Pimpri Chinchwad Education Trust's

Pimpri Chinchwad University

Sate, Pune - 412106

PCET's Pimpri Chinchwad University

Learn | Grow | Achieve

Curriculum Structure

B. Tech First Year (CSE/AIDS/AIML)

(2024 Pattern)

School of Engineering and Technology

Effective from Academic Year 2024-25

First Year Engineering Curriculum

Preamble:

The first year of an engineering program lays the crucial foundation for future success. Students dive into core math, science, and engineering principles, developing the skills and mindset to tackle complex engineering problems. This comprehensive curriculum prepares them for the challenges and opportunities ahead in the field of engineering. The first year engineering curriculum lays a solid foundation for a rewarding and dynamic career in engineering. By leveraging the abundant resources and support available, students can maximize their potential and embark on an exciting journey of lifelong learning and innovation.

Vision and Mission of the department:

Vision:

To cultivate a dynamic and disciplined community of aspiring engineers dedicated to face the complex global challenges.

Mission:

To provide a transformative educational experience that empowers first-year students to develop the knowledge, skills, and mindset required for the success in the field of engineering.

Program Outcomes

Programme Outcomes (POs):
PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2: 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.
PO3: 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.
PO4: 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.
PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6: 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.
PO7: 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.
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10: 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.
PO11: 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.
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Sr. No.	Type of course	No. of Courses	Total Credits	
			No	%
1	Basic Science Course (BSC)	**04**	**16**	**9.8**
2	Engineering Science Course(ESC)	**05**	**14**	**8.5**
3	Programme Core Course (PCC)	**29**	**66**	**40.2**
4	Programme Elective Course (PEC)	**10**	**20**	**12.1**
5	Multidisciplinary Minor (MD M)	**10**	**10**	**6**
6	Open Elective (OE) Other than a particular program	**04**	**08**	**4.9**
7	"Vocational and Skill Enhancement Course (VSEC)"	**04**	**03**	**1.8**
8	Ability Enhancement Courses/ Co-curricular Courses (CC) (AEC -01, AEC-02)	**05**	**04**	**2.4**
9	Indian Knowledge System (IKS)	**02**		
10	Value Education Course (VEC)	**02**		
11	Research Methodology	**01**	**02**	**1.2**
12	Comm. Engg. Project (CEP)/Field Project (FP)	**02**	**03**	**1.8**
13	Project	**03**	**09**	**5.5**
14	Internship/ OJT	**01**	**06**	**3.7**
15	Massive Open Online Courses (MOOC)	**03**	**03**	**1.8**
	Total	**85**	**164**	

Course Code Nomenclature

Course Code	Course Name	Course Type
UBTFY101	Linear Algebra & Differential Calculus	BSC
UBTFY102	Integral Calculus & Numerical Techniques	BSC
UBTFY103I/II	Engineering Physics	BSC
UBTFY104 I/II	Engineering Chemistry	BSC
UBTFY105 I/II	Basic Electronics Engineering	ESC
UBTFY106 I/II	Basic Electrical Engineering	ESC
UBTFY107 I/II	Engineering Graphics & Design	ESC
UBTFY110 I/II	IT Workshop	VSEC
UBTFY113 I/II	Web Programming	ESC
UBTFY114	Procedural Programming	PCC
UBTFY115 I/II	Fab Workshop	VSEC
UBTFY116	Object Oriented Programming	PCC
UEG101	Applied Communication	AEC
UEG102	Advanced Communication	AEC
ACIKSET101 I/II	IKS: Indian Science , Engineering & Technology	AC
ACUHV101 I/II	UHV-I: Professional Ethics	AC

Course Structure

School of Engineering and Technology, PCU

Structure of B.Tech. First Year (CSE/AIML/AIDS)- 2024 Pattern

WEF: A.Y. 2024-25

Semester I

Course Code	Course Name	Course Type	Teaching Scheme					Assesment Scheme		
			Th	Prac	Tut	Credit	Hrs	CIA	ESA	Total
UBTFY101	Linear Algebra & Differential Calculus	BSC	3	-	1	4	4	40	60	100
UBTFY103I/UBTFY104I	Engineering Physics/ Engineering Chemistry	BSC	3	1	-	4	5	40	60	100
UBTFY105I/UBTFY106I	Basic Electronics Engineering/Basic Electrical Engineering	ESC	3	1	-	4	5	40	60	100
UBTFY107I/UBTFY113I	Engineering Graphics & Design /Web Programming	ESC	2	1	-	3	4	40	60	100
UBTFY114	Procedural Programming	PCC	2	1	-	3	4	40	60	100
UBTFY110I/UBTFY115I	IT Workshop/ Fab Workshop	VSEC	-	1	-	1	2	50	-	50
UEG101	Applied Communication	AEC	1	-	1	2	2	50	-	50
ACUHV101I/ACIKSET101I	UHV-I: Professional Ethics/ IKS: Indian Science , Engineering & Technology	AC	2	-	-	-	2	50	-	50
	Total		16	5	2	21	28	350	300	650

Semester II

Course Code	Course Name	Course Type	Teaching Scheme					Assesment Scheme		
			Th	Prac	Tut	Credit	Hrs	CIA	ESA	Total
UBTFY102	Integral Calculus & Numerical Techniques	BSC	3	-	1	4	4	40	60	100
UBTFY104II/UBTFY103II	Engineering Chemistry/Engineering Physics	BSC	3	1	-	4	5	40	60	100
UBTFY106II/UBTFY105II	Basic Electrical Engineering/Basic Electronics Engineering	ESC	3	1	-	4	5	40	60	100
UBTFY113II/UBTFY107II	Web Programming /Engineering Graphics & Design	ESC	2	1	-	3	4	40	60	100
UBTFY116	Object Oriented Programming	PCC	2	1	-	3	4	40	60	100
UBTFY115II/UBTFY110II	Fab Workshop/IT Workshop	VSEC	-	1	-	1	2	50	-	50
UEG102	Advanced Communication	AEC	1		1	2	2	50	-	50
ACIKSET101II/ACUHV101II	IKS: Indian Science , Engineering & Technology / UHV-I: Professional Ethics	AC	2	-	-	-	2	50	-	50
	Total		16	5	2	21	28	350	300	650

Abbreviations: Course Abbreviation; Th = Theory, Tut = Tutorial, Prac. = Practical, Hrs. = Hours, Cr = Credits; CIA = Continuous Internal Assessment, ESA = End Semester Assessment

Course Exit Policy

UG certificate in CSE/AIML/AIDS: Students who opt to exit after completion of the first year and have scored required credits offered by the school in the program structure will be awarded a UG certificate in CSE/AIML/AIDS, provided they must earn additional credits during the summer vacation of the first year.

Course Code	Course Name	Course Type	Teaching Scheme					Assessment Scheme				
								Theory		OR/PR		
			Th	Pr	Tut	Cr.	Hrs	CIA	ESA	CIA	ESA	Total
UCEXET101	Advanced Web Programming	VSC	2	-	-	2	2	-	-	50	-	50
UCEXET102	Project	VSC	-	2	-	2	4	-	-	50	-	50

***Project- In house/ Sponsored/ Case Study/ Field work**

Course Details

COURSE CURRICULUM

Name of the Program:	F Y B. Tech	Semester : 1	Level: UG
Course Name	Linear Algebra and Differential Calculus	Course Code/ Course Type	UBTFY101 /BSC
Course Pattern	2024	Version	1.0

Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	-	1	4	4	40	60	--

Pre-Requisite: Determinants, Matrices, Limits, Continuity, Differentiation.

Course Objectives (CO):	The objectives of (Linear algebra and differential calculus) are: 1. To apply knowledge of matrix rank to solve problems in various fields, including systems of linear equations, linear transformations, and data analysis. 2. To evaluate Eigenvalues and Eigenvectors and its application in image processing. 3. To employ Taylor's and Maclaurin's theorems for expanding functions into infinite series and understand continuity concepts through L'Hospital's rule. 4. To deal with partial derivatives of functions of several variables that are essential in various branches of engineering 5. To utilize partial derivatives to solve optimization problems, including finding maximum and minimum values of functions, Jacobians & error percentage
Course Learning Outcomes (CLO):	Students would be able to: 1. Recognizing the relationship between the rank of a coefficient matrix and the solvability of systems of linear equations. 2. Understand Eigen values & Eigen vectors & its application in image processing. 3. Explore the concept of continuity and advance calculation in limits continuity by using L'Hospital rule & expansion of function in infinite series by Taylor's and Maclaurin's theorems. 4. Comprehend the concept of partial differentiation. 5. Develop the ability to solve the application of partial differentiation like Jacobian, error percentage, maxima minima.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Matrices: System of linear equations: Types of Matrices, Rank of a matrix, Echelon form of matrix, system of linear equations, linear dependence and linear independence, Applications of system of linear equations, Linear transformation.	**CLO 1**	**09**
UNIT II		
Eigen values and Eigen vectors: EigenValues and EigenVectors, Cayley-Hamilton theorem and its Applications, Diagonalization of Matrix, Singular value decomposition (SVD), Principal Component Analysis (PCA) & Applications to Image Processing and Machine Learning.	**CLO 2**	**09**
UNIT III		
Differential Calculus: Function. Limit, continuity, differentiability, Roll's theorem, Lagrange's mean value theorem, Taylor's Series and Maclaurin's Series. Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits.	**CLO 3**	**09**
UNIT IV		
Partial Differentiation: Introduction to function of several variables, Partial derivative, homogeneous function, Euler's theorem, Total Derivatives, Change of Independent Variables.	**CLO 4**	**09**
UNIT V		
Application of Partial differentiation: **Jacobian:** Jacobians and their applications. Errors and Approximations. **Maxima and Minima:** Maxima and Minima of Functions of two variables.	**CLO 5**	**09**
Total Hours:		**45**

Learning resources

Textbooks:

1. Higher Engineering Mathematics - B. V. Ramana (Tata McGraw-Hill).
2. Advanced Engineering Mathematics - Erwin Kreyszig (Wiley Eastern Ltd.)

Reference Books:

1. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
3. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).

Online resources/e-learning resources:

1. https://medium.com/javarevisited/5-best-linear-algebra-courses-to-learn-in-2023-895ae9269c88
2. https://tutorial.math.lamar.edu/Classes/DE/DE.asp

COURSE CURRICULUM

Name of the Program:		F. Y. B. Tech		Semester : 2		Level: UG	
Course Name		Integral Calculus and Numerical Techniques		Course Code/ Course Type		UBTFY102/BSC	
Course Pattern		2024		Version		1.0	
Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	--	1	4	4	40	60	--
Pre-Requisite:		Differential and Integral Calculus, Vector algebra.					

Course Objectives (CO):	The objectives of (**Integral Calculus and Numerical Techniques(ICNT)**) are: 1. To Demonstrate ability to solve a variety of differential equations (ordinary differential equations) using appropriate methods and techniques. 2. To utilize integration techniques for solving complex integrations. 3. To determine the area, volume of various surfaces & three dimensional objects. 4. To apply vector calculus to modernized techniques in various computing systems. 5. To implement appropriate numerical techniques to approximate solutions for differential equations, optimization problems, linear algebraic equations & interpolation methods to construct approximate functions.
Course Learning Outcomes (CLO):	Students would be able to: 1. Enhance the ability to solve various types of differential equations. 2. Utilize advanced Integral techniques to solve complex integrations. 3. Explore the concept of multiple integral and its various applications. 4. Comprehend the concept of Scalar and Vector point function and Vector calculus. 5. Apply numerical Techniques for solving various problems like Algebraic and Transcendental equations, numerical integration & ordinary differential equations.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Linear Differential equations of first order and Its Application : Introduction, Exact differential equations, differential equations reducible to Exact form, Linear differential equations, Applications of differential equations to Newton's law of cooling, Kirchhoff's law of electrical circuits.	**CLO 1**	**09**
UNIT II		
Integral Calculus: Introduction, Reduction formulae (Sine and Cosine), Beta and Gamma functions, differentiation under integral sign.	**CLO 2**	**09**
UNIT III		
Multiple Integration : Introduction, double and triple integrations, Cartesian and polar form, applications to find area, and volume.	**CLO 3**	**09**
UNIT IV		
Vector Calculus : **Vector differentiation:** Introduction, vector differential operator, gradient, divergence, curl, directional derivative (First two cases), solenoidal, irrotational and conservative fields. **Vector Integration:** Line, surface and volume integrals, Problems on - Green's lemma, Stoke's theorem, and Gauss's divergence theorem.	**CLO 4**	**09**
UNIT V		
Numerical Methods : **Numerical Solution of Algebraic and Transcendental equations:** Bisection method &Newton–Raphson method. **Interpolation:** Finite Differences, Newton's forward and backward Interpolation, Lagrange's Interpolation formula. **Numerical Integration**: Trapezoidal and Simpson's $1/3^{rd}$ and $3/8^{th}$ rule. **Solution of Ordinary differential equations:** Euler's, Modified and Runge-Kutta 4th order methods	**CLO 5**	**09**
Total Hours:		**45**

Learning resources

Textbooks:

1. Higher Engineering Mathematics - B. V. Ramana (Tata McGraw-Hill).
2. Advanced Engineering Mathematics - Erwin Kreyszig (Wiley Eastern Ltd.)

Reference Books:

1. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
3. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).

Online resources/e-learning resources:

1. https://math.mit.edu/~djk/calculus_beginners/
2. https://ncert.nic.in/ncerts/l/lemh201.pdf
3. https://gdcboysang.ac.in/About/Droid/uploads/Numerical%20Methods.pdf

COURSE CURRICULUM

Name of the Program:		B. Tech FY		Semester: 1/2		Level: UG	
Course Name		Engineering Physics		Course Code/ Course Type		UBTFY103I/II/ BSC	
Course Pattern		2024		Version		1.0	
Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	1	–	4	5	40	60	–

Pre-Requisite: 1. Calculus, 2. Wave theory of light, 3. Atomic, Molecular, and Laser Physics 4. Magnetism, 5. Semiconductor Physics 6. Quantum Mechanics basics

Course Objectives (CO):	The objectives of (Engineering Physics) are: 1. To deploy the reflection, refraction, interference and diffraction phenomena. 2. To understand crystal structure theory and concepts in semiconductor physics. 3. To get familiar with the Laser and their types, and molecular spectroscopy techniques. **4.** To realize concepts behind magnetism and superconductors, and get familiar with several magnetic and superconducting materials. 5. To deliver the basic concepts of nanotechnology, and understand nanomaterials' fabrication, analysis, and characterization methods.
Course Learning Outcomes (CLO):	Students would be able to: 1. Understand the concepts of reflection, refraction, and diffraction for various engineering applications. In addition, perform lab experiments based on these phenomena. 2. Interpret crystal structure theory and semiconductor physics, and their application in the field of solid-state Physics. 3. Apply the working principle of laser, their prominent applications and hands-on experience through lab practical. 4. Remember the fundamental understanding of magnetism, interpret properties superconductors, and their applications in advanced technologies. 5. Comprehend the basic properties of nanostructures/nanomaterials and their modeling and applications on the basis of quantum Physics.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
WAVE OPTICS **Reflection, Refraction, and Interference:** Wave front and Huygens's principle - Reflection, total internal reflection and refraction of plane wave at a plane surface using wavefronts, optical fiber basics, interference, Young's double slit experiment (interference) and expression for fringe width, phase difference and path difference between waves, constructive & destructive interference, geometrical path & optical path, phase difference due to reflection at boundaries of optical interfaces, thin film, interference due to thin film of uniform thickness, conditions of maxima and minima, interference at wedge shaped film (without derivation), anti-reflection coating as an application of interference, Newton's rings, ultrasonic interferometer. **Diffraction:** Introduction of diffraction, differences between interference and diffraction of light, types of diffraction, condition of maxima and minima, resultant intensity distribution pattern, diffraction grating, double slit experiment	**CLO 1**	**9**
UNIT II		
SOLID STATE PHYSICS **Crystal Structure Theory:** Crystalline and amorphous materials, Space lattice, Unit cell and translation vectors, Simple crystal structures: SC, FCC, BCC, NaCl, CsCl, Miller indices, single crystal basics, X-ray diffraction and Bragg's diffraction law, free electron theory and it's failure, band theory of solids: origin of energy band formation in solids, classification of materials into conductors, semiconductors and insulators, effective mass of electron, brief about neutron diffraction. **Semiconductor Physics:** Intrinsic and extrinsic semiconductors, carrier concentration, Fermi level in intrinsic and extrinsic semiconductors, barrier potential and depletion layer, P-N Junction diode, forward and reverse bias and its characteristics, solar cell and its I-V characteristics, Hall effect and its application.	**CLO 2**	**9**
UNIT III		
LASER AND MOLECULAR SPECTROSCOPY **Lasers:** Coherent source, monochromaticity, interaction of light with matter- absorption, spontaneous emission, stimulated emission, population inversion, Einstein's coefficients, characteristics of laser, types of lasers, applications of laser-industrial, defense and medical; introduction to holography. **Molecular Spectroscopy:** types of molecular spectra and molecular energy states, rotational and vibrational spectra, IR spectroscopy, FTIR, Raman spectroscopy, fluorescence, phosphorescence.	**CLO 3**	**9**
UNIT IV		
MAGNETISM AND SUPERCONDUCTIVITY **Magnetism**: Origin of magnetization, orbital and spin magnetic moment, classification of magnetic materials, magnetic transitions- Curie and Neel temperature, hysteresis curve, magnetoresistance, magnetic susceptibility, magnetocaloric effect, adiabatic demagnetization. **Superconductivity:** Temperature variation of resistivity, Meissner effect, type I and II superconductor, BCS theory, applications of superconductors, high temperature superconductors (introductory), difference between conventional and high temperature superconductors	**CLO 4**	**9**
UNIT V		
NANNOSCIENCE AND NANOTECHNOLOGY Origin of nanoscience and nanotechnology, nano scale, surface to volume ratio, physical, chemical, and optical properties of nano materials dimensional classification of nanomaterials, quantum well, quantum wire, quantum dot, bottom-up fabrication: sol-gel	**CLO 5**	**9**

process, chemical vapor deposition; top-down fabrication: ball milling, nanolithography; carbon allotropes: diamond, graphene, and fullerene (description and their properties), characterization (SEM, EDAX), applications of nanomaterials in various sectors - medical, energy, automobile, space, defense.		
Total Hours		**45**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: I-V characteristics of solar cell	Week 1	1.1 To study IV characteristics of Solar Cell and determine fill factor	CLO 1	2
		Week 2	1.2 Calculations and graphs – I-V characteristics and Fill factor of solar cell		2
2.	Practical 2: Energy gap of semiconductor	Week 3	2.1 To determine band gap of given semiconductor – performance of experiment	CLO 2	2
		Week 4	2.2 Graphs and calculations of energy gap of given unknown semiconductor and identify the given semiconductor material		2
3	Practical 3: Laser based experiment (Grating element)	Week 5	Determination of number of lines on grating surface	CLO 3	2
4	Practical 4: Ultrasonic interferometer	Week 6	4.1 Determination of velocity of ultrasonic waves in given liquid	CLO 1	2
		Week 7	4.2 and calculations of compressibility of given liquid		2
5	Practical 5: Hall effect	Week 8	5.1 To determine Hall coefficient	CLO 2	2
		Week 9	5.2 And it's charge carrier density calculations		2
6	Practical 6: Diffraction grating	Week 10	6.1 To determine unknown wavelength by using plane diffraction grating	CLO 1	2
		Week 11	6.2 Calculations: experimental wavelengths and their deviation (%) from std. ones		2
7	Practical 7: Newton's rings	Week 12	7.1 determination of wavelength of	CLO 1	2

			monochromatic light		
		Week 12	7.2 determine the radius of curvature of Plano-convex lens		2
8	Practical 8: Magnetic susceptibility	Week 13	8.1 Understand the solution preparation technique and apparatus	CLO 4	2
		Week 14	8.2 Find Magnetic susceptibility of given material/solution		2
	Total			**Total hours:**	**30**

Learning resources

Text Books/Reference Books:

Text Reading:

1. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd.
2. Engineering Physics, R.K. Gaur, S. L Gupta, Eighth revised edition 2012, Dhanpatrai.
3. Nanotechnology -Principles & Practices, Sulabha K. Kulkarni, Third edition Capital Publishing Company.

References:

1. Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd.
2. Concept of modern physics - Arthur Beiser, McGraw Hill Publication.
3. Basic Atomic and Molecular Spectroscopy, J.M. Hollas, Royal Society of Chemistry
4. Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P) Ltd. Publishers.
5. Fundamentals of Physics- Resnick & Halliday, John Wiley & sons.
6. An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P. S. Hemne, Revised edition 2017- S. Chand & Company Pvt. Ltd.
7. Introduction to Electrodynamics - Davis J. Griffiths, Pearson Publication.
8. Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.
9. Solid State Physics - R. K. Puri and V. K. Babbar, S. Chand publication.
10. Basic Electronics: Solid State, B. L. Theraja, S. Chand & Company Ltd., New Delhi
11. Nano: The Essentials -T. Pradeep, First edition 2007, McGraw Hill Education.

Online Resources/E-Learning Resources

1. Bayda S, Adeel M, Tuccinardi T, Cordani M, Rizzolio F. The History of Nanoscience and Nanotechnology: From Chemical-Physical Applications to Nanomedicine. Molecules. 2019 Dec 27;25(1):112. doi: 10.3390/molecules25010112. PMID: 31892180; PMCID: PMC6982820.
2. Nanotechnology: A Maker's Course
    a. https://www.coursera.org/learn/nanotechnology/home/welcome
3. X-Ray Diffraction simulators
    a. http://kantor.50webs.com/diffraction.htm

COURSE CURRICULUM

Name of the Program:	B. Tech. FY			**Semester : 1/2**		**Level: UG**	
Course Name	Engineering Chemistry			**Course Code/Course Type**		**UBTFY104 I/II / BSC**	
Course Pattern	**2024**			**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
3	1	-	4	5	40	60	-
Pre-Requisite: Electrochemical series, Structure of water, Volumetric analysis, Classification and properties of polymers, Corrosion and its effects, Electromagnetic radiations.							
Course Objectives (CO):	The objectives of Engineering Chemistry are: 1. To introduce instrumental methods for rapid and precise qualitative and quantitative analysis. 2. To understand technology involved in analysis and improving quality of water as commodity 3. To understand structure, properties and applications of specialty polymers and nano- material and to study renewable and sustainable fuels with respect to their properties and applications 4. To understand the corrosion mechanism and its prevention 5. To understand and interpret UV and IR spectroscopic techniques.						
Course Learning Outcomes (CLO):	Students would be able to: 1. Select appropriate electro-chemical technique and method for chemical analysis 2. Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity 3. Identify advanced materials and select appropriate bio-fuel for engineering applications. 4. Apply the knowledge of different methods for preventing corrosion 5. Interpret the UV and IR spectrum for material characterization.						

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Electrochemical methods of Analysis: a) Electrochemistry: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes b) Basic principles, instrumentation and applications of :- i) Conductometry: introduction, titrations of strong acid versus strong base, strong acid versus weak base and weak acid versus strong base. ii) pHmetry: theory of buffers and preparation, standardization of pH-meter, titration of weak acid versus strong base, simple and differential plots. c) Battery technology: introduction and types of batteries, construction, working and applications of Lithium ion battery, charging and discharging reactions at respective electrodes.	**CLO 1**	**9**
UNIT II		
Water Technology Impurities in water, hardness of water: Types, Units and Numericals. Determination of hardness (by EDTA method) and alkalinity, numericals. Effects of hard water in boiler - priming and foaming, boiler corrosion, caustic embrittlement, scale and sludge formation. Water treatment: i) Zeolite method and numerical ii) Demineralization method. Purification of water: Reverse osmosis and Electrodialysis.	**CLO 2**	**9**
UNIT III		
Engineering Materials and Bio-fuel a) Polymers : Definition, classification of polymers on the basis of thermal behavior, properties of polymers: degree of polymerization, crystallinity, Tg & Tm and factors affecting on Tg, reaction mechanism of free radical and condensation polymerization. Advanced polymeric materials: Structure, properties and applications of conducting polymers -Polyacetylene, electroluminescent polymer - PPV, biopolymers polymers – Lignin base bioplastics, AI software using DOE for process optimization of lignin based polymer, polymer composite -fibre reinforced polymer. b) Nanomaterials: Definition, types of nanomaterials and properties of nanomaterials, structure, synthesis, properties and applications of CNTs, Graphene, Quantum dots. c) Biofuel- Liquid fuels: Bioethanol, Gaseous fuels: Hydrogen gas as a future fuel, H2-O2 fuel cell.	**CLO 3**	**9**
UNIT IV		
Corrosion and Corrosion control a) Corrosion: introduction, types of corrosion, mechanism of atmospheric corrosion and wet corrosion. Electrochemical and galvanic series. Factors affecting corrosion: nature of metal and environmental factors. Different types of corrosion: Pitting corrosion, concentration cell corrosion, stress corrosion and soil corrosion. b) Corrosion control: methods of prevention of corrosion - cathodic and anodic protection, metallic coatings and its types - anodic and cathodic coatings. Method to apply metallic coatings -electroplating and its applications cementation. Non- metallic coating - powder coating.	**CLO 4**	**9**

UNIT V		
Spectroscopic techniques Ultra Violet and IR spectroscopy, nature of electromagnetic radiation and its characteristics. a) UV Spectroscopy: Principle and Instrumentation, types of electronic transitions. Beer's & Lambert's law, their derivations and applications, Terms used in UV spectroscopy chromophore, auxochrome, bathochromic shift (red shift), hypochromic shift (blue shift), hyper chromic and hypochromic effect. b) IR spectroscopy: principle and Instrumentation of IR spectrophotometer, Hooks law, types of vibrations (stretching and bending). Different regions of IR radiation such as fundamental group region, finger print region and aromatic region. Applications of IR spectroscopy.	**CLO 5**	**9**
Total Hours		**45**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number/ Turn	Details	CLO	Hours
1	To determine strength of strong acid using pH metry	Week 1	To understand the pH-metry is an electro-analytical technique to study pH metric titration.	CLO1	2
2	Titration of a mixture of weak acid and strong acid with strong base using conductometer	Week 2	To determine the conductance of solution and plot graph between conductance and volume of NaOH	CLO1	2
3	To determine hardness of water by EDTA method	Week 3	3.1 Standardization of EDTA solution	CLO2	2
	To determine hardness of water by EDTA method	Week 4	3.2Determination of total hardness in water	CLO 2	2
4	To determine alkalinity of water	Week 5	4.1 Titration of alkaline water with acid	CLO2	2
	To determine alkalinity of water	Week 6	4.2 Calculations to find out amount of each type of alkalinity	CLO 2	2
5	Extraction of lignin containing hemicelluloses from lignocellulosic biomass waste.	Week 7	Handling the extraction apparatus	CLO3	2
6	Interpretation of TGA Graph	Week 8	Determine the thermal stability of polymers	CLO3	2
7	To use DOE software for the process optimization of bio-ethanol production	Week 9	7.1 Explanation about DOE software	CLO3	2
	To use DOE software for the process optimization of bio-ethanol production	Week 10	7.2 Using DOE software for the optimization of bio-ethanol production	CLO3	2
8	To coat copper on iron plate	Week 11	8.1 Explanation of	CLO4	2

	using electroplating		electroplating		
	To coat copper on iron plate using electroplating	Week 12	8.2 Coating of copper on iron plate	CLO4	2
9	Identification of functional group by using IR spectrum	Week 13	Interpretation of IR spectrum	CLO5	2
10	To determine the concentration of unknown sample in a given sample using UV spectrophotometrically	Week 14	10.1 Explanation of Beers law and Lambert's Law	CLO5	2
	To determine the concentration of unknown sample in a given sample using UV spectrophotometrically	Week 15	10.2 Determination concentration of unknown sample using UV spectrophotometrically	CLO5	2
	Total Hours				**30**

Learning resources

Textbooks:

1. Engineering Chemistry by S.S. Dara, S.Chand Publications (2010).
2. Engineering Chemistry by B.S. Chauhan, UnivSc Press.(2015).
3. A Text Book of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (2015).
4. Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Co.(2016).

Reference Books:

1. Instrumental Methods of Analysis by H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, 6 th Edition, CBS Publisher.
2. Organic Spectroscopy by William Kemp, 3 rd edition, , John Wiley and Sons, Palgrave publication.
3. Polymer Science by V. R. Gowariker, New Age International Publication (2015).
4. Nanotechnology by T. Gregory, Springer Verlog New York (1999).
5. Engineering Chemistry by Wiley India Pvt. Ltd,First edition 2011.

Online Resources/E-Learning Resources

1. https://www.scribd.com/document/358797688/40902-Engineering-Chemistry

3. https://mayfile.online/download/4810587-engineering-chemistry-notes-pune-university

4. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://kshatriyacollegeofengineeringarmur.yolasite.com/resources/Engg_Chemistry.pdf

6. https://www.statease.com/

COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 1/2**		**Level: UG**	
Course Name		**Basic Electronics Engineering**		**Course Code/ Course Type**		**UBTFY105I/II/ESC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/ Oral**
3	1	--	4	5	40	60	-
Pre-Requisite:							
Course Objectives (CO):		The objectives of Basic Electronics Engineering are: 1. To give knowledge of some basic electronic components and circuits. 2. To introduce basics of diodes, transistor circuits. 3. To understand working of some IC based circuits. 4. To expose the students to working of some transducers and sensors. 5. To get acquaint the students with the logic gates and various devices used to implement logical operations on variables.					
Course Learning Outcomes (CLO):		Students would be able to: 1. Describe the operation of diode and their role in simple electronic applications. 2. Understand the operation of BJT, and MOSFET and compare it. 3. Use of Operational Amplifier for various applications. 4. Study and Classify active and passive sensors. 5. Study the basic digital circuits using universal/basic gates.					

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I Introduction to Electronics		
Evolution of electronics and its impact in industry and society, active and passive components. **P-N Junction Diode:** P-N Junction diode, zener diode, light emitting diode (LED) and photo diode and their applications. Half wave rectifier, full wave and bridge rectifier with capacitor filter, block diagram of regulated power supply.	**CLO 1**	**9**
UNIT II Transistors		
Bipolar Junction Transistor : Construction, type, operation, input/output characteristics, regions of operation, , comparisons of CB, CE, CC configurations and CE amplifier, FET, MOSFET Types, Operation, V-I characteristics, regions of operation.	**CLO 2**	**9**
UNIT III Operational Amplifier (OPAMP)		
Functional block diagram of operational amplifier, ideal operational amplifier and its parameter, Op-amp as an inverting and non- inverting amplifier, adder and subtractor, comparator, integrator, differentiator.	**CLO 3**	**9**
UNIT IV Sensors		
Classification of a sensors, active /passive Sensors, analog/digital Sensors, motion sensors (LVDT, Accelerometer), temperature sensors (Thermocouple, Thermistor, RTD), semiconductor Sensors(Gas Sensors), optical sensors (LDR), Strain Gauge, load cell (Pressure sensors), biosensors (Working Principle and one application).	**CLO 4**	**9**
UNIT V Number System and Logic Gates		
Number System: Binary, Octal, Decimal, Hexadecimal and their conversion. Binary addition, subtraction using ones' complement, 2's Complement, De-Morgan's theorem. Basic Gates (AND, OR, NOT, XOR, XNOR), universal gates (NAND, NOR), half adder, full adder. Introduction to microprocessor (8085) and microcontroller (8051) (Only block diagram and explanation).	**CLO 5**	**9**
Total Hrs.		**45**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Electronic Components	Week 1	Study of Active and Passive components a) Resistors, Calculation of resistor value using color code. b) Capacitors. c) Inductors, Calculation of inductor value using color code. d) Devices such Diode, BJT, MOSFETs Switches & Relays.	CLO1	4

2	Measurements using various measuring equipment's	Week 2	a) Measure voltage, current and resistance using digital multimeter. Also use multimeter to checkdiode, BJT. b) Study of function generator and DSO, Observation of different waveforms.	CLO1	4
3	V-I characteristics	Week 3	a) P-N Junction diode. b) Zener diode	CLO1	2
4.	Rectifier circuits	Week 4	a) Implement half wave, full wave and bridge rectifier using diodes. b) Observe the effect of capacitor filter on rectifier output.	CLO1	2
5	Characteristics of BJT/FET	Week 5	a) To plot Characteristics of BJT. b) To plot Characteristic of FET.	CLO2	4
6	Linear applications of Op-amp	Week 6	Study of inverting and non-inverting amplifier using op-amp.	CLO3	2
7	Test and verify the truth tables	Week 7	a) Basic and Universal Gates. b) Half / Full Adder.	CLO5	4
8	Study of Sensors	Week 8	Study of different types of Sensors	CLO4	2
9	Build and test any circuit	Week 9	Build and test any circuit using BJT/MOSFET/Op-Amp/Logic Gates using any one sensor.	CLO 1,2,3,4,5	4
10	Case Study	Week 10	Case Study of any one electronics appliance with block diagram, specification etc.	CLO 1,2,3,4,5	2
	Total				**30**

Learning resources

Textbooks:

1. Jacob Millman, Christas C. Halkias, "Integrated Electronics", McGraw Hill.
2. Robert Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", McGraw Hill education (India) Private Limited, 2014.
3. A. K. Sawhney , " Electrical and Electronics Measurements and Instrumentation", Dhanpat rai and co.
4. R.P. Jain ,"Modern Digital Electronics", Tata McGraw Hill, 4th Edition.
5. Ramakant Gaikwad, "Op-Amps and Linear Integrated Circuits", Pearson, 4th Edition.

Reference Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
2. A.J.Bouwens ,"Digital Instrumentation", McGraw Hill Education (India) Private Limited, 2017
3. D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education (India) Private Limited, 2014.
4. Thomas. L. Floyd,"Digital Fundamentals" , Pearson ,11th Edition.
5. S. Soloman, "Sensors Handbook", 2nd Edition.

6. H.S.Kalsi, "Electronic Instrumentation and Measurements", McGraw Hill Education (India) Private Limited, 2019.

Online Resources/E-Learning Resources

1. https://be-iitkgp.vlabs.ac.in/List%20of%20experiments.html.
2. https://www.youtube.com/watch?v=3hiQYy8f2Lw&ab_channel=LearnWithUs
3. https://nptel.ac.in/courses/1221060252.
4. https://www.youtube.com/watch?v=vGlBlsTwCfA&list=PLwymdQ84KI-5DwDzqO_4hWsB2Jc4_eBy&index=5&ab_channel=SimplifiedEEEStudies
5. https://www.youtube.com/watch?v=SUusup7FfJo&ab_channel=IITKharagpurJuly2018

COURSE CURRICULUM

Name of the Program:		**B. Tech F Y**		**Semester : 1/2**		**Level: UG**	
Course Name		**Basic Electrical Engineering**		**Course Code/Course Type**		**UBTFY106I/II/ESC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
3	1	-	4	5	40	60	-
Pre-Requisite: XII th Science and Technical Course							
Course Objectives (CO):		The objectives of **Basic Electrical Engineering** are: 1. To introduce fundamental concepts, various laws-principles. 2. To understand theorems associated with electrical systems. 3. To understand the basic concepts of single-phase and three-phase AC circuits. 4. To impart the basic knowledge of the Electric and Magnetic circuits. 5. To provide knowledge of the concepts of transformer.					
Course Learning Outcomes (CLO):		Students would be able to: 1. Apply Kirchhoff's laws and star delta Techniques to analyze the D C Circuits. 2. Apply and analyze different network theorems for D C Circuit. 3. Differentiate between electrical and magnetic circuits and derive mathematical relations between self, mutual inductance. 4. Apply and derive the expressions for current, voltage and power in A C circuit. 5. Understand phase and line quantities in a poly phase network and the working principle of single-phase transformer.					

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Fundamentals of DC Circuits: Basic Elements, Active and Passive, Linear Non-linear, Unilateral, Bilateral Elements, Resistance, Resistivity, Ohms Law, Temperature co-efficient of resistance, Series and Parallel Connections of Resistance, Star-Delta Transformation, Kirchhoff's Laws, Node Analysis.	**CLO 1**	**09**
UNIT II		
D C Theorems: Source Transformation, Superposition Theorem, Thevenin's and Norton's Theorems, Maximum Power Transfer Theorem.	**CLO 2**	**09**
UNIT III		
Magnetic Circuits: Concepts of Lines of Force, Flux, Flux Density, Permeability, Magnetic Field, Field Strength, Reluctance, Magnetic Field by Straight Conductor and Solenoid, Magnetic circuit, Analogy between Electric and Magnetic Circuit, Series Magnetic Circuit. Faraday's Laws of Electromagnetic Induction, Lenz's Law, Self & Mutual Inductance, Derivation for coefficient of coupling.	**CLO 3**	**09**
UNIT IV		
AC Fundamentals: Generation of AC Supply, Instantaneous value, Average value, Peak values, Effective value, Root Mean Square Values of AC Quantities, Frequency, Time Period, Peak factor, Form factor. Phasor representation, Concept of Lagging, Leading and in phase quantities, polar & Rectangular forms. AC Circuit Analysis Using Resistance, Inductance, Capacitance. Series RL, Series RC, Series RLC, Impedance Triangle and Power Triangle.	**CLO 4**	**09**
UNIT V		
Poly-phase AC& Transformer: Generation of Three phase AC Supply, Phase Sequence, Balanced and Unbalanced Loads, Star and Delta Connections of Three Phase AC Circuit, Phasor Diagram, Relation between phase and Line Quantities. **Single Phase Transformer:**-Construction, Working Principle, Types, EMF Equation, Losses, Efficiency, Regulation of Transformer	**CLO 5**	**09**
Total Hours:		**45**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number	Details	CLO	Hours
1	Practical 1: To study measuring instruments and safety precautions while working on electrical systems.	Week 1	Study different types of multimeter, ammeter, Voltmeter	CLO1	2
1	Practical 1: To study measuring instruments and safety precautions while working on electrical	Week 2	Study different types of multimeter, ammeter, Voltmeter	CLO1	2

	systems.				
2	Practical 2: To study and verify Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL).	Week 3	Verify Kirchhoff's laws	CLO1	2
3	Practical 3: To study the V-I characteristics of using resistive load.	Week 4	Find temperature coefficient of Resistance	CLO2	2
4	Practical 4: To study and verify Thevenin's and Norton's theorem	Week 5	Find Thevenin's Voltage, Norton Current	CLO2	2
4	Practical 4: To study and verify Thevenin's and Norton's theorem	Week 6	Find Thevenin's Voltage, Norton Current	CLO2	2
5	Practical 5: To study and verify the Superposition theorem.	Week 7	Find total Current by using each acting separately.	CLO2	2
6	Practical 6: To study and verify the Maximum Power Transfer theorem.	Week 8	Find the maximum power by using condition $Rs=R_l$	CLO2	2
7	Practical 7: To study series RL and series RC circuit	Week 9	Find the Value of RL and RC	CLO3	2
8	Practical 8: To study the R-L-C series circuits	Week 10	Find the value of I, X_L,Xc,power factor	CLO3	2
9	Practical 9: To study Star & Delta connection in a 3-Phase AC circuit	Week 11	Find the three phase power	CLO4	2
10	Practical 10: To find Efficiency and regulation of single phase transformer using direct loading	Week 12	Calculate efficiency and regulation	CLO4	2
10	Practical 10: To find Efficiency and regulation of single phase transformer using direct loading	Week 13	Calculate efficiency and regulation	CLO4	2
11	Practical 11: To study electrical protecting devices: MCB, MCCB, ELCB, Earthing	Week 14	Study different types of Earthing	CLO5	2
12	Practical 12: To study LT 1 residential electricity bill.	Week 15	Study the Electricity bill and different component on that bill	CLO5	2
Total Hours:-					**30**

Learning Resources

Textbooks:

1. Basic Electrical Engineering by Fitzerald and Higginbotham, TMH.
2. Fundamentals of Electric Circuits by Matthew N. O. Sadiku, McGraw-Hill.
3. Electrical Engineering Fundamentals by Vincent Del Toro,Pearson.
4. Basic Electrical Engineering by D.C.Kulshreshtha,TMH
5. Fundamental of Electrical Engineering by Ashfaq Husain, DhanpatRai and Co.
6. Electrical Technology Volume-II by B.L.Theraja, S Chand

Reference Books:

1. Dash. S. S, Subramani. C, Vijaya Kumar. K; "Basic Electrical Engineering", First edition, Vijay Nicole Imprints Pvt. Ltd, 2013.
2. S. Ghosh, "Fundamentals of Electrical & Electronics Engineering", Second edition, PHI Learning, 2007.
3. MethA V.K, RohitMetha, "Basic Electrical Engineering", Fifth edition, Chand. S &Co, 2012.
4. Bhattacharya.S.K,"BasicElectrical and ElectronicsEngineering",First edition, Pearson Education, 2011.

Online Resources/E-Learning Resources

1. https://www.electrical4u.com/
2. https://www.allaboutcircuits.com/
3. https://www.vlab.co.in/broad-area-electrical-engineering
4. https://onlinecourses.nptel.ac.in/noc20_ee68/preview
5. https://www.tutorialspoint.com/articles/category/electrical-engineering

COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 1 / 2**		**Level: UG**	
Course Name		**Engineering Graphics and Design**		**Course Code/ Course Type**		**UBTFY107I/II/ESC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
2	1	-	3	4	40	60	-

Pre-Requisite: Basics of Mathematics (Geometry)

Course Objectives (CO):	The objectives of Engineering Graphics and Design are: 1. To understand basics of engineering objects & its simple geometries. 2. To visualize the concept of projection for different condition of the object. 3. To realize concepts behind development of lateral surfaces of geometrical solids. 4. To understand reading skills of three dimensional objet to draw orthographic view. 5. To get familiar with visualization skills to draw an isometric view.
Course Learning Outcomes (CLO):	Students would be able to: 1. Understand the imagination & basic principle of representation using line and point. 2. Analyze the fundamentals of projection of plane. 3. Imagine the solid object and its development. 4. Acquire fundamental understanding of orthographic views. 5. Imagine & draw the isometric view from two dimensional views.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
FUNDAMENTALS & PROJECTION OF LINES **Part A: Fundamentals of Engineering Drawing:** Introduction to Drawing Instruments, Layout and sizes of drawing sheets, Different types of lines used in drawing practice, Dimensioning-General rules for dimensioning, Dimensioning–linear, angular etc. Quadrant and its positions, First and Third angle of projection method. **Part B: Projections of Points and Lines:** Introduction, Projection of Point, Projection of line, Line Parallel to HP & VP. Line parallel to HP & perpendicular to VP. Line perpendicular to one plane and parallel to other plane, Parallel to one plane and inclined to the other plane, Line inclined to both planes. (First angle method of projections only).	**CLO 1**	**06**
UNIT II		
PROJECTION OF PLANES Introduction, Types of planes, Projection of planes, Perpendicular to one plane and parallel to other plane, Parallel to one plane and inclined to the other plane, Inclined to both planes Projection of Planes (Triangle, Quadrilateral, Pentagon, Hexagon and Circle) (First angle method of projections only).	**CLO 2**	**06**
UNIT III		
SECTION OF SOLIDS & DEVELOPMENT OF SURFACES Introduction, Types of solid, Projections of solids in simple position, Projections of prism, pyramid, cone and cylinder in simple position. Section of above solids in simple vertical position (axis perpendicular to HP alone) by planes inclined to HP and Perpendicular to VP (AIP), Development of retained portion of solids.	**CLO 3**	**06**
UNIT IV		
ORTHOGRAPHIC VIEWS Orthographic projections of given pictorial view by First Angle Method of projections. Sectional orthographic views (Full section only).	**CLO 4**	**06**
UNIT V		
ISOMETRIC VIEWS Isometric axes, scale, difference between isometric projection and isometric view, Isometric Views of Simple solids and Objects, Dimensioning – Only Length, Width & Height.	**CLO 5**	**06**
Total Hours		**30**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1.	Practical 1: Sheet No.1 -	Week 1	Projection of Lines	CLO1	2
2.	Practical 2: Sheet No.2 -	Week 2, Week 3	Projection of Planes	CLO2	4
3.	Practical 3: Sheet No.3 -	Week 4, Week 5	Development of Solids	CLO3	4
4.	Practical 4: Sheet No.4-	Week6, Week 7	Orthographic Projections	CLO 4	4
5.	Practical 5: Sheet No.5 -	Week8, Week 9	Isometric Projections	CLO 5	4
6.	Practical 6: Drafting using computer software	Week10, Week 11	Drawing of objects of line/planes/Development using any Drafting Software e.g. AutoCAD.	CLO 1,2	4
7.	Practical 7: Drafting using computer software	Week 12, Week 13	Drawing of objects of Orthographic View using any Drafting Software.	CLO4	4
8.	Practical 8: Drafting using computer software	Week 14 Week 15	Drawing of objects of Isometric View using any Drafting Software.	CLO 5	4
Total Hours					**30**

Learning resources

Textbooks:

1. "Elementary Engineering Drawing" by Bhatt, N.D., Charotar publishing Co.
2. A text book of Engineering Drawing by R.K. Dhawan, S.Chand & Company Ltd., New Delhi.
3. A text book of Engineering Drawing by P. S. Gill, S. K. Kataria & sons, Delhi

Reference Books:

1. "Basic Drawing for Engineering Technolog y" by Randolph
2. "A Practical Guide to Engineering Drawing" by M A R Siddiqui
3. "Engineering Drawing" by Basant Agrawal and C M Agrawal

Online Resources/E-Learning Resources

1. https://www.udemy.com/course/engineering-drawing-graphics/
2. https://archive.nptel.ac.in/courses/112/102/112102304/

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COURSE CURRICULUM

Name of the Program:	**CSE**				**Semester : 1/2**	**Level: UG**	
Course Name	**IT Workshop**				**Course Code/Course Type**	**UBTFY110I/II/VSEC**	
Course Pattern	**2024**				**Version**	1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
-	1	-	1	2	50	-	-
Pre-Requisite: Basic knowledge of Computer							

Course Objectives (CO):	**The objectives of It workshop are:** 1. To impart knowledge of various hardware components of a computer. 2. To introduce Multimedia, Antivirus tools and Office Tools such as Word processors, spread sheets, Presentation and Latex tools. 3. To teach the usage of networking trouble shooting commands for productivity and self-paced life-long learning.
Course Learning Outcomes (CLO):	**Students would be able to:** 1. Understand various Hardware components of a system and inter dependencies. 2. Document/ Presentation preparation. 3. Perform calculations using spreadsheets. 4. Understand the usage of networking 5. Utilize AI tools

Practical Plan

Assignment/ Practical/Activity Number	Assignment/ Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: PC Hardware	Week 1 / Week 2	Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral.	CLO1	4
2	Practical 2: Software Installation	Week 3	Installation of system like Linux or MS windows on the personal computer.	CLO1	2
3	Practical 3: WORD	Week 4	Create a Identity Card of your own which contains your own details by using different font styles, font colors, alignments and page size as follows : Page width="2.2" Page height="3.2"	CLO2	2
4	Practical 4: WORD	Week 5	Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.	CLO2	2
5	Practical 5: LaTeX	Week 6/ Week 7	Using LaTeX to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in La TeX.	CLO2	4
6	Practical 6: EXCEL	Week 8 / Week 9	Create a marks sheet for 10 students using EXCEL. Use sum, average, if, countif functions, chart, Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting	CLO3	4
7	Practical 7: EXCEL	Week10	Create a basic VLOOKUP function to link two Spreadsheets.	CLO3	2
8	Practical 8: Power point	Week11 / Week12	Create a presentation to build relationships, think creatively and market your product using the following tools: Inserting Text, Formatting Text, Bullets and Numbering, AutoShapes, Lines and Arrows Hyperlinks, Inserting Images, Slide Layout ,fill	CLO2	4

			color ,Inserting object, picture(effects), graph, word art, comments, Security -password, Tables and Borders, Rehearse timings, Recording Narrations, Audio and video files, inserting files, merging files, creating custom shows.		
9	Practical 9: Internet/ Network	Week 13/ Week 14	a. Introduction to basic networking commands: IPConfig, IPConfig / ALL, PING, NSLOOKUP, TRACERT, etc. b. Using CISCO Packet TRACER/ BOSON NEXIM create network topology for computer lab.	CLO4	4
10	Practical 10: AI TOOLS – Chat GPT	Week 15	**Creative Writing**: Use the model as a writing assistant. a. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. **Ex**: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality." b. To write a technical blog take help of the model by providing the content.	CLO5	2
Total Hours					**30**

Learning resources

Text Books:

1. Computer Fundamentals, Anita Goel, Pearson Education, 2017
2. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
3. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition

Reference Book:

1. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr.N.B.Vekateswarlu, S.Chand
2. LaTeX Companion, Leslie Lamport, PHI/Pearson.
3. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

Online Resources/E-Learning Resources

1. https://excel-practice-online.com/
2. https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes

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COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 1/2**		**Level: UG**	
Course Name		**Web Programming**		**Course Code/ Course Type**		**UBTFY113I/II/ESC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/ Oral**
2	1	-	3	4	40	60	-
Pre-Requisite: 1. Foundation of Programming Languages 2. C/Basics of C++							
Course Objectives (CO):				**The objectives of Web Programming are**: 1. To familiarize students with Web Programming basic concepts. 2. To learn and understand Web scripting languages. 3. To explore the Front end& Back-end web programming skills. 4. To understand and learn Mobile web development. 5. To understand and learn Web application deployment.			
Course Learning Outcomes (CLO):				**Students would be able to:** 1. Create well-structured web pages using HTML. 2. Demonstrate the ability to style web pages using CSS. 3. Style web pages using Bootstrap & W3C. 4. Understand basics of JavaScript programming. 5. Gain familiarity with essential web development tools.			

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
INTRODUCTION TO WEB DEVELOPMENT: Introduction to web browsers and Web servers. Basics of HTTP and HTTPS protocols. **Introduction to HTML**: Getting started with HTML, Why HTML, Tags and Elements, Attributes, Properties, Headings list, Links, Tables, Images, HTML Form, Media (Audio, Video), Semantic HTML5 Elements.	**CLO 1**	**6**
UNIT II		
CSS FUNDAMENTALS: Why CSS, Types of CSS, How to use CSS, Properties, Classes, Child-Class (Nested CSS), Colors, Text, Background, Border, Margin, Padding, Positioning (flex, grid, inline, block), Animation, Transition.	**CLO 2**	**6**
UNIT III		
BOOTSTARP FUNDAMENTALS: Why Bootstrap, CSS over Bootstrap, How to Use Bootstrap, Bootstrap Grid System, Bootstrap Responsive, Bootstrap Classes, Bootstrap Components (i.e., Button, Table, List, etc.), Bootstrap as a Cross Platform. **W3C FUNDAMENTALS**: What is W3C, How W3C handles /Supports Web Technologies	**CLO 3**	**7**
UNIT IV		
JAVASCRIPT BASICS: Introduction to Scripting languages, Introduction to JavaScript (JS), JS Variables and Constants, JS Variable Scopes, JS Data Types, JS Functions, JS Array, JS Object, JS Events.	**CLO 4**	**5**
UNIT V		
INTRODUCTION TO WEB DEVELOPMENT TOOLS: Version control with Git and GitHub, Introduction to Code Editors ex. Visual Studio Code, Basics of Web Debugging tools.	**CLO 5**	**6**
Total Hours		**30**

Practical Plan

Assignment/Practical/Activity Number	Assignment/ Practical/ Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1:	Week 1, 2, 3	a. Create HTML document with formatting as: bold, italics, underline, colors, heading, title, font, background, paragraph etc. b. Build a personal Bio Data using HTML and CSS. • Create an HTML document with	CLO1	6

			appropriate elements such as headings, paragraphs, and lists • Use CSS to style the page, including fonts, colors, and layout • Add images or icons to enhance the visual appeal		
2.	Practical 2	Week 4, 5, 6, 7	**Styling a Photo Gallery:** **Task**: Develop a webpage with a grid layout to display a collection of images **Requirements:** • Apply CSS to style the gallery, including image borders, margins, and spacing • Implement hover effects to highlight images on mouse over. • Make the gallery responsive and ensure it looks good on both desktop and mobile devices	CLO2	8
3	Practical :3	Week 8, 9, 10, 11	**Simple Calculator Application:** **Task:** Develop a basic calculator application using Java for web **Requirements:** • Create an HTML page with input fields for numbers and buttons for operations (addition, subtraction, multiplication, division). • Use JavaScript to handle user interactions and perform calculations based on the input. • Implement error handling to prevent invalid operations (e.g., division by zero) • Display the result dynamically on the webpage	CLO3	8
4	Practical 4	Week 12, 13, 14, 15	**Temperature Conversion Tool:** **Task**: Develop a temperature conversion tool using Java for web **Requirements**: • Create an HTML form with input fields for temperature values and radio buttons to select the conversion type (e.g., Celsius to Fahrenheit, Fahrenheit to Celsius) • Use JavaScript to handle the form submission and perform the temperature	CLO 4	8

			conversion calculations. • Display the converted temperature dynamically on the webpage		
Total					**30**

Learning resources

Textbooks:

1. Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.

Reference Books:

1. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81- 265-1635-3
2. Dr.HirenJoshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93- 5004-088-1
3. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81-265- 1635-3
4. Ivan Bayross,"Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,
   BPB Publications,4th Edition,ISBN:978-8183330084.

Online Resources/E-Learning Resources:

1. https://developer.mozilla.org
2. https://www.w3schools.com
3. https://www.codecademy.com

COURSE CURRICULUM

Name of the Program:	**B. Tech FY**		**Semester : 1**		**Level: UG**	
Course Name	**Procedural Programming**		**Course Code/Course Type**		**UBTFY114 /PCC**	
Course Pattern	**2024**		**Version**		1.0	
Teaching Scheme				**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/ Oral**
2	1	--	3	4	40	60	--
Pre-Requisite: Basic knowledge of Computer							

Course Objectives (CO):	**The objectives of Procedural Programming are**: 1. To explain algorithms, flowcharts and different programming constructs of C to be used for development of applications. 2. To familiarize students with Data types and the use of Operators. 3. To illustrate the use of iterative statements and conditional Statements for solving the real-world problems. 4. To demonstrate the use of all derived data types in C. 5. To develop simple C programs and to illustrate the applications of Arrays, pointers, functions and structures.
Course Learning Outcomes (CLO):	**Students would be able to**: 1. Demonstrate knowledge on C programming constructs to develop programs. 2. Use and Apply of branching and looping statements for solving the real world problems. 3. Apply Arrays and strings to enhance reusability and data manipulation. 4. Develop C programs to solve simple engineering problems using Pointers and functions 5. Implement C programs to demonstrate the applications of structures and files.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Computing: Introduction to program, algorithm, flowcharts and pseudo codes. **Introduction to C Programming:** Features of C, basic concepts, structure of C program, Editing, compiling / interpreting / running programs, Errors, declarations, variables, data types, expressions, types of operators, precedence of operators, type conversions, scanf and printf functions.	**CLO 1**	**6**
UNIT II		
Decision Control Structures in C: if-else, nested if-else, cascaded if-else and switch statement. **Loop Controls Structures in C:** Conditional control structures: for, while, do-while. Unconditional control structures: break, continue, goto statement.	**CLO 2**	**6**
UNIT III		
Arrays: Declaration and Initialization of one-dimensional and two-dimensional Array, accessing array elements. **Character Arrays and Strings:** Declaration and Initialization of String Variables, Reading Strings from Terminal, Writing Strings to Screen, String-handling Functions.	**CLO3**	**6**
UNIT IV		
User-defined Functions: Need for user defined functions, Definition of function, function calls, function declaration, Category of functions, different types of user defined function, recursion.	**CLO4**	**6**
UNITV		
Pointers: Introduction to Pointers, Array of Pointers, Functions returning pointers, Dynamic Memory allocation. **Structures**: Introduction, Defining a structure, declaring structure variables, accessing structure members, structure initialization, array of structures.	**CLO5**	**6**
Total Hours		**30**

Practical Plan

Assignment/Practical/Activity Number	Assignment/ Practical/Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1: Different data types	Week 1/ Week 2	a. To implement flowchart for problem solving using smart draw/ E-draw. b. To write an algorithm and pseudo code for simple and complex problems.	**CLO1**	**4**
2	Practical 2:	Week 3/	a. C Program to input from user for different data	**CLO1**	**4**

	Different operators	Week 4	types available in C language. b. C Program to calculate area and perimeter of square, rectangle and triangle. Take sides input from the user.		
3	Practical 3: control statements	Week 5/ Week 6	a. C program to input basic salary of an employee and calculate gross salary according to given conditions. **Formula:** gross salary= Basic salary + Allowances i. Basic Salary <= 10000: HRA = 20%, DA = 80% ii. Basic Salary is between 10001 to 20000 : HRA = 25%, DA = 90 iii. Basic Salary >= 20001: HRA = 30%, DA = 95%. b. C program to find the sum of individual digits of a given number/ Sequencing of numbers. Ex: consider 123 as input. Sum of digits is 1+2+3 and output is 6.	**CLO2**	**4**
4	Practical 4: Concept of Arrays	Week 7/ Week 8	a. C program to accept n number of element from user (where, n is specified by user) and store data in an array and display the largest/smallest element of that array using loops. b. C Program to multiply two matrices (MxN) and print the result. Accept details of two matrices as input	**CLO3**	**4**
5	Practical 5: Concept of Strings	Week 9	a. Write a program in C to compare two strings without using string library functions. Justify whether it is palindrome or not.	**CLO3**	**2**
6	Practical 6: concept of functions	Week 10/ Week 11	a. Write a program in C to check whether a number is a prime number or not using the function. b. Write a program generate Fibonacci series with and without using recursive function.	**CLO4**	**4**
7	Practical 7: concept of Pointers	Week 12/ Week 13	a. Write a program in C to store n elements in an array and print the elements using a pointer. b. Write a C program to find sum of n elements in an array entered by user. To perform this program, allocate memory dynamically using malloc( )/ calloc( ) function.	**CLO5**	**4**
8	Practical 8: concept of Structures	Week 14/ Week 15	A class teacher wants to keep record of 10 students in the class along with the names and marks obtained in 5 subjects. Write a C program	**CLO5**	**4**

			with function that displays : a) Name of the student with highest marks in a particular subject. b) Overall percentage result of the class c) Total number of passing students in the class d) Total number of students failing in one subject e) Total number of distinctions in the class.		
Total Hours					**30**

Learning resources

Text Books:

1. Brian W Kernighan, Dennis M Ritchie, "C Programming Language", 2 nd Edition, Pearson, 1988.
2. E. Balagurusamy, "Programming in ANSI C", 8 th Edition, McGraw Hill, 2019.
3. Maureen Sprankle, "Problem Solving and Programming Concepts", 7th Edition, Prentice Hall, 1989.

Reference Book:

1. Yashavant Kanetkar, "Let Us C", 16th edition, BPB publications,2018.
2. Herbert Schildt, "C: The Complete Reference", 4th Edition, McGraw Hill,2000
3. R. G. Dromey, "How to Solve it by Computer", 1 st Edition, Prentice-Hall International, 1982.

Online Resources/E-Learning Resources:

1. https://www.w3schools.com/c/index.php
2. https://www.programiz.com/c-programming

COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 1/2**			**Level: UG**
Course Name		**Fab Workshop**		**Course Code/ Course Type**			**UBTFY112/I/II/VSEC**
Course Pattern		**2024**		**Version**			1.0
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
--	1	--	1	2	50	--	--
Pre-Requisite:							
Course Objectives (CO):		**The objectives of Fab Workshop are:** 1. To impart knowledge about practical experience in basic mechanical workshop and different methods used for manufacturing. 2. To develop the skill through demonstration and hands-on practices using different tools and its functions. 3. To study safety norms and various workshop layout. 4. To understand of various advanced technologies in manufacturing.					
Course Learning Outcomes (CLO):		**Students would be able to:** 1. Figure out appropriate tools, materials required for specific machining operations. 2. Apply techniques to perform machining operations. 3. Apply safety consciousness and show team work. 4. Get familiar with advanced machining technologies.					

Course Contents/Syllabus: Practical Plan

Assignment/ Practical/Activity Number	Assignment/ Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Introduction to mechanical workshop	Week 1,2	Introduction to various Shops / Sections and workshop layouts, Safety tools and norms to be followed in a workshop.	CLO1	4
2	Study of Machines and Various machining operations	Week 3,4,5	Study of various machining tools & operations, different types of materials & their applications. Introduction and demonstration to various Machines used in manufacturing industries. (Lathe Machine, Drilling Machine, Milling Machine).	CLO1, 2	6
3	Metal Joining Processes	Week 6,7	Introduction of tools, types of welding joint, Arc Welding, Soldering, Brazing.	CLO2	4
4	Study of measuring instruments	Week 8	Study of various measuring instrument used for measurement of machining component.	CLO2	2
5	Advancement in manufacturing and use of technologies	Week 9,10	Study of various advance technologies and machines used in manufacturing industries. 3D printing technology, Nanotechnology	CLO4	4
6	Hands on Practice	Week 11,12,13,	Demonstration and hands on practice on 3D printing technology.	CLO4	6
7	Study of dimensions and Tolerances	Week 14,15	Study of various dimensions (linear, angular, inclined), fit and tolerances.	CLO1	4
Total Hrs.					**30**

Learning resources

Text Books:

1. Hajara Choudhari, Bose S. K," Elements of Workshop Technology"" Vol I, II, Asia Publishing House.
2. Rao P. N. ,"Manufacturing Technology & Foundry, Forming & Welding", Vol I, II, Tata McGraw Hill Publishing Co. ISBN-0 07 451863 1

Reference Books:

1. Jain R.K., "Production Technology", Khanna Publishers, ISBN 81-7409-099-1.
2. Sharma P.C., "A Text Book of Production Technology- Manufacturing Processes", S. Chand & Co. ISBN 81-219-111-4-1.
3. Chapman W A J., "Workshop Technology" Vol. I, II & III, Edward Arnold Publishers. ISBN- 0 7131 3287 6
4. HMT, "Production Technology", Tata McGraw Hill Publishing Co.
5. Raghuwanshi B.S.,"A Course in Workshop Technology", Vol. I, II, Dhanpat Rai & Co.

Online resources

1. https://archive.nptel.ac.in/courses/112/107/112107219/
2. http://ecoursesonline.iasri.res.in/course/view.php?id=443

COURSE CURRICULUM

Name of the Program:		**B. Tech**		**Semester : 2**		**Level: UG**	
Course Name		**Object Oriented Programming**		**Course Code/ Course Type**		**UBTFY116/PCC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
2	1	-	3	4	40	60	-
Pre-Requisite: 1. Foundation of Programming Languages 2. C/Basics of C++							
Course Objectives (CO):		**The objectives of Object Oriented Programming are:** 1. To introduce students to the fundamental principles of object-oriented programming. 2. To understand students how to define classes and create objects. 3. To understand students how to define constructors and destructors. 4. To familiarize students with the concept of inheritance in object-oriented programming. 5. To introduce students to polymorphism and its importance in object-oriented programming.					
Course Learning Outcomes (CLO):		**Students would be able to**: 1. Students will be able to get the deeper learning in object-oriented programming. 2. Students will demonstrate the ability to use class and objects in the programming. 3. Students will demonstrate the ability to use constructors and destructors in the code. 4. Students will have a basic understanding of inheritance in the object-oriented programming. 5. Students will gain familiarity with essential polymorphism and its importance.					

Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Overview of OOP concepts, OOP Characteristics, Comparison with procedural programming, Advantages and disadvantages of OOP, Introduction to classes and objects	**CLO 1**	**6**
UNIT II		
Defining classes in CPP, declaring objects, Access specifiers (public, private, protected), Member functions and data members	**CLO 2**	**6**
UNIT III		
Constructors and Destructors: Default, parameterized, copy, Destructors: Purpose and implementation, Constructor overloading, Memory management in constructors and destructors	**CLO 3**	**6**
UNIT IV		
Inheritance: Concept of inheritance, Types of inheritance: single, multiple, multilevel, hierarchical, hybrid. Base and derived classes, Access control in inheritance, Virtual functions	**CLO 4**	**6**
UNIT V		
Polymorphism: Introduction to polymorphism, Function overloading, Operator overloading, Abstract Class. **Exceptional Handling-** try, throw and catch block. **File Handling Concepts**	**CLO 5**	**6**
Total Hours		**30**

Practical Plan

Assignment/Practical/Activity Number	Assignment/Practical/Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1:	Week 1, 2,3	a. Write a C++ program to find the sum of individual digits of a positive integer. b. Write a C++ program using class and objects to find largest and smallest of a number in the list of integers.	CLO1/ CLO2	6
2.	Practical 2	Week 4,5,6,7	a. Create a class named weather report that holds a daily weather report with	CLO2	8

			data member's day_of_month, hightemp, lowtemp, amount_rain and amount_snow. Use different types of constructors to initialize the objects. Also include a function that prompts the user and sets values for each field so that you can override the default values. Write a menu driven program in C++ with options to enter data and generate monthly report that displays average of each attribute. b. Design a class 'Complex 'with data members for real and imaginary part. Provide default and parameterized constructors. Write a program to perform arithmetic operations of two complex numbers using operator overloading. i. Addition and subtraction using friend functions ii. Multiplication and division using member functions		
3	Practical :3	Week 8,9,10,11	a. Create a class called 'TIME' that has • Three integer data members for hours, minutes and seconds • Constructor to initialize the object to zero • Constructor to initialize the object to some constant value • Member function to add two TIME objects- member function to display time in HH:MM: SS format • Write a main function to create two TIME objects, add them and display the result in HH:MM: SS format. b. Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.	CLO2	8
3	Practical :4	Week 12,13	Create a base class shape with two double type values and member functions to input the data and compute area () for calculating area of figure. Derive two	CLO3	4

			classes' triangle and rectangle. Make compute area () as a virtual function and redefine this function in the derived class to suit their requirements.		
4	Practical 5	Week 14, 15	Design a base class with name, date of birth, blood group and another base class consisting of the data members such as height and weight. Design one more base class consisting of the insurance policy number and contact address. The derived class contains the data members' telephone numbers and driving license number. Write a menu driven program to carry out the following things: i. Build a master table ii. Display iii. Insert a new entry iv. Delete entry v. Edit vi. Search for a record	CLO 4 / CLO5	4
Total Hrs.					**30**

Learning resources

Text Books:

1. Object-Oriented Programming in C by E. Balagurusamy
2. Programming with C++ by Bjarne Stroustrup

Reference Books:

1. C++ Primer by Stanley B. Lippman
2. Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides.

Online Resources/E-Learning Resources:

1. http://www.cplusplus.com/doc/tutorial/
2. https://www.w3schools.com
3. https://www.codecademy.com/catalog/language

COURSE CURRICULUM

Name of the Program:	**B. Tech FY**	**Semester : 1**	**Level: UG**
Course Name	**Applied Communication**	**Course Code/ Course Type**	UEG101 /AEC
Course Pattern	**2024**	**Version**	1.0

Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/ Oral**
2	--	--	2	2	50	--	--

Pre-Requisite: General English

Course Objectives (CO):	The objectives of **Applied Communication** are: 1. To impart basic knowledge of modern grammar. 2. To comprehend syntax of the English language 3. To familiarize with issues in modern English grammar 4. To comprehend common errors in English 5. To focus on motivating students to express themselves in correct English.
Course Learning Outcomes (CLO):	By the end of the course, students will be able to: 1. Measure a strong theoretical understanding on Modern grammar. 2. Distinguish between acceptable and inappropriate grammar and usages, 3. Produce free use of expressions in writing. 4. Practice advanced forms of writing. 5. Produce clarity and conciseness on writing.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT 1		
Basics: Parts of Speech-Nouns, Articles, Pronouns, Adjectives, Adverbs, prepositions, Conjunctions, interjections. Forms of Be, Tenses, Reported speech, and their usage	**CLO1**	**06**
UNIT 2		
Syntax: Sentence, phrase, clause structures, coordination and subordination	**CLO2**	**06**
UNIT 3		
Usage Issues in Modern English Grammar: Punctuation, verb forms, Subject-verb agreement, Pronoun-Antecedent agreement, Auxiliaries, Adjective-Adverb Confusions	**CLO3**	**06**
UNIT 4		
Common Errors in English: Dangling construction, Parallel construction, American vs. British, Errors in common expressions, Errors by Non-Native students	**CLO4**	**06**
UNIT 5		
Style and composition: Emphasis, Clarity, Concision and Consistency, Forms of writing	**CLO5**	**06**
Total Hours		**30**

Learning resources

Textbooks:

1. Green, David.. 2014. Contemporary English Grammar—Structures and Composition. Hyderabad: Macmillan
2. Narayanaswamy, K. R. 2003. Success with Grammar and Composition. Hyderabad: Orient Longman

Reference Books:

1. Bas Aarts. 2011.Oxford Modern English Grammar. Oxford University Press, Oxford.

Online Resources/E-Learning Resources

1. https://en.wikipedia.org/wiki/Modern_English
2. https://www.britannica.com/topic/English-language/Characteristics-of-Modern-English

COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 2**		**Level: UG**	
Course Name		**Advanced Communication**		**Course Code/ Course Type**		UEG102/AEC	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
2	--	--	2	2	50	--	--
Pre-Requisite: Applied communication							
Course Objectives (CO):		The objectives of Advanced Communication is to : 1. To create an ambience for students to speak English fluently and fearlessly 2. To familiarize students with different speech acts 3. To comprehend English in real life situations 4. To enhance English fluency of the students 5. To increase their potentials to succeed in their 6. Professional and personal life.					
Course Learning Outcomes (CLO):		By the end of the course, students will be able to— 1. listen to English discourses with higher comprehension capacity, 2. speak English in their life situations 3. use English for practical purpose 4. express themselves fluently in any unknown circumstances, and 5. Defend communicative competence.					

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
English Everywhere: Non- Conventional Pedagogical tools - Mobile, Television, News, Theatre, Famous Speeches, Friends etc.	**CLO1**	**06**
UNIT II		
Speech Acts: Greetings, introducing oneself, invitation, making request, expressing gratitude, complimenting and congratulating, expressing sympathy, apologizing, asking for information, seeking permission, complaining and expressing regret, idioms and phrases	**CLO2**	**06**
UNIT III		
English in real life situations: At the College office, Library, Department, Bank, Railway station, Post office, Police station, Travel agency, Interview	**CLO3**	**06**
UNIT IV		
Fluency Development: Vocabulary enhancement, Conversation skills, Role play, Commentary etc.	**CLO4**	**04**
UNIT V		
Speaking skills: Presentation skills, Public Speaking skills, GD skills, Interview skills, independent practice: Listening to BBC, CNN and paying attention to idiomatic usage of the language and different accent for speech acts that are used, Watch and appreciate English movies.	**CLO5**	**08**
Total Hours		**30**

Learning resources

Textbooks:

1. Collins, Stevens. Practical Everyday English: A Self-study Method of Spoken English for Upper Intermediate and Advanced Students. Montserrat Publishing; 5th Revised edition 2008
2. Mohan, Krishna and N.P. Singh. Speaking English Effectively. Delhi: Macmillan, 1995.

Reference Books:

1. SasiKumar. V and P.V. Dharmija. 1993. Spoken English: A Self-Learning Guide Conversation Practice. 34threprint. Tata McGraw – Hill. New Delhi.
2. Swets, Paul. W. 1983. The Art of Talking So That People Will Listen: Getting Through to Family, Friends and Business Associates. Prentice Hall Press. New York.

Online Resources/E-Learning Resources

1. https://learnenglish.britishcouncil.org/skills/speaking
2. https://learnenglish.britishcouncil.org/business-english

COURSE CURRICULUM

Name of the Program:		B .Tech FY	**Semester : 1**		**Level: UG**		
Course Name		Indian Science, Engineering & Technology	**Course Code/ Course Type**		ACIKSET101I/II/AC		
Course Pattern		**2024**	**Version**		1.0		
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
2	-	-	-	2	50	-	-
Pre-Requisite:							
Course Objectives (CO):		The objectives of Indian Science, Engineering & Technology are: 1. To familiarize learners with major sequential development in Indian science, engineering and technology To recognize 2. To familiarize with the science of ancient architecture. 3. To understand the use of different materials used for construction in ancient and new age of science. 4. To have a comprehensive study on environmental issues. 5. To study the remedial measures on environment issues.					
Course Learning Outcomes (CLO):		Students would be able to: 1. Students will be able to identify sequential development in Indian science, engineering and technology 2. Explain the science of architecture and its science. 3. Understand the use of different materials for construction. 4. Understand environmental issues. 5. Recognize the remedial measures on environment issues.					

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT :		**6**
Indian Traditional Knowledge; Science and Practices Introduction to the Science and way of doing science and research in India. Traditional agricultural practices, Traditional water-harvesting practices, Traditional Livestock and veterinary Sciences Traditional Houses, Temples & villages, Traditional Forecasting.	**CLO 1**	
UNIT II:		**6**
Indian Science in Architect Study of Vastushastra, sun diagram, Basic drawing skills, locating directions using Vedic, modern and common techniques, using instruments, compass directions, making drawings and zone plans , study of maps of houses office, factories, etc Planning: Residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors. Vastu shastra and its importance in building interrelationship with human, nature and cosmos.	**CLO 2**	
UNIT III:		**6**
Ancient Architecture as Expression of Art & Design Different type of Materials used for construction in Ancient Indian architecture. Clay products: Classification of bricks, Fire Brick, Fly Ash Bricks, Tiles, Terra-cotta, Earthenware, Porcelain, Stoneware. Stones: Uses of Stones, Qualities of Good Building Stones, Dressing, Common Building Stones of India. Glass: Different glass Forms and their Suitability, Timber: Different Forms and their Suitability Metals: Ferrous & Nonferrous Metals and Alloys, and, their Suitability, limitations, precautions Paints and Varnishes: Different types and their Suitability, limitations, precautions	**CLO 3**	
UNIT IV:		**6**
Importance of environmental studies in Engineering in the field of construction Environmental studies- Introduction- definition, scope and importance, measuring and defining environmental development indicators, Environmental and natural resources Renewable and non-renewable resources, natural resources and associated problems, forest resources, use and overexploitation, deforestation, case studies, timber extraction, mining, dams and other effects on forest and tribal people, water resources, use and over utilization of surface and ground water, floods, drought, conflicts over water, dams, benefits and problems, mineral resources, use and exploitation.	**CLO 4**	
UNIT V:		**6**
Importance of environmental studies in Engineering in the field of Agriculture Environmental effects of extracting and using mineral resources, case studies, food resources, world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer pesticide problems, water logging, salinity, case studies, energy resources, growing energy needs, renewable and non-renewable energy sources use of alternate energy sources, case studies, land resources, land as a resource, land degradation, man induced landslides, soil erosion and desertification, role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.	**CLO 5**	
Total Hours		**30**

Learning resources

Text Books:

6. Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
7. Kapur K and Singh A.K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of sankaracharya, Central chinmay mission trust, Bombay, 1995.
8. Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008

Reference Books:

1. SK Das, The education system of Ancient hindus, Gyan publication house, India Blake Alan Landscape Construction and detailing, BT Batsford Ltd London 1996
2. Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
3. Kapur K and Singh A K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of sankaracharya, Central chinmay mission trust, Bombay, 1995.
4. Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindolog Colvin Brenda Land and Landscape Trivedi P, Pratibha Beautiful Shrubs Indian Council of Agricultural Research New Delhi 1990.

Online- E Resources:

1. https://link.springer.com/article/10.1007/s40974-020-00158-2
2. https://www.cseindia.org/traditional-water-harvesting-systems-683
3. https://link.springer.com/chapter/10.1007/978-981-97-0281-7_11
4. https://www.cheggindia.com/general-knowledge/ancient-architecture-in-india/#:~:text=Ancient%20architecture%20in%20India%20is,of%20the%20Indus%20Valley%20Civilization

COURSE CURRICULUM

Name of the Program:		**B. Tech FY**		**Semester : 1/2**		**Level: UG**	
Course Name		**UHV-I: Professional Ethics**		**Course Code/ Course Type**		**ACUHV101I/II/AC**	
Course Pattern		**2024**		**Version**		1.0	
Teaching Scheme					**Assessment Scheme**		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/ Oral**
2	--	--	--	2	50	-	-
Pre-Requisite: UHV-I							

Course Objectives (CO):	The objectives of Universal Human Value- Professional Ethics are: 1. To make the students understand the importance of ethical behavior 2. To expose the students to the ethical practices to be followed in profession 3. To sensitize the students to become responsible persons who will uphold ethics in profession when they pursue their career 4. To make students understand Psychological and Philosophical approaches 5. To make students understand social responsibility and corporate Sustainability
Course Learning Outcomes (CLO):	Students would be able to: 1. Equip themselves with an understanding of moral, professional and personal values. 2. Understand the need of ethics in shaping their profession. The learners will hone their decision-making skills. 3. Refine their business ethics based on psychological and philosophical perspective. 4. Assess the need for a balance between ecology, and economy. 5. Equip themselves with a better understanding of themselves and the society they live in and the responsibilities they shoulder in creating a sustainable world.

Course Contents/ Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Individual and Professional Ethics: Introduction to Professional Ethics, Morals, Values and Ethics – Personal and Professional- Sensé of Professional Ethics – Code of Ethics by NSPE-Making decisions with ethical dimensions–definition–roadmap to ethical decision making–common standards– internal obstacles – bias – empathy	**CLO 1**	**6**
UNIT II		
Business Ethics: Philosophical approaches to Business Ethics – ethical reasoning – ethical issues in business - Social Responsibility of Business- conflict of interest– cultural relativism-Ethical Leadership-Resisting un-ethical authority and domination-Global Business Ethics	**CLO 2**	**6**
UNIT III		
Psychological Approaches: Ethical Theories-Psychological and Philosophical Approaches-Myths about Morality-conflict of interest in psychological perspective - Courage-Integrity – ethical dilemma – Emotional Intelligence (Mahabharata- Iskcon Publications)	**CLO 3**	**6**
UNIT IV		
Workplace Ethics: Ethics in changing domains of Research–academic integrity– intellectual honesty-Role of Engineers and Managers-Ethical issues in Diverse workplace – competition – free will- Confidentiality – employee rights – Intellectual property rights – discrimination	**CLO 4**	**6**
UNIT V		
Safety, Responsibilities and Rights: Ecology, and Economy-Risk benefit analysis and reducing risk SDGs–Corporate social responsibility and Corporate Sustainability - CSR in India - Sustainability Case Studies	**CLO 5**	**6**
Total Hours		**30**

Learning resources

Textbooks:

1. Subramanian. R. Professional Ethics, Oxford Publication, 2013.
2. Nagarasan. R. S. Professional Ethics and Human Values. New Age International Publications, 2006.

Reference Book:

1. Mike W Martin and Roland Schinzinger, Ethics in Engineering,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014

Online Resources/E-Learning Resources

1. https://www.nspe.org/resources/ethics/code-ethics
2. https://www.toolshero.com/tag/ethical-decision-making/
3. https://pagecentertraining.psu.edu/public-relations-ethics/introduction-to-public-relations-ethics/lesson-1/ethical-theories/
4. https://peer.asee.org/case-studies-in-engineering-ethics.pdf

COURSE CURRICULUM

Name of the Program:	FY B Tech			Semester: II		Level: UG	
Course Name	Advanced Web Programming			Course Code/ Course Type		UCEXET101/VSC	
Course Pattern	2024			Version		1.0	
Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	--	--	2	2	50	-	-

Pre-Requisite: Proficiency in a programming language, such as Python or Java	
Course Objectives (CO):	**The objectives of Advanced Web Programming are:** 1. To familiarize students with Web Programming basic concepts. 2. To learn and understand Web scripting languages. 3. To explore the front-end & back-end web programming skills. 4. To comprehend and learn Mobile web development. 5. To learn Web application deployment.
Course Learning Outcomes (CLO):	**Students would be able to:** 1. Develop a Static and Dynamic website using technologies like HTML, CSS, and Bootstrap. 2. Demonstrate the use of web scripting languages. 3. Develop web applications with Front End & Back End Technologies. 4. Develop a mobile website using JQuery Mobile. 5. Deploy web applications on the cloud using AWS.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
WEB SCRIPTING LANGUAGES: **JavaScript**: Introduction to Scripting languages, Introduction to JavaScript (JS), JS Variables and Constants, JS Variable Scopes, JS Data Types, JS Functions, JS Array, JS Object, JS Events. **Advanced JavaScript**: JSON - JSON Create, Key-Value Pair, JSON Access, JSON Array, JS Arrow Functions, JS Callback Functions, JS Promises, JS Async-Await Functions, JS Error Handling. AJAX: Why AJAX, Call HTTP Methods Using AJAX, Data Sending, Data Receiving, AJAX Error Handling.	CLO 1	06
UNIT II		
FRONT END TECHNOLOGIES **Front-End Frameworks**: What is web framework? Why Web Framework? Web Framework Types. MVC: What is MVC, MVC Architecture, MVC in Practical, MVC in Web Frameworks. **AngularVersion 10+:** Angular CLI, Angular Architecture, Angular Project Structure, Angular Lifecycle, Angular UNITs, Angular Components, Angular Data Binding, Directives and Pipes, Angular Services and Dependency Injections (DI), Angular Routers, Angular Forms.	CLO 2	06
UNIT III		
BACK-END TECHNOLOGIES: **Node.JS**: Introduction to Node.JS, Environment Setup, Node.JS Events, Node.JS Functions, Node.JS Built-in UNITs, File System, NPM, Install External UNITs, Handling Data I/O in Node.JS, Create HTTP Server, Create Socket Server, Microservices- PM2. **ExpressJS**: Introduction to ExpressJS, Configure Routes, Template Engines, ExpressJS as Middleware, Serving Static Files, REST HTTP Method APIs, Applying Basic HTTP Authentication, Implement Session Authentication.	CLO 3	06
UNIT IV		
BACK-END WITH DATABASE: **MongoDB:** NoSQL and MongoDB Basics, MongoDB-Node.JS Communication, CURD Operations using Node.JS, Mongoose ODM for Middleware, Advanced MongoDB. Big database Connectivity.	CLO 4	06
UNIT V		
MOBILE WEB DEVELOPMENT: **Mobile-First**: What is Mobile-First? What is Mobile Web? Understanding Mobile Devices and Desktop. **JQuery Mobile:** Introduction to the jQuery Mobile Framework, Set-up jQuery Mobile, Pages, Icons, Transitions, Layouts Widgets, Events, Forms, Themes, Formatting Lists, Header and Footer, CSS Classes, Data Attributes, Building a Simple Mobile Webpage	CLO 5	06
Total Hours		**30**

Learning resources

Text Books:

1. Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.

Reference Books:

1. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81- 265-1635-3
2. Dr.HirenJoshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93- 5004-088-1
3. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81-265- 1635-3
4. Ivan Bayross,"Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,BPB Publications,4th Edition,ISBN:978-8183330084.
5. URLs (Optional) - List of Online Courses

Online Resources/E-Learning Resources

1 https://www.udemy.com/course/advanced-web-developer-course-beginner-to advanced/?couponCode=ST8MT40924
2 https://www.shiksha.com/online-courses/web-development-courses-certification-training-by-nptel-st644
3 https://onlinecourses.swayam2.ac.in/nou20_cs05/preview