of Yoga.			
2.	To understand the concept of health body and healthy mind.			
3.	To develop a comprehensive outlook of an individual with a strong civic position, moral qualities, sense of responsibilities, an independent, initiative, tolerant person.			
Course Contents				
Unit I	Meditative Asanas: Sukhasan, Swastikasan, Padmasan, Vajrasan and Siddhasan.			
Unit II	Cultural Asanas: Bhujagasan, Ardha-Shalabhasana, Dhanurasan Naukasana, Padmasthan, halasan, Matsyasan, Vakrasan, Chakrasan, and Lateral bend Tadasan, Utkratan, Vrikshasan, Parvatan, and Shavasan.			
Unit III	Pranayam: Anuloma-Vilomaand Ujjai (Both without Khubhak) Bandh: Uddiyan Mudra: Vipritkarani Kriya Kapalbhathi			
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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