Yashoda Shikshan Prasarak Mandal's

YASHODA TECHNICAL CAMPUS, SATARA

An Autonomous Institute

FACULTY OF ENGINEERING

Department of Basic Science & Humanities

Course Structure

F.Y. B.Tech SEMESTER I Physics Group A

Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					TOTAL
			L	T	P	SL	Credit	Scheme	Theory Max.	Theory Min. Passing	Practical Max.	Practical Min. Passing	
Students Induction Program As Per AICTE Guidelines													
0UBHBS101	F	Linear Algebra & Differential Equations	3	1	0	5	4	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHBS102	F	Engineering Physics	3	0	0	3	3	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHES103	F	Engineering Graphics & CAD	2	0	0	2	2	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHES104	F	Elements of Civil Engineering	2	0	0	2	2	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHES105	F	Elements of Electrical and Electronics Engineering	3	0	0	3	3	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHIK106	F	Indian Epistemology	2	0	0	2	2	ISE	50	20	-	-	**50**
0UBHVS107	F	Programming Skill -I	0	0	4	2	2	ISE ESE	- -	-	25 25	25**	**50**
0UBHBS108	F	Engineering Physics Laboratory	0	0	2	1	1	ISE ESE	-	-	25 25	25**	**50**
0UBHES109	F	Engineering Graphics & CAD Laboratory	0	0	4	2	2	ISE ESE	-	-	25 25	25**	**50**
0UBHES110	F	Elements of Electrical and Electronics Engineering Laboratory	0	0	2	1	1	ISE ESE	-	-	25 25	25**	**50**
TOTAL			**15**	**1**	**12**	**23**	**22**	**TOTAL MARKS**					**750**
Total Contact Hours Per Week			**28**										

Course Category	Basic Sciences Course	Engineering Science Course	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co – curricular Courses	Total
	BS	ES	VS	AE	IK	CC	
Credit	08	10	02	-	02	-	22

ISE :-In semester evaluation , MSE: - Mid Semester Examination, ESE: - End Semester Examination

Note- * Scoring 40% in ESE is essesntial and Combining ISE+MSE+ESE=40% for Theory Course.

**** ISE-40%; ESE 50% combined together need to be 50% for Laboratory Course.**

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YASHODA TECHNICAL CAMPUS, SATARA

An Autonomous Institute

FACULTY OF ENGINEERING

Department of Basic Science & Humanities

F.Y. B.Tech SEMESTER II — Physics Group A

Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					Total
									Theory		Practical		
			L	T	P	SL	Credit	Scheme	Max.	Min. Passing	Max.	Min. Passing	
Students Induction Program As Per AICTE Guidelines													
0UBHBS201	F	Applied Mathematics	3	1	0	5	4	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHBS111	F	Engineering Chemistry	3	0	0	3	3	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHES112	F	Engineering Mechanics	3	0	0	3	3	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHES113	F	Elements of Mechanical Engineering	2	0	0	2	2	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHAE114	F,E	Professional Communication Skills	2	0	0	2	2	ISE MSE ESE	20 20 60	40*	-	-	**100**
0UBHVS115	F,E	Design Thinking and Prompt Engineering	2	0	0	2	2	ISE	50	20			**50**
0UBHVS202	F	Programming Skill -II	0	0	4	2	2	ISE ESE	- 	- 	25 25	25**	**50**
0UBHBS116	F	Engineering Chemistry Laboratory	0	0	2	1	1	ISE ESE	- 	- 	25 25	25**	**50**
0UBHES117	F	Engineering Mechanics Laboratory	0	0	2	1	1	ISE ESE	- 	- 	25 25	25**	**50**
0UBHAE118	F,E	Professional Communication Skills Laboratory	0	0	2	1	1	ISE ESE	- 	- 	25 25	25**	**50**
0UBHVS119	F,E	Workshop Practices	0	0	2	1	1	ISE ESE	- -	- -	25 25	25**	**50**
TOTAL			**15**	**1**	**12**	**23**	**22**	**TOTAL MARKS**					**800**
Total Contact Hours Per Week			**28**										

Course Category	Basic Sciences Course	Engineering Science Course	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co –curricular Courses	Total
	BS	ES	VS	AE	IK	CC	
Credit	08	06	05	03	-	-	22

ISE :-In semester evaluation , MSE: - Mid Semester Examination, ESE: - End Semester Examination
Note- * Scoring 40% in ESE is essesntial and Combining ISE+MSE+ESE=40% for Theory Course.
**** ISE-40%; ESE 50% combined together need to be 50% for Laboratory Course**

Total Credit Distribution in FY

SEM-I	SEM-II	TOTAL
22	22	44

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Course Structure:

Class	F.Y B. Tech. Sem.–I
Course Code and Course Title	**0UBHBS101, Linear Algebra and Differential Equations**
Prerequisite/s	Matrix, Derivative
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHBS101_1	**Apply** matrix techniques to solve linear systems and diagonalize matrices.	**L3**
0UBHBS101_2	**Apply** partial differentiation and its applications to analyze engineering functions and optimization problems.	**L3**
0UBHBS101_3	**Solve** first-order differential equations and apply them to model engineering systems.	**L3**
0UBHBS101_4	**Compute** numerical solutions for engineering differential equations using Euler's and Runge-Kutta techniques.	**L3**

Course Contents:		
Unit 1	**Matrix-I** Introduction, Gauss elimination method, Normal form, Rank of matrix, Consistency of non-homogeneous and homogeneous system of linear equations.	**07Hrs.**
Unit 2	**Matrix-II** Linear and orthogonal transformation, Eigen values, Eigen vectors, Cayley-Hamilton theorem, Diagonalization of a matrix.	**07 Hrs.**
Unit 3	**Partial Differentiation** Partial derivatives of first and higher orders, Homogeneous functions – Euler's theorem for functions containing two and three variables (without proofs), Change of variables.	**07 Hrs.**

Unit 4	**Applications of Partial differentiation** Jacobian and its properties, Taylor's and Maclaurin's theorems (without proofs) for functions of two variables, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers.	**07 Hrs.**
Unit 5	**Ordinary Differential Equations of First Order and First Degree and Their Applications** Exact differential equations, Equations reducible to exact equations, Linear equations, Equation reducible to linear equations, Applications to orthogonal trajectories.	**08 Hrs.**
Unit 6	**Numerical Differentiation** Finite Differences, Newton interpolation formulae, Euler's method, Euler's modified method and Runge-Kutta's Fourth order methods for solving engineering problems.	**06 Hrs.**
	Total Hours	**42 Hrs**

Text Books:

Sr. No	Title	Author	Publisher
1	Higher Engineering Mathematics	B. V. Ramana	(Tata McGraw Hill)
2	Higher Engineering Mathematics	B. S. Grewal	(Khanna Publication, Delhi)

Reference Books:

Sr. No.	Title	Author	Publisher
1	Advanced Engineering Mathematics	Erwin Kreyszig	Willey
2	A textbook of Engineering Mathematics	N. P. Bali & Dr. Manish Goyal	Laxmi Publication Pvt Ltd
3	Advanced Engineering Mathematics	H. K. Das	S. Chand & Company
4	Engineering Mathematics	K. A. Stroud	Palgrave Macmillan

5	Applied Mathematics (Vol. I and II)	P. N. Wartikar and J. N. Wartikar	Vidyarthi Griha Prakashan, Pune

E- Learning Resources:

Sr. No.	Title	Course Instructor	Platform	Web link
1.	Engineering Mathematics -I	Prof. Jitendra Kumar	NPTEL/ Swayam/ YouTube	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma133 And https://www.youtube.com/playlist?list=PLbRMhDVUMngeVrxtbBz-n8HvP8KAWBpI5

Course Structure:

Class	F.Y B. Tech. Sem. –I/II
Course Code and Course Title	**0UBHBS102, Engineering Physics**
Prerequisite/s	Fundamental laws of Physics
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHBS102_1	**Use** the principles of acoustics and ultrasonic wave propagation to solve engineering problems and understand their industrial and technological applications.	**L3**
0UBHBS102_2	**Apply** the principles of optical interference and LASER technology with numerical and conceptual problems on interference of light.	**L3**
0UBHBS102_3	**Utilize** the concepts of crystal structures and superconductivity to calculate crystal parameters, determine lattice properties, classify superconductors, and solve engineering-related problems.	**L3**
0UBHBS102_4	**Apply** the non-destructive characterization techniques for material investigation and industrial applications.	**L3**
0UBHBS102_5	**Apply** the concepts of semiconductor and magnetic materials to explain their behavior and engineering applications.	**L3**
0UBHBS102_6	**Interpret** wave-particle duality, quantum phenomena, nuclear properties, and radiation detection techniques through principles of quantum mechanics and nuclear physics.	**L3**

Course Contents:		
Unit 1	**Sound:** Acoustics: Introduction, reflection of sound (Reverberation and Echo), absorption coefficient, Sabine's formula, Acoustical planning of building and factors affecting architectural acoustics of building. Ultrasonics: Properties, production of ultrasonic waves; Magnetostriction and Piezoelectric method, applications (any three in details).	**06 Hrs.**
Unit 2	**Optics:** Interference: Interference in thin film due to reflected light, Wedge shaped film, Newton's rings, and applications. LASER: Characteristics, spontaneous and stimulated emission; metastable state, population inversion, types of pumping, resonant cavity, He-Ne LASER, semiconductor LASER, applications of LASER. Optical Fibre: Introduction, total internal reflection, structure of optical fibre, critical angle, acceptance angle, acceptance cone, numerical aperture.	**08 Hrs.**

Unit 3	**Solid State Physics** Crystal Structures: Fundamental concepts, cubic structure; number of atoms per unit cell, atomic radius, co-ordination number, atomic packing fraction, Miller Indices, relation between crystal density (ρ) and lattice constant (a), relation. Superconductors: Introduction, critical temperature and magnetic field, Meissner effect, type-I and type-II superconductors, applications of superconductor.	**07 Hrs.**
Unit 4	**Non-Destructive Testing** Non-Destructive Testing (NDT): Introduction, types of defects, methods of NDT: visual inspection, Liquid penetrant testing, magnetic particle testing, ultrasonic testing; X-Ray Diffraction (XRD), scanning Electron Microscopy (SEM), Transmission electron Microscopy (TEM).	**06 Hrs.**
Unit 5	**Semiconductor and Magnetic materials** Semiconductor: Introduction, Valence band, conduction band, band gap energy, direct & indirect band gap semiconductor, conductivity of semiconductor, Fermi level, Fermi energy level in intrinsic & extrinsic semiconductor, Hall effect. Magnetic materials: Types of magnetic materials, domain theory, Hysteresis curve.	**07 Hrs.**
Unit 6	**Quantum Mechanics & Nuclear Physics** Quantum Mechanics: Introduction, De-Broglie hypothesis of matter wave, wave function and its significance, Heisenberg's uncertainty principle, Schrodinger's time dependent wave equation, Schrodinger's time independent wave equation, introduction to quantum computing, bits and qubits, difference between classical and quantum computing. Nuclear Physics: Introduction, mass defect, Q-value of nuclear reaction, properties of α, β and γ rays, GM-counter.	**07 Hrs.**
	Total Hours	**42 Hrs.**

Text Books:

Sr. No.	Title	Author	Publisher
1	Engineering Physics	Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar & TVS Arun Murthy	S. Chand
2	Engineering Physics	Dr. L. N. Singh	Synergy Knowledgeware
3	Engineering Physics	R. K. Gaur & S. L. Gupta	Dhanpat Rai Publication
4	Engineering Physics	Hitendra K. Malik & A. K. Singh	Mc Graw Hill

Reference Books:

Sr. No.	Title	Author	Publisher
1	Concepts of Modern Physics	Arthur Beizer	Tata Mc Graw Hill
2	Optics	Ajoy Ghatak	Mc Graw Hill
3	Solid State Physics	Dekkar A. J.	McMillan India
4	Fundamentals of Physics	Halliday & Resnik	Willey Eastern ltd.

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E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Concepts in Magnetism and Superconductivity	Prof. Arghya Taraphder (IIT Kharagpur)	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph42
2	Solid State Physics	Prof. A. K. Das (IIT Kharagpur)	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph61
3	Theory and Practice of Non Destructive Testing	Prof. Ranjit Bauri (IIT Madras)	NPTEL/ Swayam	https://share.google/jWpLYF8GGqEprVPJi
4	Introduction to Quantum Computing	Prof. Prabha Mandayam (IIT Madras)	NPTEL/ Swayam	https://share.google/SkGw3L0Gdko6RdUPr

Course Structure:

Class	**F**.Y .B. Tech Sem –I/II
Course Code and Course Title	**0UBHES103,** **Engineering Graphics & CAD**
Prerequisite/s	**-**
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	2
Evaluation Scheme-ISE / MSE / ESE	20/20/60

Course Objectives (COs): Upon successful completion of this course, the student will be able to:	
0UBHES103_1	**Practice** the fundamentals and standards of engineering graphics as per BIS.
0UBHES103_2	**Apply** the principles of orthographic projection for points, lines, planes and solids.
0UBHES103_3	**Develop** visualization skills required for interpreting and creating engineering drawings.
0UBHES103_4	**Prepare** engineering drawings using conventional drawing instruments and basic CAD tools and Develop the foundation necessary for advanced engineering design and manufacturing courses.

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES103_1	**Construc**t projections of straight lines in various positions using inclination and initial conditions with respect to reference planes.	**L3**
0UBHES103_2	**Develop** accurate projections of planes in different orientations by applying initial conditions and inclinations relative to reference planes.	**L3**
0UBHES103_3	**Draw** projections of solids inclined to both the reference planes. **Draw** the development of lateral surfaces of simple geometric solids.	**L3**
0UBHES103_4	**Draw** required orthographic views of a solid object using first-angle projection. **Build/Construct** isometric views from given orthographic views.	**L3**

Course Contents:		
Unit 1	**Fundamentals of Engineering Graphics and Projections of Lines** **Fundamentals of Engineering Graphics:** Introduction to Drawing instruments and their uses. Different types of lines used in drawing practice, Dimensioning system as per BIS, Introduction to AutoCAD & Basic Commands, Editing and Modification Commands, Viewing and Transformation Tools **Projections of Lines:** Introduction to First angle and Third angle methods of projection. Projections of points on regular and auxiliary reference planes. Types of Lines (horizontal, frontal, oblique and Profile lines), Projections of lines on regular and auxiliary reference planes. True length of a line, Point View of a line, angles made by the line with reference planes, Traces of a line.	**09**
Unit 2	**Projections of Planes** Projections on regular and on auxiliary reference planes, Edge view and True shape of a Plane. Angles made by the plane with Principle reference planes. Projections of plane figures inclined to both the reference planes. (Circle & regular polygon up to hexagon).	**05**
Unit 3	**Projections of Solids and Development of Surfaces** Types of Solids, Projection of solids on regular reference planes with axis inclined to both the planes, Method of development, Developments of lateral surfaces of right solids.	**06**
Unit 4	**Orthographic Projections and Isometric Projections** Lines used, selection of views, spacing of views, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views into orthographic views), including sectional orthographic views. Introduction to isometric projections. Isometric scale, Isometric projections and Isometric views /drawings. Circles in isometric view. Isometric views of simple solids and objects.	**08**
	Total Hours	**28**

Text Book:-

Sr. No	Title	Author	Publisher
01	Engineering Drawing	N. D. Bhatt	Charotar Publishing House Pvt. Ltd, Anand
02	Engineering Drawing	Dr. Dhananjay Johle,	Tata Mc-Graw Hill
	Auto CAD Book		
03	Fundamentals of Engineering Drawing	W. J. Luzadder	Prentice Hall of India

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04	Engineering Drawing & Graphics	M. L. Mathur	Jain brothers

Reference Book:-

Sr. No.	Title	Author	Publisher
01	Engineering Drawing and Graphics	K. Venugopal	New Age Publication
02	A text book of Engineering Drawing	R. K. Dhawan	S. Chand and Co
03	Engineering Drawing	N. B. Shaha and B. C. Rana	Pearson Education
04	Machine Drawing	K. L. Narayana	New Age Publication

E Learning Resourses :	
01	NPTEL Course on Engineering Drawing,By Prof. P. S. Robi, IIT Guwahati https://nptel.ac.in/courses/ 112103019
02	NPTEL Course on Engineering/Architectural Graphics – Part I: Orthographic Projection By Prof. Avlokita Agrawal, IIT Roorkee, https://nptel.ac.in/courses/124107157
03	**NPTEL Course on Engineering Graphics and Design** By Prof. Naresh Datria, Prof. S. R. Kale, IIT Delhi https://nptel.ac.in/courses/112102304
04	**NPTEL Course on Engineering Drawing and Computer Graphics** By Prof. Rajaram Lakkaraju, IIT Kharagpur

Course Structure:

Class	F.Y. B. Tech. Sem. –I / II
Course Code and Course Title	**0UBHES104, Elements of Civil Engineering**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES104_1	**Choose** construction materials to be used in various types of construction.	**L3**
0UBHES104_2	**Illustrate** principles of building planning, bye-laws and components in Construction activities.	**L3**
0UBHES104_3	**Apply** basics of surveying, leveling and interpretation in Construction projects.	**L3**
0UBHES104_4	**Illustrate** the significance of emerging technologies in civil engineering.	**L3**

Course Contents:		
Unit 1	**Introduction to Civil Engineering** Role of Civil Engineer, Branches of Civil Engineering, Building materials: Stone, Brick, Cement, Aggregate, Concrete, Steel, Aluminum, Timber, Roofing materials and Flooring materials, Sustainable Construction Material, Building Services: Mechanical, Electrification and Plumbing.	**07 Hrs.**
Unit 2	**Elements of Building Planning and Components** Principles of building planning; building bye-laws, FSI calculations, ventilation, and sanitation as per local authority regulations, RERA documents list. Components of Building: Substructure and Superstructure components and their functions; types of Structures and types of foundations.	**07 Hrs.**
Unit 3	**Introduction to Surveying and Leveling** Surveying: Objectives and Principles of surveying, Classification & types of surveys, Bearing and its types, System of bearing. Leveling: Introduction to leveling, bench marks, Types of leveling, Methods of reduction of levels. Introduction to modern surveying instruments and equipment – Total Station, GPS/DGPS, EDM and Drones.	**07 Hrs.**
Unit 4	**Modern Tools and Equipment in Civil Engineering** Modern construction equipment – excavators, loaders, cranes, batching plants, transit mixers, concrete pumps and road construction machinery, Introduction to BIM, prefabrication, modular construction and 3D concrete printing. Emerging technologies – AI, IoT, robotics, AR/VR and Digital Twin in Civil Engineering.	**07 Hrs.**
	Total Hours	**28 Hrs.**

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Text Books:

Sr. No	Title	Author	Publisher
1	Basic Civil Engineering	Gopi S	Pearson Publication
2	Basic Civil Engineering	S. S. Bhavikatti	New Age International Publications
3	Basic Civil and Environmental Engineering	G. K. Hiraskar, C. P. Kaushik and A. Kaushik	New Age International Publications
4	Text book of Remote Sensing and GIS	Kali Charan Sahu	Atlantic Publishers & Distributors (P) Ltd

Reference Books:

Sr. No.	Title	Author	Publisher
1	The Civil Engineering Handbook	W. F. Chen and J. Y. R. Liew	CRC press (Tailor and Francis)
2	Essentials of civil engineering	K. R. Dalal	Charotar Publishing House
3	Surveying	B.C. Punmia	Laxmi Publication
4	Remote Sensing and GIS	B. Bhatta	Oxford Publication

E- Learning Resources

Sr. No	Title	Course Instructor	Platform	Web link
1	Building Materials as a Cornerstone to Sustainability	Prof. Iyer Vijayalaxmi Kasinath	NPTEL/ Swayam	Preview: Building Materials as a Cornerstone to Sustainability | SWAYAM

Course Structure:

Class	FY B. Tech. Sem. – I/II
Course Code and Course Title	**0UBHES105, Elements of Electrical and Electronics Engineering**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES105_1	**Apply** fundamental circuit laws to determine AC and DC circuit quantities.	**L3**
0UBHES105_2	**Apply** semiconductor and digital electronics concepts to basic electronic circuits.	**L3**
0UBHES105_3	**Use** digital electronics concepts to construct basic logic circuits	**L3**
0UBHES105_4	**Choose** suitable electrical machines for engineering applications.	**L3**
0UBHES105_5	**Measure** electrical parameters and observe waveforms using measuring instruments and test equipment.	**L3**
0UBHES105_6	**Implement** electrical safety practices and energy conservation methods in domestic systems.	**L3**

Course Contents:		
Unit 1	**Electrical Circuits** DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor, Series and Parallel Circuits, Ohm 's Law, Kirchhoff 's Laws AC Circuits: AC Waveforms parameters - Frequency, Time period, Phase angle, active power, reactive power and apparent power, power factor.	**07 Hrs**
Unit 2	**Rectifiers and Power Supplies** PN Junction diode: Principle of operation, V-I characteristics, Block diagram description of a dc power supply, V-I characteristics & Applications of Zener diode, LED Rectifier: half wave and full wave bridge rectifier, capacitor filter (no analysis)	**06 Hrs**
Unit 3	**Digital Electronics Fundamentals** Number systems: Binary, Decimal, Hexadecimal Logic Gates: AND, OR, NOT, NAND, NOR, XOR with Truth tables Basic Boolean algebra, Basic combinational circuits: Half adder, Full adder	**06 Hrs**
Unit 4	**Electrical Machines** Faradays law of electromagnetic induction and Flemings left and right-hand rule DC motors: Construction, working principle of dc motor, types of DC Motor, Applications of DC motors. Single Phase Induction Motor: Construction, working principle of Induction motor, types of induction motor, Applications of induction motors Single Phase Transformer: Construction and working principle of transformer, types of transformer Applications of transformers.	**10 Hrs**

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Unit 5	**Measurements and Instrumentation** Functional elements of an instrument, Construction and working principal of: Moving Coil and Moving Iron instruments, Ammeter, voltmeter, wattmeter, Energy meter Block diagram of: Multi-meter, Digital Storage Oscilloscope.	**06 Hrs**
Unit 6	**Electrical Wiring and Energy Conservation** Single line diagram of electrical power system, Types of wiring systems – Domestic wiring, staircase wiring, Godown wiring, Earthing and its types (plate and pipe earthing) Fuse, MCB, Safety precautions while handling electrical equipment, Energy conservation methods in homes and industries, Star rating of appliances, Electricity bill calculation (Units consumed, tariff concept)	**07 Hrs**
	Total teaching hours	**42 Hrs**

Text Books

Sr. No	Title	Author	Publisher
1	Basic Electrical Engineering	D. P. Kothari, I. J. Nagrath	Tata McGraw Hill
2	Basic Electrical and Electronics Engineering	B. L. Theraja, A. K. Theraja	S. Chand Publishing
3	Basic Electrical Engineering	U. A. Bakshi and U. V. Bakshi	Technical Publications
4	Principles of Electrical Engineering and Electronics	V. K. Mehta, Rohit Mehta	S. Chand Publishing

Reference Books

Sr. No.	Title	Author	Publisher
1	Electrical Technology	J. B. Gupta	S.K. Kataria & Sons
2	Electrical Measurements and Measuring Instruments	A. K. Sawhney	Dhanpat Rai Publications
3	Electronic Devices and Circuit Theory	Robert L. Boylestad and Louis Nashelsky	PHI/Pearson Education
4	Basic Electronics Engineering	S. K. Bhattacharya	Pearson Education

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Basic Electrical Technology	Prof. D. C. Kulshreshtha | Indian Institute of Technology Kanpur	NPTEL / SWAYAM	https://onlinecourses.nptel.ac.in
2	Electronic Systems for Beginners	Prof. Nagendra Krishnapura | Indian Institute of Technology Madras	NPTEL/SWAYAM	https://onlinecourses.nptel.ac.in

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Course Structure:

Class	F.Y.B. Tech. Sem. –I/II
Course Code and Course Title	**0UBHIK106 Indian Epistemology**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHIK106_1	**Explain** the concepts and significance of the Indian Knowledge System in the context of education and society.	**L2**
0UBHIK106_2	**Apply** the fundamental principles and contributions of Indian mathematicians and astronomers to basic mathematical contexts.	**L3**
0UBHIK106_3	**Apply** the concepts of celestial coordinate systems and the Indian Panchang to identify basic astronomical coordinates and calendar elements.	**L3**
0UBHIK106_4	**Correlate** the principles of ancient Indian technologies with modern engineering practices through suitable examples.	**L3**

Course Contents:		
Unit 1	**Indian Knowledge System: An introduction** Definition of Indian Knowledge System (IKS); Importance of Ancient Knowledge, the space and relevance of IKS, Vedic Corpus: Introduction to Vedas, Contents of Siddhant's.	**07Hrs.**
Unit 2	**Indian Mathematics** Introduction to Indian Mathematics, Unique aspects of Indian Mathematics, Indian Mathematicians and their Contributions (Aryabhata-I), Number systems in India – Historical evidence, Algebra, Geometry, Trigonometry.	**07 Hrs.**
Unit 3	**Celestial Sphere, Coordinate System and Indian Panchang** **Celestial Sphere:** Introduction; Celestial Horizon, Meridian, Equator, Ecliptic. **Coordinate System:** Celestial longitude and latitude (Ecliptic System); Right Ascension and Declination (Equatorial System); Azimuth and Altitude (Horizontal System); Hour Angle and Declination (Meridian System). **Indian Panchang:** Tithi, Nakshatra, Yoga, Karana, Vara.	**09 Hrs.**
Unit 4	**Introduction to Technology in Ancient India** Indian Architecture and Town Planning, Indian Rocketry, Shipbuilding, Metullargy and mining, Agriculture and Water Management.	**05 Hrs.**
	Total Hours	**28 Hrs**

Reference Books

Sr. No	Title	Author	Publisher
1	"Introduction to Indian Knowledge System: Concepts and Applications"	Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N.	PHI Learning Private Ltd. Delhi.
2	Indian Mathematics and Astronomy: Some Landmarks,	S. Balachandra Rao	Bhavan's Gandhi Centre, Bangalore
3	Geometry in Ancient and Medieval India	T. A. Saraswati Amma	Motilal Banarsidass, Varanasi
4	History of Astronomy in India,	S. N. Sen and K. S. Shukla	INSA, Delhi
5	Indian Astronomy An Introduction	S. Balachandra Rao	Universities Press, Hyderabad
6	Tantrasaṅgraha of Nīlakaṇṭha Somayājī, Translation and Notes	K. Ramasubramanian and M. S. Sriram,	Hindustan Book Agency, New Delhi
7	Indian Astronomy: A Source Book	B.V. Subbarayappa and K.V. Sarma,	Nehru Centre, Bombay
8	Indian Mathematics Engaging the World from Ancient to Modern Times,	G. G. Joseph	World Scientific, London
9	History of Indian Mathematics,	C. N. Srinivasiengar	The World Press, Calcutta
10	Indian Architecture	Acarya, P.K	Munshiram Manoharlal Publishers, New Delhi.

1.**SWAYAM / NPTEL (Government of India)**: Look up the official SWAYAM Portal for courses like **"Introduction to Indian Knowledge Systems"** or **"Indian Philosophy"**. These courses feature downloadable video lectures, text transcripts, and self-assessment quizzes curated by IIT and central university professors.

2.**e-PG Pathshala (MHRD)**: This platform hosts post-graduate level e-text modules specifically dedicated to **Indian Epistemology**. Search the portal under the "Philosophy" or "Indian Culture" sections to find highly detailed PDFs on *Pramana Shastra* (the theory of knowledge).

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Course Structure:

Class	F.Y. B.Tech Sem. – I
Lab Code and Lab Title	**0UBHES107, Programming Skills-I**
Prerequisite/s	Concepts in C language
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE / ESE	25/25

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHES107_1	Apply C programming fundamentals including data types, operators, control statements, and loops.	L3
0UBHES107_2	Develop logical solutions using functions, arrays, strings, and recursion.	L4
0UBHES107_3	Utilize pointers, structures, and file handling for data management.	L4
0UBHES107_4	Implement Stack and Queue operations using arrays.	L4
0UBHES107_5	Apply searching techniques and binary tree traversals for problem solving.	L3
0UBHES107_6	Develop a mini project integrating C programming concepts and basic data structures.	L4

List of Experiments:

Expt. No.	**Title of Experiment**
1	Study of C Programming Environment, compilation process, and writing the first program.
2	Programs using input/output statements, data types, operators, and type conversion.
3	Programs using decision-making statements (if, if-else, switch).
4	Programs using loops (for, while, do-while) for mathematical problems.
5	Logic-building programs (Prime, Palindrome, Armstrong, Fibonacci, GCD).
6	One-dimensional array operations (search, sum, average, maximum).
7	Matrix operations using two-dimensional arrays.
8	User-defined functions and recursion.
9	String operations (length, copy, concatenate, reverse, palindrome).
10	Pointer basics, pointer arithmetic, and swapping.
11	50% submission of project. And submission of experiment 1-10
12	Array manipulation using pointers.

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13	Structures for Student/Employee record management.
14	Nested structures and passing structures to functions.
15	File handling (create, write, read, append).
16	Menu-driven Student Record Management using files.
17	Stack using arrays (push, pop, display).
18	Queue using arrays (enqueue, dequeue).
19	Linear Search and Binary Search.
20	Binary Tree creation and traversals.
21	Mini Project integrating arrays, functions, structures, files, and DSA.

***Note- Minimum 10 experiments compulsory**

Text Books

Sr. No	Title	Author	Publisher
1	The C Programming Language	Brian W. Kernighan & Dennis M. Ritchie	PHI Learning
2	Let Us C	Yashavant P. Kanetkar	BPB Publications
3	Programming in ANSI C	E. Balagurusamy	McGraw-Hill Education
4	C: The Complete Reference	Herbert Schildt	McGraw-Hill Education

Reference Books

Sr. No.	Title	Author	Publisher
1	Data Structures Using C	Reema Thareja	Oxford University Press
2	Fundamentals of Data Structures in C	Ellis Horowitz, Sartaj Sahni & Susan Anderson-Freed	Universities Press
3	Practical C Programming	Steve Oualline	O'Reilly Media
4	Data Structures Through C in Depth	S. K. Srivastava & Deepali Srivastava	BPB Publications

E- Learning Resources

Sr. No	Title	Author	Publisher
1	Problem Solving Through Programming In C	By Prof. Anupam Basu | IIT Kharagpur	NPTEL/Swayam
2	Programming in C	Prof. S. N. Sivanandam	NPTEL/Swayam
3	Introduction to Data Structures	IIT Madras Faculty	NPTEL/Swayam

Course Structure:

Class	F.Y.B. Tech. Sem.-I/II
Lab Code and Lab Title	**0UBHBS108, Engineering Physics Lab**
Prerequisite/s	Fundamental Laws of Physics
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE / ESE-OE/POE	25/25-POE

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHBS108_1	**Illustrate** principles of wave optics to determine thickness, wavelength, and curvature using optical experiments.	**L3**
0UBHBS108_2	**Identify** the structure and properties of materials through crystallography, band gap studies and B-H curve experiments.	**L4**
0UBHBS108_3	**Determine** the characteristics and behavior of pn-junction diode through Hall Effect and four-probe methods.	**L5**
0UBHBS108_4	**Demonstrate** the working and applications of optical fiber, G.M. counter and ultrasonic interferometer.	**L3**

List of Experiments:

Expt. No.	**Title of Experiment**
1	Determination of radius of curvature of Plano convex lens / wavelength of light by Newton's rings.
2	Determination of thickness of thin wire using Wedge Shaped film.
3	Determination of specific rotation of optically active material by Half shade Polarimeter.
4	Determination of wavelength of He-Ne laser light using LASER.
5	Determination of operating voltage of G.M. tube using G.M. Counter.
6	Study of planes with the help of models related Miller Indices of Crystal Plane.
7	Determination of P N Junction Diode Characteristics in forward bias.
8	Determination of P N Junction Diode Characteristics in reverse bias.
9	Determination of resistivity of semiconductor by using Four Probe Method.
10	Measurement of Band gas energy of semiconductor.
11	Determination of numerical aperture of optical fiber.
12	Study the B-H Curve of magnetic material.
13	Determination of velocity of ultrasound in given liquid by ultrasonic interferometer.

***Note- Minimum 10 experiments compulsory.**

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Text Books:

Sr. No.	Title	Author	Publisher
1	Engineering Physics	Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar & TVS Arun Murthy	S. Chand
2	Engineering Physics	Dr. L. N. Singh	Synergy Knowledgeware
3	Engineering Physics	R. K. Gaur & S. L. Gupta	Dhanpat Rai Publication
4	Engineering Physics	Hitendra K. Malik & A. K. Singh	Mc Graw Hill

Reference Books:

Sr. No.	Title	Author	Publisher
1	Concepts of Modern Physics	Arthur Beizer	Tata Mc Graw Hill
2	Optics	Ajoy Ghatak	Mc Graw Hill
3	Solid State Physics	Dekkar A. J.	McMillan India
4	Fundamentals of Physics	Halliday & Resnik	Willey Eastern ltd.

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Concepts in Magnetism and Superconductivity	Prof. Arghya Taraphder (IIT Kharagpur)	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph42
2	Solid State Physics	Prof. A. K. Das (IIT Kharagpur)	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph61

Note-POE: The Practical Oral Examination shall be conducted based on the prescribed practicals/experiments included in the Laboratory component of the syllabus.

Course Structure:

Class	F.Y. B. Tech Semester –I/II
Course Code and Course Title	**0UBHES109,** **Engineering Graphics & CAD Laboratory**
Prerequisite/s	--
Teaching Scheme: **Lecture/Tutorial/Practical**	00/00/04
Credits	2
Evaluation Scheme- ISE/ESE-OE/POE	25/25-OE

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES110_1	**Use** AutoCAD tools and basic commands to create accurate 2D shapes like lines, circles, arcs, and polygons.	**L3**
0UBHES110_2	**Apply** editing, modification, viewing, and transformation tools in AutoCAD for efficient drafting of 2D components.	**L3**
0UBHES110_3	**Prepare** the development of lateral surfaces of simple solids using manual drafting techniques and AutoCAD following standard engineering drawing practices.	**L3**
0UBHES110_4	**Prepare** orthographic and sectional views of engineering objects using manual methods and AutoCAD following BIS standards.	**L3**
0UBHES110_5	**Construct** isometric views and prepare dimensioned engineering drawings suitable for plotting and printing.	**L3**

Course Contents:	
1. Fundamentals of Engineering Graphics and Manual Drafting: BIS conventions, drawing instruments, types of lines, lettering, dimensioning, geometrical constructions, and preparation of engineering drawing sheets.	**04**
2. AutoCAD Fundamentals: Introduction to AutoCAD interface, coordinate systems, creation of basic 2D entities (Line, Circle, Arc, Polygon, Polyline, Ellipse), editing and modification commands, viewing and transformation tools.	**08**
3.Projections of Points, Lines and Planes: Manual and AutoCAD drafting of projections of points, straight lines and plane figures using the First Angle Projection method	**06**
4. Orthographic and Isometric Drawings: Preparation of orthographic views, sectional views and isometric views of engineering objects using manual drafting and AutoCAD.	**06**
5. Projections of Solids manually and Development of Lateral Surfaces and Plotting: Development of lateral surfaces of simple solids (Prism, Pyramid, Cylinder and Cone), layer management, dimensioning, hatching and plotting of engineering drawings using AutoCAD	**04**

Laboratory Work				
Sr. No	**Sheet No.**	**Title / Topic of the Experiment**	**CAD**	**Title / Topic of the Experiment**
1	1	Introduction to Engineering Graphics, BIS conventions, Types of lines, Lettering	1	Introduction to AutoCAD Interface, Coordinate Systems, Basic Commands
2	2	Dimensioning Practice and Geometrical Constructions	2	Drawing basic entities (Line, Circle, Arc, Rectangle, Polygon, Polyline, Ellipse)
3	3	Projection of Points and Straight Lines (First Angle Method)	3	Editing Commands (Erase, Trim, Extend, Offset, Mirror, Move, Copy)
4	3	Projection of Straight Lines – True Length, True Inclination	3	Modification Commands (Rotate, Scale, Stretch, Array, Fillet, Chamfer)
5	4	Projection of Planes (Simple Cases)	4	Layers, Line types, Object Properties, Blocks
6	4	Projection of Planes (Inclined to HP & VP)	4	Hatching, Dimensioning, Text Styles, Leader Commands
7		**Mid Semester Submission / Practical Assessment**		**Plotting, Printing and Layout Setup**
8	5	Orthographic Projection – Simple Objects	5	Orthographic Drawing using AutoCAD
9	5	Orthographic Projection – Objects with Hidden Details & Sections	5	Orthographic Drawing with Sections using AutoCAD
10	6	Isometric Views of Simple Solids	6	Isometric Drawing using AutoCAD
11	6	Isometric Views from Orthographic Views	6	Isometric Drafting of Engineering Components
12	7	Projection of Solids (Simple Cases)	7	Development of Lateral Surfaces using AutoCAD
13	8	Development of Lateral Surfaces of Pyramid and Cone	8	CAD Exercise integrating Drawing, Layers, Dimensioning and Plotting
14		**Final Submission & Practical Viva**		**Final CAD Test & Practical Viva**
Total Practical – 28				Total Hours – 56

Text Book:-

Sr. No	Title	Author	Publisher
01	Engineering Drawing	N. D. Bhatt	Charotar Publishing House Pvt. Ltd, Anand
02	Engineering Drawing	Dr. Dhananjay Johle,	Tata Mc-Graw Hill
	Auto CAD Book		
03	Fundamentals of Engineering Drawing	W. J. Luzadder	Prentice Hall of India
04	Engineering Drawing & Graphics	M. L. Mathur	Jain brothers

Reference Book:-

Sr. No.	Title	Author	Publisher
01	Engineering Drawing and Graphics	K. Venugopal	New Age Publication
02	A text book of Engineering Drawing	R. K. Dhawan	S. Chand and Co
03	Engineering Drawing	N. B. Shaha and B. C. Rana	Pearson Education
04	Machine Drawing	K. L. Narayana	New Age Publication

E Learning Resourses :	
01	NPTEL Course on Engineering Drawing,By Prof. P. S. Robi, IIT Guwahati https://nptel.ac.in/courses/ 112103019
02	NPTEL Course on Engineering/Architectural Graphics – Part I: Orthographic Projection By Prof. Avlokita Agrawal, IIT Roorkee, https://nptel.ac.in/courses/124107157
03	**NPTEL Course on Engineering Graphics and Design** By Prof. Naresh Datria, Prof. S. R. Kale, IIT Delhi https://nptel.ac.in/courses/112102304
04	**NPTEL Course on Engineering Drawing and Computer Graphics** By Prof. Rajaram Lakkaraju, IIT Kharagpur

Note- OE-: The Oral Examination shall be based on the concepts, procedures, principles, and applications covered in the Laboratory component of the syllabus

Course Structure:

Class	FY B. Tech. Sem. – I/II
Lab Code and Lab Title	**0UBHES110, Basic Electrical and Electronics Engineering Lab**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE-OE/POE	25/25-POE

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHES110_1	**Perform** basic electrical circuit experiments to verify fundamental laws and power concepts.	**L3**
0UBHES110_2	**Use** electrical measuring instruments such as digital multimeter and DSO for measurement and waveform observation.	**L3**
0UBHES110_3	**Verify** the operation of basic digital logic gates.	**L3**
0UBHES110_4	**Implement** domestic wiring circuits including lighting, fan, regulator, and extension board connections.	**L3**
0UBHES110_5	**Apply** electrical safety practices and estimate household electricity consumption and billing.	**L3**

List of Experiments:

Expt. No.	**Title of Experiment**
1	Verification of Ohm's Law using resistive circuit
2	Verification of Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL)
3	Measurement of active power in single phase AC circuit
4	Measurement of voltage, current, resistance, continuity test using digital multimeter
5	Measurement of AC waveform parameters (frequency, time period and amplitude) using DSO
6	Verification of V-I characteristics of PN junction diode
7	Study of half wave bridge rectifier
8	Study of full wave bridge rectifier
9	Verification of logic gates – AND, OR, NAND, NOR, XOR
10	Study and connection of ceiling fan with regulator and switch.
11	Implementation of basic house wiring circuits: one lamp control, staircase wiring and godown wiring

***Note- Minimum 09 experiments compulsory**

List of Mini Project:

Expt. No.	**Title of Experiment**
1	Preparation and testing of power supply board using switch, socket, fuse, and indicator

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2	Estimation of household electrical load and electricity bill calculation based on connected load and tariff

***Note- Minimum 01 compulsory**

Text Books

Sr. No	Title	Author	Publisher
1	Basic Electrical Engineering	D. P. Kothari, I. J. Nagrath	McGraw Hill Education
2	Basic Electrical and Electronics Engineering	B. L. Theraja, A. K. Theraja	S. Chand Publishing
3	Basic Electrical and Electronics Engineering	V. Jegathesan, K. Vinoth Kumar, R. Saravanakumar	Wiley India
4	Principles of Electrical Engineering and Electronics	V. K. Mehta, Rohit Mehta	S. Chand Publishing

Reference Books:

Sr. No	Title	Author	Publisher
1	Electrical and Electronics Measurements and Instrumentation	A. K. Sawhney	Dhanpat Rai Publications
2	Electrical Technology	J. B. Gupta	S.K. Kataria & Sons
3	Electronic Devices and Circuit Theory	Robert L. Boylestad and Louis Nashelsky	PHI/Pearson Education
4	Electrical Wiring, Estimating and Costing	S. L. Uppal	Khanna Publishers

E- Learning Resources

Sr. No	Title	Author	Publisher
1	Basic Electrical Technology	Prof. D. C. Kulshreshtha, IIT Kanpur	NPTEL Videos
2	Electronic Systems for Beginners	Prof. Nagendra Krishnapura, IIT Madras	NPTEL Videos

Note-POE: The Practical Oral Examination shall be conducted based on the prescribed practical's/experiments included in the Laboratory component of the syllabus.

Course Structure:

Class	F.Y B. Tech. Sem.–II
Course Code and Course Title	**0UBHBS201 Applied Mathematics**
Prerequisite/s	Derivative, Integral, Set Theory
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHBS201_1	**Apply** De-Moivre's theorem, hyperbolic functions and logarithmic properties to solve problems involving complex numbers.	**L3**
0UBHBS201_2	**Compute** reduction formulae and curve tracing techniques to solve mathematical problems.	**L3**
0UBHBS201_3	**Evaluate** multiple integrals and apply coordinate transformations to engineering problems involving area, volume and physical quantities.	**L3**
0UBHBS201_4	**Apply** vector differential and integral calculus to solve mathematical and engineering problems.	**L3**
0UBHBS201_5	**Apply** probability concepts and Bayes' theorem to analyze uncertainty in engineering and real-world situations.	**L3**

Course Contents:		
Unit 1	**Complex Numbers** Definition and geometrical representation, De-Moivre's Theorem (without proof), Roots of complex numbers by using De-Moivre's Theorem, Circular function of complex variable- definition, Hyperbolic functions, Relations between circular and hyperbolic function, Logarithm of complex quantities.	**07 Hrs.**
Unit 2	**Reduction Formulae and Curve Tracing** Reduction formulae- $\int_0^{\frac{\pi}{2}} sin^n x\, dx$, $\int_0^{\frac{\pi}{2}} cos^n x\, dx$, $\int_0^{\frac{\pi}{2}} sin^m x\, cos^n x\, dx$ Tracing of Curves – Cartesian, Polar and Parametric curves.	**07 Hrs.**
Unit 3	**Multiple Integrals** Introduction to double integrals, Evaluation of double integrals in Cartesian and polar coordinates, Change of order of integration, Transformation from Cartesian to polar coordinates, Evaluation of triple integrals.	**07 Hrs.**
Unit 4	**Vector Differential Calculus** Physical interpretation of Vector differentiation, Vector differential operator, Gradient, directional derivative, divergence and curl, Solenoidal, Irrotational and Conservative fields, Scalar potential, Vector identities.	**07 Hrs.**

Unit 5	**Vector Integral Calculus** Line, Surface and Volume integrals, Work-done, Green's Lemma, Gauss's Divergence theorem, Stoke's theorem.	**07 Hrs.**
Unit 6	**Probability Theory** Basic Concept of probability, classical, empirical, and axiomatic probability, Addition and Multiplication theorems, Bayes' theorem, Properties of probabilities, Examples.	**07 Hrs.**
	Total Hours	**42 Hrs**

Text Books

Sr. No	Title	Author	Publisher
1	Higher Engineering Mathematics	B. V. Ramana	(Tata McGraw Hill)
2	Higher Engineering Mathematics	B. S. Grewal	(Khanna Publication, Delhi)

Reference Books

Sr. No.	Title	Author	Publisher
1	Advanced Engineering Mathematics	H.K. Dass	S. Chand & company limited
2	Advanced Engineering Mathematics	M. D. Greenberg	Pearson Education
3	Advanced Engineering Mathematics	Peter V. O'Neil	Cengage Learning (Thomson)
4	Thomas' Calculus	George B. Thomas	Pearson (Addison-Wesley)
5	Applied Mathematics (Vol. I and II)	P. N. Wartikar and J. N. Wartikar	Vidyarthi Griha Prakashan, Pune
6	Fundamentals of Statistics	S. C. Gupta	Himalaya Publishing House

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Engineering Mathematics II	Prof. Jitendra Kumar IIT Kharagpur	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/noc26_ma37/preview

Course Structure:

Class	F.Y B. Tech.Sem I/II
Course Code and Course Title	**0UBHBS111, Engineering Chemistry**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE/ MSE/ ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHBS111_1	**Apply** methods to treat water for hardness in domestic use.	**L3**
0UBHBS111_2	**Utilize** the characteristics of fuels and lubricants to access their performance	**L3**
0UBHBS111_3	**Apply** electrochemical concepts to conductance analysis, titration techniques, and energy storage systems	**L3**
0UBHBS111_4	**Implement** corrosion prevention and protection techniques to minimize material degradation.	**L3**
0UBHBS111_5	**Apply** principles of nanomaterial synthesis and photovoltaic cells for technological applications.	**L3**
0UBHBS111_6	**Apply** polymerization concepts and polymer properties in engineering applications	**L3**

Course Contents:		
Unit 1	**Water Treatment** Introduction, Hard and Soft water, Disadvantages of hard water, Softening of water :Ion exchange process, Hot lime –soda process, Hardness and its determination by EDTA method, Numerical on Hardness, Treatment of water for domestic purpose- aeration, sedimentation and disinfection.	**07 Hrs.**
Unit 2	**Fuels and Lubricants** Fuels: Introduction, Classification of fuel, Calorific value of a fuel, Characteristics of a good fuel, Calorific value by- Bomb Calorimeter, Boy's Calorimeter, Numerical on Calorific value. Lubricant: Introduction, classification of lubricant - Solid, Semi –solid and liquid lubricant, Properties of lubricant: Physical and Chemical properties of lubricant – viscosity, surface tension, Acid value.	**08 Hrs.**
Unit 3	**Electrochemistry** Introduction, Electrical conductance- Specific & Molar Conductance, Cell constant, Conductometric titrations, Types of reference electrodes – Calomel electrode, Indicator electrode (Glass electrode), Rechargeable Batteries: Lithium ion batteries, H2-O2 Fuel Cell.	**06 Hrs.**

Unit 4	**Corrosion and its Control** Introduction, Electrochemical Corrosion (Wet corrosion), Types of Wet corrosion-Galvanic, Microbiological Corrosion, Direct Chemical Corrosion (Dry corrosion), Factors affecting the rate of corrosion, Methods to minimize the rate of corrosion- Cathodic and Anodic protection method.	**07 Hrs.**
Unit 5	**Nanomaterial's & Solar Energy** Introduction, Properties of nanomaterial-top-down and bottom-up approach for synthesis of nanomaterial (Carbon Nanotubes, Graphene): Introduction to semiconducting nanomaterial's (ZnO, TiO2 etc), Metal nanoclusters (Ag, Pt), Applications of nanomaterial's. Introduction, Photovoltaic cell: Construction, Working, Advantages, Disadvantages & Applications.	**08 Hrs.**
Unit 6	**Polymers** Introduction. Types of Polymerization-Addition & Condensation, Thermoplastic and Thermosetting resin, Synthesis of Urea formaldehyde and Styrene -butadiene rubber with its Properties and Uses, Brief discussion on Natural Rubber, Properties and uses of PVC, Bakelite, Epoxy resin.	**06 Hrs.**
	Total Hours	**42 Hrs**

Text Books

Sr. No	Title	Author	Publisher
1	Engineering Chemistry	Dr. Jayashree Parikh	Shivaji University
2	Text Book of Engineering Chemistry	Dr. Savita Garg	Techsar
3	Eng. Chemistry (Fundamentals & Applications)	Shikha Agarwal	Cambridge University
4	Polymer Science	V. R. Gowarikar	New Age International Publication

Reference Books

Sr. No.	Title	Author	Publisher
1	Engineering Chemistry	S. S. Dara & Dr. S. S. Umare	S. Chand
2	Engineering Chemistry	Dr. Savita Garg	Wiley
3	Engineering Chemistry	Jain & Jain	Dhanpat Rai
4	Engineering Chemistry	Bhaskar Chaurasia	CBS

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1.	Water and waste water treatment	Prof. Bhanu Prakash Vellanki	NPTEL	https://onlinecourses.nptel.ac.in/noc26_ce72/preview
2.	Solar Cell	Jens Andresen	Coursera	www.coursera.org/learn/solar-cell
3.	Chemistry of Nanomaterials	Dr. SYAMCHAND. S. S	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy05
4.	Engineering Aspects of Biofuels and Biomass Conversion Technologies	Prof. Ejaz Ahmad	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ch88
5.	Introduction to Polymer Science	Prof. Dibakar Dhara	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cy47

Course Structure:

Class	F.Y. B.Tech Sem.-I/II
Course Code and Course Title	**0UBHES112, Engineering Mechanics**
Prerequisite/s	***
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES112_1	**Apply** the principles of force systems to determine the resultant and equilibrium of engineering systems.	**L3**
0UBHES112_2	**Analyze** the equilibrium of particles, rigid bodies, and beams using free-body diagrams and support reaction calculations.	**L4**
0UBHES112_3	**Calculate** forces in the members of truss using the joint and section method.	**L4**
0UBHES112_4	**Examine** the centroid and moment of inertia of plain and composite figure	**L4**
0UBHES112_5	**Compute** motion parameters using kinematics and kinetics principles.	**L3**
0UBHES112_6	**Analyze** engineering systems using work-energy and impulse-momentum principles to determine the motion of particles and colliding bodies.	**L3**

Course Contents:		
Unit 1	**Fundamentals of Engineering Mechanics & Force Systems** Objectives of engineering analysis and design, Basic assumptions in engineering mechanics, Laws of motion, Law of Parallelogram, Law of Transmissibility. **Force Systems:** Types of force systems (coplanar, concurrent, non-concurrent, Parallel), Resolution and composition of forces, Resultant of force systems, Moment and Couple. **Theorems:** Varignon's Theorem.	**08 Hrs.**
Unit 2	**Equilibrium of Particles and Rigid Bodies** **Equilibrium:** Conditions of equilibrium, Free Body Diagrams (FBD), Lami's Theorem. Introduction to surface friction: Horizontal plane and Inclined plane. **Beams:** Types of beams, Types of loads and supports, Reactions of simply supported beams, Continuous beams.	**06 Hrs.**
Unit 3	**Analysis of Truss** Introduction of ruff truss, types of trusses, Determinacy of truss, Assumptions for analysis of truss. Analysis of truss by Joint method and	**07 Hrs.**

	section method	
Unit 4	**Centroid and Moment of Inertia** **Centroid:** Introduction to centroid and centre of gravity, Centroid of composite figures and shaded areas. **Moment of Inertia:** M.I. of standard shapes, Parallel and Perpendicular axis theorem. Centroid of plain and composite figures.	**08 Hrs.**
Unit 5	**Dynamics – Kinematics & Kinetics** **Kinematics:** Equations of motion, Rectilinear motion, Constant and variable acceleration, Motion under gravity, Projectile motion. **Kinetics:** D'Alembert's Principle (linear motion), Kinetics of rigid bodies (translation).	**07 Hrs.**
Unit 6	**Work, Energy, Power & Momentum Methods** **Work, Energy, Power:** Work done by a force, Potential and kinetic energy, Work-energy principle, Conservation of energy, Power. **Impulse & Momentum:** Impulse-momentum principle, Collision of elastic bodies.	**06 Hrs.**
	Total Hours	**42 Hrs**

Text Books

Sr. No	Title	Author	Publisher
1	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P) Ltd.
2	Engineering Mechanics	R. S. Khurmi & N. Khurmi	S. Chand
3	Engineering Mechanics	R. K. Bansal & Sanjay Bansal	Laxmi Publication Pvt. Ltd.
4	Engineering Mechanics	Bhavikatti S. S., Rajashekarappa K. G.,	New Age International Publications

Reference Books

Sr. No.	Title	Author	Publisher
1	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publisher
2	Engineering Mechanics – Statics and Dynamics	Irving H. Shames	Pearson Education
3	Engineering Mechanics (Schaum's Outline Series)	McLean, Nelson	McGraw Hill Book Company, New Delhi
4	Engineering Mechanics – Statics & Dynamics	Singer F. L.	Harper & Row Publishers, New York

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Engineering Mechanics	Prof. Anubhab Roy (IIT Madras)	NPTEL Videos	https://onlinecourses.nptel.ac.in/noc26_me63/preview

Course Structure:

Class	F.Y.B. Tech. Sem. – I/II
Course Code and Course Title	**0UBHES113 Elements of Mechanical Engineering**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHES113_1	**Explain** the role of mechanical engineering, engineering materials, manufacturing processes, and sand-casting techniques used in engineering applications.	**L2**
0UBHES113_2	**Apply** thermodynamic principles and IC engine concepts to engineering applications.	**L3**
0UBHES113_3	**Apply** the working principles of lathe, drilling, and milling machines in manufacturing operations.	**L3**
0UBHES113_4	**Analyze** the applications and advantages of CNC, rapid prototyping, robotics, and CIM in modern manufacturing systems.	**L4**

Course Contents:		
Unit 1	**Introduction to Mechanical Engineering:** Role of Mechanical Engineering in Industries and Society, Definition of manufacturing, Selection of manufacturing processes, Design Basics, Introduction to sand casting, advantages, disadvantages and applications.	**7 Hrs.**
Unit 2	**Thermodynamics:** System, Types of Systems, Laws of Thermodynamics. **Introduction to IC Engines:** Classification, Components and working principles of 4-Stroke Petrol and Diesel engines, difference between 2 and 4 stroke IC engine.	**7 Hrs.**
Unit 3	**Machining Processes:** **Lathe Machine:** Introduction**,** types of lathes, Principle of working of a center lathe, Lathe operations, **Drilling Machine:** Introduction, types, Construction and working of radial drilling machine, various operations. **Milling Machine:** Introduction, types, Construction and working of column and knee type milling machine, milling operations.	**8 Hrs.**
Unit 4	**Introduction to Advanced Manufacturing Systems**: Introduction, components of CNC, advantages and applications of CNC, Introduction to rapid prototyping. **Robotics and Computer Integrated Manufacturing (CIM):** Introduction to Industrial robotics, Robot configuration, Robot applications in manufacturing, Introduction to Computer Integrated Manufacturing (CIM).	**6 Hrs.**
	Total Hours	**28 Hrs**

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Text Books

Sr. No.	Title	Author	Publisher
1	Basic Mechanical Engineering	K. R. Gopalkrishna	Subhas Publications
2	Manufacturing Engineering and Technology	Serope Kalpakjian & Steven Schmid	Pearson Education
3	Basic Mechanical Engineering	T. J. Prabhu, V. Jaiganesh & T. Balasubramanian	Scientific International Pvt. Ltd.
4	Elements of Mechanical Engineering	S. Trymbaka Murthy	I.K. International Publishing House

Reference Books

Sr. No.	Title	Author	Publisher
1	Fundamentals of Modern Manufacturing: Materials, Processes and Systems	Mikell P. Groover	Wiley India
2	Production Technology	P. C. Sharma	S. Chand Publications
3	Internal Combustion Engines	V. Ganesan	McGraw Hill Education
4	Manufacturing Technology	R. K. Rajput	Laxmi Publications

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Basic Mechanical Engineering	Prof. K. M. Gupta	NPTEL/Swayam	https://onlinecourses.nptel.ac.in/noc26_ee27/preview

Course Structure:

Class	F.Y.B. Tech. Sem-I/II
Course Code and Course Title	**0UBHAE114, Professional Communication Skills**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHAE114_1	**Apply** communication principles in professional contexts.	**L3**
0UBHAE114_2	**Use** phonetic transcription for accurate pronunciation.	**L2**
0UBHAE114_3	**Apply** grammar rules for effective communication.	**L3**
0UBHAE114_4	**Develop** strategies to enhance language skills	**L3**
0UBHAE114_5	**Analyze** Interpersonal Dynamics and build Professional Confidence	**L4**

Course Contents:		
Unit 1	**Fundamentals of Communication** **Forms of Communication** Meaning, process, elements and importance of communication, **Verbal and non-verbal communication**: Types of Verbal: Oral, Written, audio visual, Effective communication Types of non-verbal communication: Seven Nonverbal codes, body language, visual language, paralanguage **Organizational communication:** Vertical communication: upward communication, downward communication Horizontal communication, diagonal communication, grapevine communication **Types of Barriers in Communication:** Psychological, linguistic, cultural, semantic, personal and physical barriers **7 C's of communication**	**08Hrs.**
Unit 2	**Study of Phonetics Sounds:** Introduction to Phonetics**,** Study of Speech Organs**,** Study of Phonemic Script**,** Articulation of Different Sounds in English**,** Introduction to Stress and Intonation	**04 Hrs.**
Unit 3	**Language Mechanics** **Grammar and usage:** Types of verb: Auxiliary verbs, module auxiliary verbs Nouns, Adjectives, Adverbs, Prepositions, Articles, Conjunctions, Tenses, Idioms and phrases, Common errors and sentences corrections,	**06 Hrs.**

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Unit 4	**LSRW Skills** **Listening Skills**: Types of listening, barriers in listening **Speaking Skills:** Debate, Group Discussion, Extempore **Writing Skills:** Letter writing, Resume /CV writing, E-mail drafting and etiquettes, Report Writing, Blog and content writing. **Reading skills:** Skimming, Scanning, Intensive & Extensive Reading	**04 Hrs.**
Unit 5	**Development of Soft skills** **Emotional intelligence and confidence building** **Social media Etiquettes & Netiquettes:** Storytelling and persuasive communication **Grooming:** Appearance & voice modulation, interview techniques **Case study discussion and Role play on Soft Skills**	**06 Hrs.**
	Total Hours	**28**

Text Books

Sr. No	Title	Author	Publication
1	Communication Skills	Dr. Meenu Pandey Roma M. Ludrik	Technical Publications
2	Communication Skills for Engineers	Sunita Mishra & C.Muralikrishna	Pearson Publication
3	Communication Skills	Sanjay Kumar Pushp Lata	Oxford University Press
4	Cambridge English for Job-Hunting	Colm Downes	Cambridge University Press

Reference Books

Sr. No.	Title	Author	Publication
1	English Grammar in Use	Raymond Murphy	Cambridge University Press
2	Soft Skills	S. P. Dhanavel	Orient BlackSwan
3	Communication Skills for Professionals	Nira Konar	PHI Learning Private Limited
4.	Business Communication	C.S. Rayudu	Himalaya Publishing House

E- Learning Resources

Sr no.	Title	Course Instructor	Platform	Web link
1	Soft Skills and Personality Development	Prof. T. Ravichandran	NPTEL	nptel.ac.in

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Course Structure:

Class	F.Y B. Tech. Sem. –I/ II
Course Code and Course Title	**0UBHVS115, Design Thinking and Prompt Engineering**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHVS115 _1	Explain the principles of design thinking, creative learning, and the Stanford Design Thinking Framework for solving design problems.	**L2**
0UBHVS115 _2	Apply human-centered design tools to identify user needs and define design opportunities.	**L3**
0UBHVS115 _3	Construct well-structured prompts using appropriate prompting techniques and prompt patterns for a given text-generation task, such that the resulting LLM output is accurate.	**L3**
0UBHVS115 _4	Generate tailored AI-generated content by crafting effective prompts, such that the content is engaging, contextually appropriate, and fit for the intended platform or research objective.	**L3**

Course Contents:		
Unit 1	**Design Thinking and Creative Learning:** Experiential Learning Styles, Self-assessment, Psychological Principles in Design Thinking, Perception and Observation, Imagination and Creative Confidence, Stanford Design Thinking Framework, IDEO Shopping Cart Case Study	**7 Hrs.**
Unit 2	**Users and Human-Centered design:** User-Design Relationship, Understanding Users through Interviews, Personas, Empathy Maps, Affinity Diagrams, Journey Maps, Need Identification, Introduction to Human-Centric Tools in Design Thinking Process, Brainstorming, Mind Mapping	**7 Hrs.**
Unit 3	**Prompt Engineering:** Introduction to Prompt Engineering & LLMs; Evolution of NLP to Large Language Models, Anatomy of LLMs: Tokens, embeddings, context windows, Introduction to GPT, Claude, PaLM, Mistral, etc Foundations of Prompt Design; Types of prompting: Zero-shot, One-shot, Few-shot. Prompt patterns; Instructional, Delimiting, Role-based, Socratic. Standard Practices	**6 Hrs.**

	for Text Generation; Generating Lists, Explain It Like I'm Five (EL15), Universal Translation Through LLMs, Ask for Context.	
Unit 4	**Generating AI for Content Creation:** Using AI for Copywriting, Creating Social Media Posts. Writing Video Scripts, Using AI for Personalized Messaging, Creating Engaging and Tailored Content with AI, Techniques for Crafting Effective Prompts for Surveys, Assessments, and Data Collection, Using Prompts in Research Methodology. Learning to Craft Image Data with GenAI.	**8 Hrs.**
	Total Hours	**28**

Text Books

Sr. No	Title	Author	Publisher
1	Design Thinking: A Comprehensive Textbook	Shalini Rahul Tiwari, Rohit Rajendra Swarup	Wiley India
2	Design Thinking	Sanjay Kumar Magoo, Rakesh Gupta	McGraw Hill India
3	Prompt Engineering for Generative AI	Mike Taylor & James Phoenix	O'Reilly
4	The Art of Asking ChatGPT for High-Quality Answers: A Complete Guide to Prompt Engineering Techniques	Ibrahim John	Nzunda Technologies Limited

Reference Books

Sr. No.	Title	Author	Publisher
1	Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation	Tim Brown	CRC Press
2	Design Thinking for the Greater Good: Innovation in the Social Sector	Jeanne Liedtka, Randy Salzman & Daisy Azer	Columbia University Press
3	Prompt Engineering: Hands-on guide to prompt engineering for AI interactions	Eric C. Richardson	BPB Publications
4.	Prompt Engineering for Beginners	Geetu Garg & Gaurav Aroraa	Arcchie Publications

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Design Thinking - A Primer	Prof. Ashwin Mahalingam, Prof. Bala Ramadurai	NPTEL/Swayam	https://nptel.ac.in/courses/110106124
2	Prompt Engineering for ChatGPT	Dr. Jules White	Coursera	https://www.coursera.org/learn/prompt-engineering

Course Structure:

Class	F.Y.B.Tech Sem. – II
Lab Code and Lab Title	**0UBHES202, Programming Skills-II**
Prerequisite/s	Concepts in C Python
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE / ESE	25/25

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHES202_1	Apply Python fundamentals (variables, data types, I/O) to write basic programs	L3
0UBHES202_2	Apply control structures and functions to solve logical problems in Python.	L3
0UBHES202_3	Analyze and use Python data structures and file handling for data management.	L4
0UBHES202_4	Apply problem-solving skills to solve coding challenges on LeetCode/HackerRank	L3
0UBHES107_5	Apply Git/GitHub for version control and build a professional LinkedIn profile.	L3
0UBHES107_6	Design responsive web pages using HTML, CSS, and JavaScript, and implement a collaborative mini project using Git/GitHub.	L6

List of Experiments:

Expt. No.	**Title of Experiment**
1	Introduction to Python and IDE Setup
2	Python Variables, Data Types and Input/Output.
3	Problem Solving using LeetCode
4	HackerRank Programming Practice
5	Conditional Statements in Python
6	Looping Statements
7	Functions in Python
8	Strings and Lists
9	Tuples, Dictionaries and Sets
10	File Handling in Python
11	Introduction to Git
12	GitHub Basics

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13	50% submission of project. And submission of experiment 1-10
14	LinkedIn Profile Creation
15	HTML Basics
16	HTML Forms and Tables
17	CSS Fundamentals
18	Responsive Web Design
19	JavaScript Basics
20	JavaScript DOM Manipulation
21	Group Mini Project using Git & GitHub

***Note- All experiments compulsory**

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Python Programming: A Modern Approach	Vamsi Kurama	Pearson Education	2nd	2022
2	Learning Python	Mark Lutz	O'Reilly Media	5th	2013
3	HTML, CSS and JavaScript: All in One	Julie C. Meloni	Pearson (Sams Teach Yourself)	1st	2020
4	Pro Git	Scott Chacon & Ben Straub	Apress	2nd	2014

Reference Books

Sr. No.	Title	Author	Publisher
1	Python Crash Course	Eric Matthes	No Starch Press
2	Head First HTML and CSS	Elisabeth Robson & Eric Freeman	O'Reilly Media
3	Eloquent JavaScript	Marijn Haverbeke	No Starch Press
4	Cracking the Coding Interview	Gayle Laakmann McDowell	CareerCup

E- Learning Resources

Sr. No	Title	Author	Publisher
1	Programming, Data Structures and	Prof. Madhavan Mukund, Chennai	NPTEL Videos

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	Algorithms using Python	Mathematical Institute	
2	The Joy of Computing using Python	Prof. Sudarshan Iyengar, IIT Ropar	NPTEL Videos
3	Introduction to Modern Application Development	Prof. Gaurav Raina, Tanmai Gopal IIT Madras	NPTEL Videos

Course Structure:

Class	F.Y.B. Tech Sem- I/II
Lab Code and Lab Title	**0UBHBS116, Engineering Chemistry Laboratory**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE-OE/POE	25/25-POE

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHBS116_1	**Apply** titration techniques to determine hardness, chloride, dissolved oxygen, and pH of water.	**L3**
0UBHBS116_2	**Perform** conductometric and pH-metric titrations to interpret experimental results.	**L3**
0UBHBS116_3	**Apply** methods to determine surface tension, viscosity, and acid value of oils.	**L3**
0UBHBS116_4	**Apply** the synthesis and properties of silver and ZnO nanoparticles.	**L3**

List of Experiments:

Expt. No.	Title of Experiment
1	To determine the Hardness of water sample by EDTA method.
2	To determine the Chloride content in water sample by precipitation titration method.
3	To determine the Dissolve Oxygen in water by Iodometric method.
4	To determine the TDS of given water sample.
5	To determine the alkalinity of given water sample.
6	To determine normality & strength of acid sample by pH – metric Titration
7	To determine normality & strength of acid sample Conductometric Titration
8	To determine the Surface tension of given oil sample by stelogonometer.
9	To determine the Viscosity of given oil sample by Ostwald Viscometer.
10	To determine the Acid value of an oil sample.
11	To determine ethanol in petrol by the water extraction method and density method.
12	To Synthesis Silver Nanoparticles by Bottom-Up Approach
13	To synthesize ZnO nanoparticles.
14	To estimate water turbidity by measuring light absorbance with colorimeter.

Projects:

- To compare the quality of petrol samples obtained from various petrol pumps in Satara District.
- To assess the quality of water from different sources in Satara District based on selected water quality parameters.

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Text Books

Sr. No	Title	Author	Publisher
1	Practical Engineering Chemistry	K. Mukkanti	B.S. Publications
2	Engineering Chemistry Laboratory Manual	K. Mukkanti	B.S. Publications
3	Engineering Chemistry Laboratory Manual	S. S. Dara	S. Chand Publishing

Reference Books:

Sr. No	Title	Author	Publisher
1	Laboratory Manual on Engineering Chemistry	A.I. Vogel	Pearson group
2	Laboratory Manual on Engineering Chemistry	S. K. Bhasin & Sudha Rani	Dhanpat Rai
3	Engineering Chemistry	Sunita Rattan	S. K. Kataria & Sons

E- Learning Resources

Sr. No	Title	Author	Publisher	Web Link
1.	Engineering Chemistry	Ministry of Education and IITs	Virtual Lab	https://bc2-iitk.vlabs.ac.in/exp/conductometric-titration/
2.	Determination of Hardness of Water	-	YouTube(Microchem's Experiments)	https://www.youtube.com/watch?v=cE4bgo8flt0

Note-POE: The Practical Oral Examination shall be conducted based on the prescribed practicals/experiments included in the Laboratory component of the syllabus.

Course Structure:

Class	F.Y. B.Tech. Sem. – I / II
Lab Code and Lab Title	**0UBHES117, Engineering Mechanics Lab**
Prerequisite/s	***
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE-OE/POE	25/25-POE

Course Outcomes (COs) Upon successful completion of this Lab, the student will be able to:		**Bloom's Level**
0UBHES117_1	**Apply** principles of coplanar force systems to verify laws of forces and determine support reactions using analytical and graphical methods.	**L3**
0UBHES117_2	**Analyze** equilibrium of engineering systems such as jib crane and bell crank lever using the principle of moments and force resolution.	**L4**
0UBHES117_3	**Evaluate** frictional behaviour between contact surfaces and interpret its effect on mechanical systems.	**L4**
0UBHES117_4	**Examine** centroid of irregular bodies and relate it to structural stability and load distribution.	**L4**
0UBHES117_5	**Calculate** the mechanical advantage, velocity ratio, and efficiency of simple machines such as screw jacks, single-purchase crabs, double-purchase crabs, and worm-and-worm-wheel mechanisms.	**L3**
0UBHES117_6	**Analyze** coplanar force systems and plane trusses using graphical methods and Microsoft Excel to determine equilibrium, support reactions, resultant forces, and member forces.	**L4**

List of Experiments:

Expt. No.	**Title of Experiment**
1	To verify the Polygon Law of Coplanar Forces.
2	To study the forces in the members of a Jib Crane.
3	To verify the Principle of Moments using a Bell Crank Lever Apparatus.
4	To determine the coefficient of friction between two surfaces.
5	To determine the centroid of composite plane figures by the graphical method.
6	To verify the support reactions of a simply supported beam.
7	To verify the law of machine using a Screw Jack.
8	To analyze a plane truss by the method of joints using the graphical method.
9	To determine the support reactions of a simply supported beam by the graphical method.
10	To analyze a coplanar force system using Microsoft Excel.
11	To verify the law of machine using single and double gear crab mechanisms.
12	To verify the law of machine using a Worm and Worm Wheel.

13	To analyze a beam subjected to point loads and uniformly distributed load (UDL) using Microsoft Excel.

***Note- Minimum 10 experiments compulsory**

Text Books

Sr. No	Title	Author	Publisher
1	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P) Ltd.
2	Engineering Mechanics	R. S. Khurmi & N. Khurmi	S. Chand
3	Engineering Mechanics	R. K. Bansal & Sanjay Bansal	Laxmi Publication Pvt. Ltd.
4	Engineering Mechanics	Bhavikatti S. S., Rajashekarappa K. G.,	New Age International Publications

Reference Books

Sr. No.	Title	Author	Publisher
1	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publisher
2	Engineering Mechanics – Statics and Dynamics	Irving H. Shames	Pearson Education
3	Engineering Mechanics (Schaum's Outline Series)	McLean, Nelson	McGraw Hill Book Company, New Delhi
4	Engineering Mechanics – Statics & Dynamics	Singer F. L.	Harper & Row Publishers, New York

E- Learning Resources

Sr. No	Title	Author	Publisher
1	Engineering Mechanics	Prof. Anubhab Roy (IIT Madras)	NPTEL Videos

Note: POE- The Practical Oral Examination shall be conducted based on the prescribed practicals/experiments included in the Laboratory component of the syllabus.

Course Structure:

Class	B. Tech, Sem.-I, II
Lab Code and Lab Title	**0UBHAE118, Professional Communication Skills Laboratory.**
Prerequisite/s	
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE -OE / POE	25/25-OE

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHAE118_1	**Apply** grammar rules for effective communication.	**L3**
0UBHAE118_2	**Use** phonetic transcription for accurate pronunciation.	**L2**
0UBHAE118_3	**Apply** communication principles in professional contexts.	**L3**
0UBHAE118_4	**Develop** strategies to overcome communication barriers.	**L3**
0UBHAE118_5	**Employ** reading, listening, and interpersonal skills effectively.	**L3**
0UBHAE118_6	**Prepare** professional resumes, emails, and digital content and would demonstrate soft skills for interviews and workplace success.	**L3**

Expt. No.	**Title of Experiment**
1	Self-Discovery
2	Articulation of sounds in English with proper manner
3	Practice of Standard articulation of English language
4	Group discussion on global/current issues
5	Debate or panel discussion
6	Extempore
7	Anchoring and event hosting practice
8	Mini-project presentation
9	Mock interview
10	Vlog Presentation
11	Role play for workplace communication
12	Formal email drafting
13	Resume, Video Resume & LinkedIn profiling

14	Professional Media Building

List of Experiments:

***Note- Minimum 10 experiments compulsory**

Text Books

Sr. No	Title	Author	Publication
1	Communication Skills	Dr. Meenu Pandey Roma M. Ludrik	Technical Publications
2	Communication Skills for Engineers	Sunita Mishra & C.Muralikrishna	Pearson Publication
3	Communication Skills	Sanjay Kumar Pushp Lata	Oxford University Press
4	Cambridge English for Job-Hunting	Colm Downes	Cambridge University Press

Reference Books:

Sr. No	Title	Author	Publication
1	English Grammar in Use	Raymond Murphy	Cambridge University Press
2	Soft Skills	S. P. Dhanavel	Orient BlackSwan
3	Communication Skills for Professionals	Nira Konar	PHI Learning Private Limited
4.	Business Communication	C.S. Rayudu	Himalaya Publishing House

E- Learning Resources

Sr. No	Title	Course instructor	Publisher/Platfom	Web Link
1	MRU e-learning	Malla Reddy University	You Tube	mallareddyuniversity.ac.in

Note-OE: **The Oral Examination shall be based on the concepts, procedures, principles, and applications covered in the Laboratory component of the syllabus.**

Course Structure:

Class	F.Y B.Tech. Sem-I/II
Course Code and Course Title	**0UBHVS119, Workshop Practices**
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	02
Evaluation Scheme: ISE / ESE	25/25

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		**Bloom's Level**
0UBHVS121_1	**Perform** plumbing and welding operations to produce functional pipeline joints and welded assemblies.	**L3**
0UBHVS121_2	**Operate** center lathe, milling and CNC turning machines to perform facing, turning, threading, drilling, knurling and face-milling operations on M.S. jobs.	**L3**
0UBHVS121_3	**Prepare** wooden joints and utility products using carpentry tools and techniques, ensuring dimensional accuracy and surface finish.	**L3**
0UBHVS121_4	**Fabricate** simple M.S. jobs through fitting operations using hand tools and measuring instruments	**L3**
0UBHVS121_5	**Fabricate** welded joints (square butt/lap) using arc, CO_2 and resistance (spot) welding, and assemble/disassemble mechanical/electrical appliances to verify functional working.	**L4**

List of Practical's

Sr. No	**Title of Practical's**
1	Wood working exercises involving planning, marking, sawing, chiseling, and grooving operations for preparing half lap joints, cross lap joints.
2	Job involving cutting, filing along the saw cut, finishing all sides and faces by filing, corner rounding, drilling, and tapping operations on mild steel (M.S.) plates.
3	A job on turning of a Mild Steel cylindrical job using center lathe Machine. Operations line turning, facing, threading, drilling, knurling etc.
4	Milling Machine exercise face milling.
5	A job on use of plumbing tools and preparation of plumbing line involving fixing of water tap and making simple assembly using elbow, tee, union and coupling, tap etc.
6	A job involving Arc and CO_2 welding (MMAW & GMAW) to make a square butt/ lap joint.

7	Exercise in Resistance (Spot) welding to make a lap joint.
8	Demonstration of CNC Turning, machining of simple profile.
9	Useful Wood working exercise eg (notice board, Drawing Board, stool, table etc.)
10	Assembly Disassembly of mechanical / Electrical appliances
11	Wood Lathe Machine Exercises for Manufacturing Useful Wooden Components.eg- Bowls, cups, Pestle, pen holders, Rolling pin etc)

***Note-** Perform any 8 Practical's

Content	
1	**Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints — Half Lap, cross etc., Methods of preparation and applications, Wood working lathe, safety precautions
2	**Fitting:** Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation, tapping operation. Safety precautions
3	**Machine shop:** Technical terms related to lathe operations, major parts of a centre lathe, cutting tools, and machining parameters. Preparation of a mild steel cylindrical job using facing, turning and Knurling operations. Use of measuring instruments for inspection, applications of turning, and safety precautions during lathe machining.
4	**Milling Machine:** Identification of milling machine parts, cutting tools, and work holding devices. Setting of workpiece and cutter, performing face milling operation to produce a flat and smooth surface with proper safety practices.
5	**Plumbing:** Technical terms related to plumbing work, plumbing fittings and accessories, water supply systems. Preparation of simple plumbing lines involving pipe cutting, threading, fitting, and fixing of water taps using fittings such as elbows, tees, unions, and couplings. Use of plumbing tools and safety precautions.
6	**Welding:** Types of Welding, Preparation, alignment, and welding of square butt and lap joints using Manual Metal Arc Welding (MMAW) and Gas Metal Arc Welding (GMAW) CO_2 process while following standard welding procedures and safety practices.
7	**Resistance (Spot) Welding:** Technical terms related to spot welding, welding electrodes, and welding parameters. Preparation of lap joints using sheet metal plates by spot welding. Identification and operation of spot welding machines, inspection of welded joints, applications, and safety precautions
8	**Demonstration of CNC Turning:** Technical terms related to CNC machines, CNC turning operations, Introduction of part programming using G-codes and M-codes, CNC simulator exercises, tool path visualization, and machining of simple profiles. Introduction to CNC machine components, tooling, applications, and safety precautions.
9	**Wood working exercise:** Identification and use of carpentry tools, measuring instruments, and woodworking machines. Preparation, cutting, shaping, assembly, and finishing of a useful wooden article following standard woodworking practices and safety precautions.
10	**Assembly Disassembly:** Identification of components, tools, and fastening methods used in mechanical and electrical appliances. Systematic disassembly, inspection, reassembly, and functional testing of appliances, Demonstration of Electric wiring while following standard procedures and safety practices.

11	**Wood Lathe Machine:** Identification of wood lathe machine parts, cutting tools, and safety precautions. Turning, shaping, and finishing of useful wooden components such as bowls, cups, pestles, pen holders, and rolling pins using wood lathe operations.

Text Books

Sr No	Title	Author	Publisher
1	Workshop Technology (Part I, II & III)	B.S. Raghuwanshi	Dhanpat Rai & Co.
2	Elements of Workshop Technology (Vol. I & II)	S.K. Hajra Choudhury, A.K. Hajra Choudhury, Nirjhar Roy	Media Promoters & Publishers
3	A Course in Workshop Technology (Vol. I & II)	B.S. Raghuwanshi	Dhanpat Rai Publications
4	Workshop Technology	K.C. John	PHI Learning Pvt. Ltd.

Reference Books

Sr No	Title	Author	Publisher
1	Production Technology	R.K. Jain	Khanna Publishers
2	Manufacturing Technology (Vol. I & II)	P.N. Rao	McGraw Hill Education
3	Welding Technology	O.P. Khanna	Dhanpat Rai Publications
4	Workshop Technology and Engineering Materials	R.K. Rajput	S. Chand Publishing