



List of Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework

Department : Industrial and Production Engineering

Programme Name : B.Tech.

Academic Year : 2023-24

Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework:

Sr. No.	Course Code	Name of the Course
01.	FOUATC2	Environmental Science and Ecology
02.	PEUALS2	Sports and Yoga
03.	IPUBTH2	Human Values and Ethics
04.	NSUBLS1	NSS
05.		
06.		
07.		
08.		
09.		
10.		

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur - 495009 (C.G.)

Scheme and Syllabus



SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)

Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

I-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering										
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits
			Theory/lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
1	AMUATB1	Engineering Mathematics - A	3	1	-	03	40	60	100	4
2	CYUATB3	Engineering Chemistry	3	-	-	03	40	60	100	3
3	ECUATE4	Basic Electrical and Electronics Engineering	3	-	-	03	40	60	100	3
4	FOUATC2	Environmental Science and Ecology	2	-	-	03	40	60	100	2
5	CSUATE5	Computer Programming	3	-	-	03	40	60	100	3
6	LAUATC1	Indian Constitution	1	-	-	01	50	-	50	1
7	CYUALB3	Engineering Chemistry Laboratory	-	-	2	03	25	25	50	1
8	CSUALE5	Computer Programming Laboratory	-	-	2	03	25	25	50	1
9	IPUALL2	Engineering Workshop Practices	-	-	2	03	25	25	50	1
10	PEUALS2	Sports and Yoga	-	-	2	-	25	25	50	1
Total			15	1	08	25	350	400	750	20
Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, FO: Forestry, LA: Law, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory.										
BASIC SCIENCE (B) 1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B		ENGINEERING SCIENCE (E) 1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronic's Engineering 5. Computer Programming 6. Basic Communication Engineering		SKILL ENHANCEMENT COURSE (L) 1. Engineering Graphics 2. Engineering Workshop Practices		HUMANITIES SCIENCE (H) 1. English for communication 2. Human Values and Ethics		MANDATORY COURSE (C) 1. Indian Constitution 2. Environmental Science & Ecology		EXTRA-CURRICULAR ACTIVITIES (S) 1. NSS 2.Sports and Yoga
Credit Definition:			Four credit courses are to be designed for 50 hours of Teaching-Learning process. Three credit courses are to be designed for 40 hours of Teaching-Learning process. Two credit courses are to be designed for 30 hours of Teaching-Learning process. One credit courses are to be designed for 15 hours of Teaching-Learning process Note: The above is applicable only to THEORY courses							
AICTE Activity Points to be earned by students admitted to B.Tech., programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, any time during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) donot affect SGPA/CGPA and shall not be considered for vertical progression.										

Eligibility for UG Certificate:

- Undergraduate Certificate course will be offered by all departments of SoS(E&T), GGV.
- For applicability of UG Certificate, the candidate who wants to exit after completing 1st year (02 semesters) BTech degree with 10 credits of skill-based courses lasting two months, including atleast 06 credits job specific internship/apprenticeship with NHEQF level 5/UCF level 4.5.
- A student shall report to the concerned Head on or before the date notified by the Department/School/University, if he/she is interested to exit with UG Certificate



SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

II-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering										
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits
			Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
1	AMUBTB4	Engineering Mathematics-B	3	1	-	03	40	60	100	4
2	PPUBTB2	Engineering Physics	3	1	-	03	40	60	100	4
3	ITUBTE2	Introduction to Information Technology	3	-	-	03	40	60	100	3
4	ELUBTH1	English for Communication	3	-	-	03	40	60	100	3
5	CEUBTE1	Engineering Mechanics	3	-	-	03	40	60	100	3
6	ME UBTH2/CH UBTH2/ IP UBTH2/CEUBTH2	Human Values and Ethics	1	-	-	02	50	-	50	1
7	PPUBLB2	Engineering Physics Laboratory	-	-	2	03	25	25	50	1
8	CEUBLE1	Engineering Mechanics Laboratory	-	-	2	03	25	25	50	1
9	MEUBLL1	Engineering Graphics	1	-	3	03	25	25	50	3
10	NSUBLS1	NSS	-	-	2	01	25	25	50	1
Total			17	2	09	27	350	400	750	24
Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory.										
BASIC SCIENCE (B)		ENGINEERING SCIENCE (E)		SKILL ENHANCEMENT COURSE (L)		HUMANITIES SCIENCE (H)		MANDATORY COURSE (C)		EXTRA-CURRICULAR ACTIVITIES (S)
1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B		1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering		1. Engineering Graphics 2. Engineering Workshop Practices		1. English for communication 2. Human Values and Ethics		1. Indian Constitution 2. Environmental Science & Ecology		1. NSS 2. Sports and Yoga
Credit Definition:				Four credit courses are to be designed for 50 hours of Teaching-Learning process. Three credit courses are to be designed for 40 hours of Teaching-Learning process. Two credit courses are to be designed for 30 hours of Teaching-Learning process. One credit courses are to be designed for 15 hours of Teaching-Learning process Note: The above is applicable only to THEORY courses						
1. >1-hour lecture (L) per week per semester = 1Credit 2. >1-hour tutorial (T) per week per semester = 1Credit 3. >2-hour Practical/Drawing(P) per week per semester = 1 Credit										
AICTE Activity Points to be earned by students admitted to B.Tech., programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, any time during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression.										

Eligibility for UG Certificate:

- Undergraduate Certificate course will be offered by all departments of SoS(E&T), GGV.
- For applicability of UG Certificate, the candidate who wants to exit after completing 1st year (02 semesters) BTech degree with 10 credits of skill-based courses lasting two months, including atleast 06 credits job specific internship/apprenticeship with NHEQF level 5/UCF level 4.5.
- A student shall report to the concerned Head on or before the date notified by the Department/School/University, if he/she is interested to exit with UG Certificate



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	AMUATB1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGINEERING MATHEMATICS - A	3	1	-	15	15	10	40	60	100	04

Course Objectives:

1. To study the mean value theorem and nth derivative.
2. To study the indeterminate forms, partial and total differentiation.
3. To study the various concepts of integral calculus such as reduction formula, area, volume and length.
4. To study the ordinary and partial differential equations.
5. To study the applications of ordinary and partial differential equations

Differential Calculus

UNIT-1:

Leibnitz theorem, Roll's theorem, Lagrange's theorem, Mean value theorem, Expansions of functions by McLaurian and Taylor's series, Tangents and normal, Maxima and minima

UNIT-2:

Indeterminate forms, Asymptotes, Radius of curvature, Partial differentiation, Total differentiation

Integral Calculus

UNIT-3:

Reduction formulae, Curve tracing, Area, Volume, Length, Surface area, Double and triple integrals, Gamma and beta function.

Differential Equations

UNIT-4:

Differential equations of first order, Linear differential equation of higher order with constant coefficient, Equations reducible to linear equations with constant coefficients, Cauchy's homogeneous linear equations, Application of linear differential equations, Simultaneous differential equations.

UNIT-5:

Series solution of differential equations about ordinary point, Partial differential equations, linear homogeneous partial differential equations, application of partial differential equations: One dimensional heat equation and wave equation.

Recommended Books:

1. N.P. Bali, A Textbook of Engineering Mathematics, Laxmi publications, 10th edition, 2016.
2. H.K. Das, Higher Engineering Mathematics, S. Chand, 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th edition

Course Outcomes: After completing the course, the students will be able to:

1. Expand the function in Maclaurin's and Taylor's series.
2. Find the limit of some indeterminate forms and solve the problems of partial and total differentiation.
3. Solve the problems related to area, volume and length.



4. Solve the ordinary and partial differential equations.
5. Solve the engineering problems using differential equations.

**Course Outcomes and their mapping with Programme Outcomes: ENGINEERING MATHEMATICS – A
(AMUATB1)**

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		1	1				1	2		2	1	1	2
CO2	3	2		1	1				1	2		2	1	1	2
CO3	3	2		1	1				1	2		2	1	1	2
CO4	3	3		1	1				1	2		2	1	1	2
CO5	3	3		1	1				1	2		2	1	1	2

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	CYUATB3	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGINEERING CHEMISTRY	3	-	-	15	15	10	40	60	100	03

Course Objectives:

The objective of this Course is to:

- To make aware and enrich the students about the basic concept and understanding of chemical concepts of basic Chemistry and spectroscopic techniques.

Course Content:

UNIT-1: I Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fieser rules for calculating λ_{\max} of conjugated dienes & α , β -unsaturated carbonyl compound, various shifts in λ_{\max} and intensities. Infra-Red Spectroscopy: Conditions for Infra-Red Spectroscopy, Molecular vibrations & factors affecting Infra-Red frequencies.

UNIT-2: Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPR Theory, V.B. Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions.

UNIT-3: Concept of Chirality, Enantiomers, Diastereomers, Meso-compounds and Racemic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Centre of symmetry, Absolute and Relative Configuration (R & S, D & L and E & Z).

UNIT -4: Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions.

UNIT -5: Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radicle, Carbocation and Carbanion. Introduction to reaction eg. Elimination and Substitution, Mechanisms of some named reactions.

Course Outcomes: After completing the course, the students will be able to:

- Understand about quantum energy, spectroscopy and spectroscopic analysis of molecules.
- Have adequate knowledge regarding bonding in molecules and different theories for the same. The students will be able to predict the hybridization and geometry of any molecules.
- Understand the concept of organic molecules with respect to chirality and stereo chemistry.
- Predict organic reactions influencing parameters and develop some knowledge regarding kinetic vs thermodynamic control of reactions.
- Design the strategy for performing organic reactions. They will have develop a now how regarding the reaction intermediate and their stability.

Textbooks/References:

- Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
- Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.
- Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
- Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
- A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
- Applied Chemistry by H.D. Gesser, Springer Publishers
- Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM
- B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
- S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
- C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India,



5th Edition, 2013.

11. R. P. Mani, K. N. Mishra, “Chemistry of Engineering Materials”, Cengage Learning, 3rd Edition, 2015.

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING CHEMISTRY (CYUATB3)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2			1						1	1		
CO2	2	1	1									1	1		
CO3	2	1	1									1	1		
CO4	2	1	1									1	1		
CO5	2	1	1									1	1		

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ECUATE4	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	3	-	-	15	15	10	40	60	100	03

Course Learning Objectives:

- To provide knowledge for the analysis of DC and AC circuits.
- To explain the working principle, construction, applications of Transformer
- Study of DC machines and AC machines.
- To impart knowledge of analog and digital electronics

Unit-I: DC CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, Ohm's Law, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Mesh & nodal analysis, Star- Delta Transformation.

Time-domain analysis of first-order RL and RC circuits.

Unit-II: AC CIRCUITS

Representation of sinusoidal waveforms, average and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. Three-phase power measurement- Two- Wattmeter method.

UNIT-III: ELECTRICAL MACHINES

Construction, classification, ideal and practical transformer, equivalent circuit, losses in transformers, tests, voltage regulation and efficiency.

Introduction to DC Machines and three phase Induction Machine

Unit-IV: ANALOG and DIGITAL ELECTRONICS

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Introduction to Bipolar Junction Transistor.

Binary Number System, Logic Gates, Combinational circuits, Boolean Algebra, De Morgan's Theorem, Half and Full Adders,

UNIT V: Simulation and analysis of DC and AC circuits. Testing on single phase transformer. Demonstration of DC and AC machines. Basic analog and digital applications

Suggested Text / Reference Books:

- D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
- D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- B L Theraja & AK Theraja, "A Textbook of Electrical Technology- Vol-I & II, S. CHAND & Co ltd, 2013.
- E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- Jacob Millman, Christos Halkias, Chetan Parikh, "Millman's Integrated Electronics - Analog and Digital Circuit and Systems", 2nd Edition 2017
- Robert L Boylestad, Louis Nashlsky, "Electronics devices and circuit theory", Pearson 11th edition 2013
- M. Morris Mano, "Digital Logic and Computer Design", Pearson, 2004.

Course Outcomes:

At the end of the course, students will be able to:

1. Analyze DC circuits.
2. Analyze AC circuits.
3. Understand the working principle of Transformer, DC and AC machines.



4. Understand the characteristics and working of diodes and transistors.
5. Understand the basics of digital circuits and its importance.

Course Outcomes and their mapping with Programme Outcomes: BASIC ELECTRICAL & ELECTRONICS ENGINEERING (ECUATE4)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1		1						3	3		2
CO2	3	2	2	1		1						3	3		2
CO3	3	2	2	1		1						3	3		2
CO4	3	2	2	1		1						3	3		2
CO5	3	2	2	1		1						3	3		2

Weightage: 1-Sightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	FOUATC2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENVIRONMENTAL SCIENCE AND ECOLOGY	2	-	-	15	15	10	40	60	100	02

Course Learning Objectives:

- To understand the concept of ecosystem and environment and its importance for sustaining life on earth.
- To be aware of the various natural resources and different types of pollution and its management.
- To gain knowledge on the sources and different types of energy for meeting daily human needs.

Course Content

UNIT – I

Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, Economic & Social Security. Definition, Scope and basic principles of ecology and environment, Fundamentals of Ecology and Ecosystem – Structural and Functional Components. Food chain & Food webs. Ecological pyramids; Energy flow

UNIT – II

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures.

UNIT-III

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.

UNIT – IV

Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water, Mineral resources, Forest Wealth, Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

UNIT-V

Energy – Different types of energy, Conventional sources & Non-Conventional sources of energy: solar energy, Hydro-electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

Text Books

- Fundamentals of Ecology (3rd Ed.) 2001- MC Dash, Tata - McGraw Hill, New Delhi.
- Introduction to Environmental Engg. (1991). - GM Masters, Prentice Hall of India.
- Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
- R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
- R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,
- Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012

Course Outcome: At the end of the course students will be:

- Acquainted with different types, needs and importance of ecosystem and environmental components on earth.



2. Aware of and able to sustainably manage the natural resources and different types of pollution caused by anthropogenic activities.
3. Able to identify and know the different types and sources of energy and the strategies to conserve the conventional energy.

Course Outcomes and their mapping with Programme Outcomes: ENVIRONMENTAL SCIENCE AND ECOLOGY (FOUATC2)

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3		1			1			
CO2							3		1			1			
CO3							3		1			1			

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	CSUATE5	L	T	P	CT- I	CT- II	Attendance & Assignments	TOTAL			
Subject:	COMPUTER PROGRAMMING	3	-	-	15	15	10	40	60	100	03

Course Objectives:

- To learn the basic ideas of the Algorithms and Flowcharts.
- To learn Basic C concepts Data types and Control statements.
- To learn the Functions and Structure of Array.
- To learn the concepts of Sorting and Searching Algorithms.
- To learn basic concepts of Linked List Notations.

Course Content:

UNIT-1: Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

UNIT-2: Arithmetic expressions and precedence

Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching Iteration and loops, **Arrays** (1-D, 2-D), Character arrays and strings

UNIT-3: Basic Algorithms

Searching, concept of binary search etc., Basic Sorting Algorithms Bubble sort etc., Finding roots of equations, introduction of Algorithm complexity

UNIT-4: Function

Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference binary search etc.

Recursion functions Recursion, as a different way of solving problems. Example programs, such as, Finding Factorial, Fibonacci series, etc.

UNIT -5: Structure

Structures, Defining structures and Array of Structures

Pointers Idea of pointers, defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Course Outcomes- At the end of the course students will be able to

1. Understand the designing of basic level Algorithm and Flowcharts.
2. Understand the C programming fundamentals on the different Control Statements, Functions and Arrays.
3. Understand the Searching, Sorting Algorithms and concepts of linked list operations.

Textbooks/References:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill



3. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India

Course Outcomes and their mapping with Programme Outcomes: COMPUTER PROGRAMMING (CSUATE5)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2				1	2	2	1	3	2	2	3
CO2	3	2	3	2	3			1	2	2	1	3	2	2	3
CO3	3	2	3	2	3				2	2	1	3	2	2	2

Weightage: 1-Sightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	LAUATC1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	INDIAN CONSTITUTION	1	-	-	20	20	10	50	-	50	01

Course Learning Objectives:

- To the importance of preamble of the constitution of India.
- To understand the fundamental rights and duty as a citizen of India.
- To understand the functioning of union and state government and their inter-relationship.

Course Content:

UNIT 1: Introduction: Constitution-meaning of the term, Sources and constitutional theory, Features, Citizenship, Preamble.

UNIT 2: Fundamental Rights and Duties: Fundamental Rights, Fundamental Duties, Directive Principles of State Policy

UNIT 3: Union Government: Structure of Indian Union: Federalism, Centre-State relationship President: Role. Power and position, Prime Minister and council of ministers, Cabinet and Central Secretariat, Lok Sabha. Rajya Sabha

UNIT 4: State Government: Governor: Role and position, Chief Minister and council of ministers, State Secretariat

UNIT 5: Relationship between Centre and States: Distribution of Legislative Powers, Administrative Relations, Coordination between States

Textbooks/References:

- Constitution of India, V.N. Shukla
- The Constitutional Law of India, J.N. Pandey
- Indian Constitutional Law. M.P. Jain

Course Outcome: At the end of the course students will be able to:

- Describe the salient features of the Indian Constitution
- List the Fundamental Rights and Fundamental Duties of Indian citizens
- Describe the Directive Principles of State Policy and their significance

Course Outcomes and their mapping with Programme Outcomes: INDIAN CONSTITUTION (LAUATC1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						2		3				1			
CO2						2		3				1			
CO3						2		3				1			

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CYUALB3	L	T	P	IA	MSE	TOTAL			
Subject:	ENGINEERING CHEMISTRY LABORATORY	-	-	2	25	--	25	25	50	01

Course Objectives:

The Lab sessions would help in learning:

- Application of iodometrically & titration in lab.
- Recognition of different chemical reaction.
- Advanced lab methods like Spectrophotometry and chromatography

Course Content:

Group – A:

1. Standardization of sodium thiosulphate solution by standard potassium dichromate solution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO₄ solution as an intermediate.
3. To determine the concentration of hypo solution (Na₂S₂O₃.5H₂O) iodometrically with given Iodine (N/50) solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution, buffer solution (pH-10) and EBT as an indicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr's method)

Group – B:

6. Preparation of Urea Formaldehyde resin.
7. Acetylation of Primary Amine: Preparation of Acetanilide.
8. Base Catalyzed Aldol Condensation: Synthesis of dibenzal propanone.
9. [4+2] Cycloaddition Reaction: Diels-Alde reaction.
10. Preparation of aspirin and calculate its yield.

Group – C:

11. To calculate the λ_{\max} of a given compound using UV-visible spectrophotometer.
12. To separate the metallic ions by paper chromatography.
13. To determine the surface tension of a liquid by stalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non- interacting system) by viscosity method.
15. To determine the relative viscosity of given liquids by Ostwald's viscometer.

Note: At least two Experiments from each group must be performed.

Course Outcomes- On completion of the course, the students will be able to

1. Have develop basics of volumetric analysis and required calculation ability.
2. Develop ability to perform organic reactions calculate their yields etc.
3. Develop knowledge regarding analytical tools and colligative properties of molecules.



**Course Outcomes and their mapping with Programme Outcomes: ENGINEERING CHEMISTRY
LABORATORY (CYUALB3)**

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1						1			1	1		1
CO2	2	2	1						1			1			1
CO3	2	2	1	1	1				1			1	1		1

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
Subject Code:	CSUALE5									
Subject:	COMPUTER PROGRAMMING LABORATORY	-	-	2	25	--	25	25	50	01

Course Learning Objectives:

- To learn the Branching and logical expressions and Loops
- To learn the Arrays and Function
- To understand the Numerical methods and Recursion

Course Content:

The laboratory should be preceded or followed by a tutorial to explain the approach or Algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 & 9: Numerical methods (Root finding, numerical differentiation, numerical Integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Course Outcomes- At the end of the course students will be able to

1. Design basic level Algorithms and Flowcharts.
2. Understand C programming fundamentals on the different Control Statements, Functions and Arrays.
3. Understand the programing concepts of Recursion, Searching, Sorting Algorithms.



4. Write C programs for basic engineering solutions.

Course Outcomes and their mapping with Programme Outcomes: COMPUTER PROGRAMMING LABORATORY (CSUALE5)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	3				2	1	2	3	3	3	2
CO2	3	3	3	2	2				2	2	2	3	3	3	2
CO3	3	3	3	2	3				2	2	2	3	3	3	2
CO4	3	3	3	2	3				2	3	3	3	3	3	2

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SYLLABUS	(SEMESTER-I)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
Subject Code:	IPUALL2									
Subject:	ENGINEERING WORKSHOP PRACTICES	-	-	2	25	--	25	25	50	01

Course objectives:

- To impart student knowledge on various hand tools for usage in engineering applications.
- Be able to use analytical skills for the production of components, electrical switch board wiring and logic gate.

Course Content:

- Study of M/C tools in lathe machine
Demonstration of different operations of lathe machine
Practice of facing plain turning, taper turning etc
- Study of Carpentry tools, equipments and different jobs
Practice of Lap joints, Butt joints, T-Joint joints
- Practice of Lap joint, Butt Joint, T-joint
- Preparation of V shape, square shape, work pieces as per the given specification
- Replacement of fuse, condenser of fan/motor and fan regulator;
Installation of switch board with wiring;
Concepts of measuring instruments.
- Identification of various electronics components and their terminals;
Study of logic gates AND, OR, XOR and NOT, NAND, NOR;
Study of Basic ICs.

Course Outcomes: At the end of the course, students will be able to:

- Understand the appropriate tools, materials, instruments required for specific operations in workshop.
- Understand the figures of the hand tools used in fitting, carpentry, welding shop and machine tools such as lathe machine.
- Understand report of procedures followed for a given task in fitting, carpentry, welding and machine shops.
- Basic understanding of electrical equipment fitting and understanding of electronic logic gates AND, OR, NOT and ICs.
- Basic understanding of electrical equipment fitting and understanding of electronic logic gates AND, OR, NOT and ICs. Apply techniques to perform basic operations with hand tools and power tools such as center lathe machine, fitting shop, carpentry, welding using given job drawing.

Textbooks/References:

- Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private



- limited, Mumbai.
- Kalpajian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
 - Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008. (iv) Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
 - Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata Mc-Graw Hill House, 2017.

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING WORKSHOP PRACTICES (IPUALL2)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2								2						
CO2	2								3						
CO3	2								1						
CO4	2								2					1	
CO5	1								3					1	

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



SPORTS & YOGA

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ES Assessment	Grand total	Credits
Subject Code:	PEUALS2	L	T	P	Attendance	Activities	TOTAL			
Subject:	SPORTS AND YOGA	-	-	2	5	20	25	25	50	01

Course Objectives:

- To make the students understand the importance of sound health and fitness principles as they relate to better health.
- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health, and fitness.
- To create a safe, progressive, methodical, and efficient activity-based plan to enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Physical Fitness Tests

- AAHPER youth fitness test
- Cooper's 12 Minute run-walk test

General Introduction of games and sports

Fundamental skills, history and development of the following games and sports:

- Athletics
- Batminton
- Basketball
- Cricket
- Football
- Hockey
- Handball
- Kabaddi
- Kho-kho
- Volley-ball
- Yoga

Note:

- Each student will have to clear one of the physical fitness tests by the end of the semester.
- One project is to be prepared by the students at least for two games.

References:

- Barron H M, McGhee R (1997) A Practical Approach to Measurement in Physical Education.
- Kansal D K (1996), Test and Measurement in sports and physical education, New Delhi, D V S Publication

Course Outcomes:

On completion of the course, the student will be able to:

- Apply warming up and warming down exercises in daily physical fitness activities
- Apply stretching rotation and flexibility exercises in daily physical fitness activities.
- Make use of acquired yoga asanas skill and pranayama method in daily lifestyle.
- Utilize the acquired weight training skills for the development of muscular strength and development. Utilize the acquired skills in playing sports and games.



Course Outcomes and their mapping with Programme Outcomes: SPORTS AND YOGA (PEUALS2)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									3			3			
CO2									3						
CO3									3			3			
CO4									3			3			

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	AMUBTB4	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGINEERING MATHEMATICS - B	3	1	-	15	15	10	40	60	100	04

Course Objectives:

1. To study the concepts of vector space, linear transformation, matrices and system of linear equations.
2. To find the roots of equations i.e. quadratic and bi-quadratic equations.
3. To study the concept of gradient, divergence, curl, Green's theorem, Gauss's theorem and Stokes's theorem and their applications.
4. To study the properties of complex numbers and to establish the relation between exponential, hyperbolic and logarithm functions.
5. To test the nature of infinite series i.e. convergence, divergence and oscillatory.

UNIT-1: Linear Algebra

Vector space, linear dependence and linear independence of vectors, linear transformations, rank and inverse by elementary transformations, system of linear equations – consistency and inconsistency, eigen value and eigen vectors, Caley-Hamilton theorem and its application to find the inverse.

UNIT-2: Theory of equations

Polynomial and polynomial equations, division algorithm, roots of equations, remainder theorem, factor theorem, synthetic division, fundamental theorem of algebra, multiplication of roots, Descartes's rule of sign, Descartes's method.

UNIT-3: Vector Calculus

Vector functions, differentiation of vectors, velocity and acceleration, scalar and vector field, gradient of scalar field, directional derivative, properties of gradient, divergence of vector, curl of vector, point function, properties of divergence and curl, integration of vector function, line integral, surface integral, Green's theorem, Gauss theorem, Stoke's theorem (without proof) and their simple applications.

UNIT-4: Complex Number

Complex numbers and its properties, conjugate complex numbers, standard form of complex numbers, De-Moivre's theorem, Roots of complex numbers, exponential function of complex variable, circular form of complex variable, Hyperbolic function of complex numbers, Logarithmic function of complex numbers.

UNIT-5: Infinite Series

Sequence, convergent, divergent, oscillating sequence, infinite series, behavior of infinite series, ratio test, root test, comparison test, Raabe's test, Logarithmic test.

Recommended Books:

1. N.P. Bali, A Textbook of Engineering Mathematics, Laxmi publications, 10th edition, 2016.
2. H.K. Das, Higher Engineering Mathematics, S. Chand, 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th edition

Course Outcomes: After completion of this course, the students will be able:

1. To know the concept of vector space, matrices and their various properties and also be able to solve the system of linear equations.
2. To solve the quadratic and bi-quadratic equations.



3. To solve the problems of gradients, divergent, curl and the applications of vector calculus.
4. To find the roots of complex numbers with the help of De-Moivre's theorem.
5. To know the convergence and divergence of infinite series using various type of tests.

**Course Outcomes and their mapping with Programme Outcomes: ENGINEERING MATHEMATICS – B
(AMUBTB4)**

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		1	1				1	2		2	1	1	2
CO2	3	2		1	1				1	2		2	1	1	2
CO3	2	2		1	1				1	2		2	1	1	2
CO4	2	2		1	1				1	2		2	1	1	2
CO5	2	2		1	1				1	2		2	1	1	2

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	PPUBTB2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGINEERING PHYSICS	3	1	-	15	15	10	40	60	100	04

Course Objectives:

- To know the basic principles, effects and applications such as physical, optical parameters used for engineering applications.
- To learn about various laws and applications of electromagnetic theory.
- To know the basic structure, working principles and applications of lasers and optical fibre communication.
- To know the basics of semiconductor physics, semiconductor materials and devices and its characterization for advance technological applications
- To familiarize the basis of quantum theory and to make students to solve the physical problems for advancement of the technology.

Course Content:

Unit 1: Optics: Interference and Diffraction

Introduction, Young's experiment theory of interference, Coherent and non-coherent sources, Fresnel's Bi- prism and Newton's ring experiment.
Diffraction of light, Fresnel and Fraunhofer's diffraction, diffraction due to plane diffraction grating.

Unit 2 Electromagnetic Theory

Coulomb's law electrostatics field and potential, electric flux, Gauss' law, Poisson's and Laplace's equation. Equation of continuity for charge conservation, Ampere's and Faraday's laws, Maxwell's Electromagnetic equations.

Unit 3 Laser and Fiber optics

Introduction, elementary idea of spontaneous and stimulated emission, active medium population inversion, Einstein's coefficients, Types of lasers and important applications of lasers.

Introduction to optical fibers, basic principles of optical fiber, critical angle numerical aperture, maximum acceptance angle, classification of optical fiber.

Unit 4 Semiconductor physics and Devices

Formation of energy in solids, Energy band gap of metals, insulators and semiconductors, classification of semiconductor: Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, working of P-N junction diodes and bipolar junction transistor.

Unit 5 Introduction to Quantum Mechanics

Introduction to Quantum Mechanics, photoelectric effect, Compton effect, wave-particle duality, uncertainty principle, wave function, De-Broglie waves, phase and Group velocity, Davisson and Germer experiment, Schrodinger wave equation, particle in a box (1-Dimensional)

Course Outcome: At the end of the course, students will be able to:

- Student's ability to understand the basic principles and applications of physical optics for physical parameters measurements such as length, thickness, aperture size etc.
- Student's will be able to design, characterized the lasers and optical fibers and their effective utilization in optical communications, imaging etc.



3. Students demonstrate appropriate competence and working knowledge of laws of electromagnetic theory and semiconductor physics and devices for their advance applications

Textbooks/References:

1. Applied physics-I and II By Navneet Gupta, Dhanpat Rai & Co.
2. Engg. Physics by S.K. Srivastava and R.A. Yadav, New Age Pub. New Delhi
3. Engg. Physics by Uma Mukherjee, Narosa Publication.
4. Engg. Physics by M.N. Avadhanulu, S. Chand Pub.
5. Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill. 1998
6. Concepts of Physics Part-II by H.C. Verma, Bharati Bhawan (P&D), 1998
7. Modern physics by Beiser, McGraw Hill Inc. New York, Publication 1995
8. Modern physics by Mani and Mehta, East-West Press Pvt. Ltd. 1998
9. Introduction to Electrodynamics, David Griffith
10. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
11. B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, John Wiley & Sons Inc. 2007).
12. S.M. Sze, Semiconductor Devices: physics and Technology, Wiley (2008)
13. Yariv and P. Yeh, Photonics Optical Electronics in Modern Communications, Oxford University press, New York (2007)
14. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997)
15. Online course: "Semiconductor Optoelectronics" by M. R. Shenoy on NPTEL.
16. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak on NPTEL.

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING PHYSICS

(PPUBTB2)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2				1					1	3	2	1
CO2	1	1											3	2	1
CO3	3	3	2	3	3	2	2			1		1	3	2	1

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ITUBTE2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	INTRODUCTION TO INFORMATION TECHNOLOGY	3	-	-	15	15	10	40	60	100	03

Course Objective

1. To illustrate the concepts of cyber security and familiar and aware with various cybercrimes attack and their prevention.
2. To describe the different services model of Cloud Computing and understand Understanding of different evaluating computer model of cloud computing.
3. To relate theoretical concepts with problem solving approach in IoT and assess the comparative advantages and disadvantages of Virtualization technology.
4. To provides the basic knowledge of use appropriate storage and access structures. the student must be able to analyse familiar with the machine learning algorithms and applications of various data science.
5. To integrate classroom learning into an everyday communicative activity in distributed system. Familiar with various web services activity.

Course Content:

Unit 1: -Cyber Security Fundamentals Security Concepts: Authentication, Authorization, Non-repudiation, Confidentiality, Integrity, availability. Cyber Crimes and Criminals: Definition of cyber-crime, types of cyber-crimes and types of cyber-criminals.

Unit 2: -Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

Unit 3: -Internet of Things–Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IOT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

Unit 4. Data Science: -Introduction and Importance of Data Science, Statistics, Information Visualisation, Data Mining, Data Structures, and Data Manipulation, Algorithms used in Machine Learning, Data Scientist Roles and Responsibilities. Data Acquisition and Data Science Life Cycle.

Unit 5: -Evaluation and Emergence of Web Services – Evaluation of Distributed Computing, Core Distributed Technologies, Challenges in Distributed System, and Introduction to web services, Web Services Architecture, Basic steps of implementing web services

Course Outcome:

1. Ability to learn about cybercrimes and how they are planned.
2. Ability to understand the cloud computing concepts and services model.
3. Ability to understand Internet of Things –Definition and Characteristics of IoT.



4. Explain how data is collected, managed and stored for data science. Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists
5. Explain the details of web services Evolution of Distributed Computing.

Textbooks/References:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu, J. David Irwin. CRC Press T&F Group
3. Cloud Computing Principles and Paradigm by Rajashekar Buyya, James Broberg, Andhrz M. Wiley 2011.
4. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
5. Mining of Massive Datasets, by Leskovec, Rajaraman, and Ullman.
6. R. Nagappan, R. Scokzylas, R.P. Sriganesh, Developing Web Services, Wiley India.

Course Outcomes and their mapping with Programme Outcomes: INTRODUCTION TO INFORMATION TECHNOLOGY (ITUBTE2)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	2		2				2	1		
CO2	3	2	1	1	2	2		2				1	1		
CO3	3	2	1	1	2	2						2	1		
CO4	3	2	2	1	2	2		1				3	1		
CO5	3	2	1	1	2	2						1	1		

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ELUBTH1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGLISH FOR COMMUNICATION	3	0	-	15	15	10	40	60	100	03

Course Learning Objectives

- To build up word power, to brush up the knowledge of English grammar, to develop good writing and speaking skills in the students

Course Content:

Unit 1: -Vocabulary Building

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

Unit 2: -Basic Writing Skills

Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

Unit 3: -Identifying Common Errors in Writing

Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

Unit 4: -Nature and Style of sensible Writing

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

Unit 5: -Writing Practices

Comprehension, Précis Writing, Essay Writing.

Oral Communication (This unit involves interactive practice sessions in Language Lab)

Listening Comprehension

Pronunciation, Intonation, Stress and Rhythm

Common Everyday Situations: Conversations and Dialogues

Communication at Workplace

Interviews

Formal Presentations

Course Outcome:

- At the end of the course students will be able learn a lot of new words. They also learnt the particularities and peculiarities of English grammar. As a result, they could speak and write English with the least possible error

Textbooks/References:

- Practical English Usage. Michael Swan. OUP.1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007 (iii)On Writing Well. William Zinsser. Harper Resource Book.2001
- Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press.2006.
- Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press.2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press



Course Outcomes and their mapping with Programme Outcomes: ENGLISH FOR COMMUNICATION
(ELUBTH1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	1	1	2	1		1	3	3	2	3			1

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	CEUBTE1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENGINEERING MECHANICS	3	0	-	15	15	10	40	60	100	03

Course Learning Objectives:

- To learn the basics of engineering mechanics and force systems.
- To learn the different type of support reactions and the basics of friction.
- To learn the concepts of centroid, centre of gravity and moment of inertia.
- To learn the basics of linear, curvilinear motions, centripetal and centrifugal forces under dynamics.

UNIT – I

INTRODUCTION: Basic idealization of mechanics, particle, rigid body, mass, time, continuum, force, force system, system of units, principle of transmissibility of forces, principle of superposition.

COPLANAR CONCURRENT FORCE SYSTEM: Resultant of forces. Resolution of forces, Composition of coplanar concurrent, parallel and non-concurrent forces, Moment of a force, Varignon's theorem, free body diagram, equilibrant, equilibrium of particles and rigid bodies.

Self-Study Component: Application of triangle and polygon Law, vector method of resolution and Composition of forces.

UNIT – II

SUPPORT REACTIONS: Types of loads and types of supports, statically determinant beams, Numerical problems on support reactions for beams with point loads (normal and inclined), uniformly distributed load, uniformly varying load and moment.

FRICTION: Introduction, types of friction, laws of friction, angle of friction, angle of repose, cone of friction, characteristics of dry friction, application – body on horizontal plane and inclined plane and ladder friction.

Self-Study Component: Numerical problems on support reaction of beams loaded with trapezoidal loads, Support reactions for Compound beams and wedge friction - numerical problems.

UNIT – III

CENTROID AND CENTRE OF GRAVITY: Introduction to centroid and centre of gravity, Centroid of rectangular, triangular, circle, semicircle, quarter circle lamina and sector from first principles. Numerical problems on Centroid of composite lamina.

Self-Study Component: Determining Centroid for Composite Lamina with openings.

UNIT – IV

MOMENT OF INERTIA: Introduction, radius of gyration, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, moment of inertia of standard geometrical figures by first principles. Numerical problems on moment of inertia of composite sections.

Self-Study Component: Determining moment of Inertia of Composite sections with reference to given axis.

UNIT – V

DYNAMICS: Introduction to dynamics, Classification, linear and curvilinear motion- projectiles, centripetal and centrifugal forces, banking/super elevation.

Introduction to work, power and energy, impulse – numerical problems.

Self-Study Component: Concept of motion with varying acceleration. Collision of elastic bodies.

Text Book(s):

- S.S Bhavikatti, A text on elements of Civil Engineering and mechanics, New age International publishers, 2015.
- R.S. Khurmi, A text book of engineering mechanics, S. CHAND & COMPANY LTD.

Reference Book(s):

- Ramamrutham S: A text book of applied mechanics, Dhanpatrai and sons
- S. Rajashekar, G Shankar Subramanian: Engineering Mechanics- Statics and Dynamics, Vikas



Publishing House 1999.

3. Ferdinand Beer and Johnson F.R. (Jr) Mechanics for Engineers, Tata Mc Graw-hill Publishing comp. Ltd New Delhi.

Course Outcome:

At the end of this course, students will demonstrate the ability to:

1. Determine the resultant force and moment for a given system of forces
2. Determine the support reactions under different loading conditions in structural members and problems related to friction.
3. Determine the centroid and centre of gravity
4. Determine the moment of inertia
5. Calculate the motion characteristics of a body under dynamic conditions

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING MECHANICS (CEUBTE1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2			1								3	
CO2	3	3	2			1								3	
CO3	3	3	2			1								3	
CO4	3	3	2			1								3	
CO5	3	3	2			1								3	

Weightage: 1-Sightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	MEUBTH2 (for Mech) CHUBTH2 (for Chem) IPUBTH2 (for IPE) CEUBTH2 (for Civil)	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	HUMAN VALUES AND ETHICS	1	-	-	20	20	10	50	-	50	01

COURSE OBJECTIVE:

1. To create an awareness on Engineering Ethics and Human Values.
2. To understand social responsibility of an engineer.
3. To appreciate ethical dilemma while discharging duties in professional life.

COURSE OUTCOME:

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

COURSE CONTENT:

UNIT I: Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education.
2. The Content and Process of Value Education.
3. Basic Guidelines for Value Education.
4. Self exploration as a means of Value Education.
5. Happiness and Prosperity as parts of Value Education.

UNIT II: Harmony in the Human Being

1. Human Being is more than just the Body.
2. Harmony of the Self ('I') with the Body.
3. Understanding Myself as Co-existence of the Self and the Body.
4. Understanding Needs of the Self and the needs of the Body.
5. Understanding the activities in the Self and the activities in the Body.

UNIT III: Harmony in the Family and Society and Harmony in the Nature

1. Family as a basic unit of Human Interaction and Values in Relationships.
2. The Basics for Respect and today's Crisis: Affection, e, Guidance, Reverence, Glory, Gratitude and Love.
3. Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
4. Harmony in Nature: The Four Orders in Nature.
5. The Holistic Perception of Harmony in Existence.

UNIT IV: Social Ethics

1. The Basics for Ethical Human Conduct.
2. Defects in Ethical Human Conduct.
3. Holistic Alternative and Universal Order.
4. Universal Human Order and Ethical Conduct.



5. Human Rights violation and Social Disparities.

UNIT V: Professional Ethics

1. Value based Life and Profession.
2. Professional Ethics and Right Understanding.
3. Competence in Professional Ethics.
4. Issues in Professional Ethics – The Current Scenario.
5. Vision for Holistic Technologies, Production System and Management Models.

TEXT BOOKS

1. A.N.Tripathy, New Age International Publishers, 2003.
2. Bajpai. B. L. , , New Royal Book Co, Lucknow, Reprinted, 2004
3. Bertrand Russell Human Society in Ethics & Politics

REFERENCE BOOKS

1. Corliss Lamont, Philosophy of Humanism
2. Gaur. R.R. ,Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
3. Gaur. R.R. ,Sangal. R, Bagaria. G.P, Teachers Manual Excel Books, 2009.
4. I.C. Sharma . Ethical Philosophy of India Nagin & co Julundhar
5. Mortimer. J. Adler, – Whatman has made of man
6. William Lilly Introduction to Ethic Allied Publisher

Course Outcomes and their mapping with Programme Outcomes: HUMAN VALUES AND ETHICS
{MEUBTH2 (for Mech), CHUBTH2 (for Chem), IPUBTH2 (for IPE) and CEUBTH2 (for Civil)}

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								3	3						
CO2								3	3						
CO3								3	3						
CO4								3	3						

Weightage: 1-Sightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	PPUBLB2	L	T	P	IA	MSE	TOTAL			
Subject:	ENGINEERING PHYSICS LABORATORY	-	-	2	25	--	25	25	50	01

Course Objectives:

1. To learn and perform the various practical related to optics and its related phenomena's like interference, diffraction and polarization.
2. To apply basic optical phenomena's for measurements such as thickness, refractive index, dispersive power, aperture size etc.
3. To characterized various optical sources such as laser, mercury light, sodium light, gratings, prism and lens.
4. To characterize various semiconductor materials and devices (PN Jn., Transistor, LED and Solar Cell) for their energy band gap, resistivity and IV characteristics.

Course Content:

LIST OF PRACTICALS:

1. To determine the wavelength of sodium light with help of Fresnel's Bi-prism.
2. To determine the refractive index and dispersive power of the material of prism with the help of spectrometer.
3. To determine the sodium light by Newton's ring method.
4. To determine the wavelength of sodium light by plane diffraction grating using spectrometer.
5. To demonstrate the diffraction pattern and determine the wavelength of different colours of mercury (white) light using plane diffraction grating and spectrometer.
6. To determine the wavelength and number of line per cm on a diffraction grating using semiconductor laser diode.
7. To determine the specific rotation of sugar solution with the help of polarimeter.
8. Determine the width of the single slit and diameter of circular aperture using Fraunhofer diffraction pattern produced by semiconductor laser diode.
9. To determine the energy band gap (E_g) of a semiconductor material using P-N junction diode.
10. To determine the e/m ratio by the Thomson's method.
11. To study the P-N junction diode characteristics, in forward and reverse bias conditions.
12. To study the Zener diode characteristics.
13. To study the characteristics and gain of Transistor in C-B and C-E mode.
14. Determine the Planck's constant.

Course Outcomes: On completion of the course, the students would be able to:

1. Know about basic optical facts and phenomenon, characterization of optical components and devices
2. To know the basic semiconductor materials and devices and their applications
3. To know how the performance of semiconductor devices can be improves.

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING PHYSICS

LABORATORY (PPUBLB2)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	1			2			2	2	2	1
CO2	2	2	3	2	2	1			2			2	2	2	1
CO3	2	2	3	2	2	1			2			2	2	2	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly



SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CEUBLE1	L	T	P	IA	MSE	TOTAL			
Subject:	ENGINEERING MECHANICS LABORATORY	-	-	2	25	--	25	25	50	01

Course Objectives:

- To perform the practical giving basic understanding to fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal force table
- To perform the practical giving basic understanding to fundamental application of mechanics like screw jack, winchcrab and simple wheel and axle

Course Content: List of Experiments

- Verification of law of parallelogram of forces.
- Verification of law of triangle of forces.
- Verification of law of polygon of forces by universal force table.
- Verification of law of moment by parallel forces apparatus.
- Practical verification of forces in the member of jib crane.
- Practical verification of forces in the member of the truss.
- Determination of coefficient of friction between two given surfaces by inclined plane method.
- Determination of efficiency of simple screw jack.
- Determination of efficiency of single purchase winch crab.
- Determination of efficiency of double purchase winch crab.
- Determination of efficiency of simple wheel and axle.

Course Outcome: At the end of the course students will be able to:

- Verify the fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal force table
- Analyze the friction coefficient between two surfaces
- Calculate the efficiency of screw jack, winch crab and wheel and axle

Course Outcomes and their mapping with Programme Outcomes: ENGINEERING MECHANICS LABORATORY (CEUBLE1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1						1	1		1	1	2	
CO2	3	2					1		1	1		1	1	2	
CO3	3	2	1				1		1	1		1	1	2	



SYLLABUS	(SEMESTER-II)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	MEUBLL1	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	ENGINEERING GRAPHICS	1	-	3	25	--	25			

Course Learning Objectives:

1. To learn the basic of Engineering Drawing and Orthographic Projections
2. To learn the Sections and Sectional Views of Right Angular Solids
3. To learn the Isometric Projections covering and overview of Computer Graphics

UNIT 1: Introduction Engineering Graphics and Engineering Curves: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction. Engineering Curves - Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids, Involute and trochoid.

UNIT 2: Projection of Points, Straight lines and Planes: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes. Projections of regular planes, inclined to both planes

UNIT 3: Projections Solids: Introduction, Type of solid, Projections of solids in simple position, Projection of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both H.P. and the V.P.

UNIT 4: Section of Solids and Development of Surfaces: Sectioning of regular solids - Section planes perpendicular to one plane and parallel or inclined to other plane - Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.

UNIT 5: Isometric Projections and Orthographic Views: Principles of Isometric Projections-Isometric Scale- Isometric Views Conventions-Plane Figures, Simple and Compound Solids. Conversion of isometric views to orthographic views. Conversion of orthographic views to isometric projections, vice-versa. Introduction to perspective projection.

Computer Aided Drafting: Introduction to computer aided drafting package to make 2-D drawings. Demonstration purpose only - not to be included in examinations.

Textbooks/References:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers
5. CAD Software Theory and User Manuals

Course Outcomes:

At the end of the course, the student shall be able to

1. Describe the fundamentals of engineering drawing and construct basic engineering curves.
2. Enhance visualization skill using projections of points, lines and planes.
3. Enhance visualization skill using projections of solids.
4. Enhance visualization skill using construction of sections of solids and development of surfaces.
5. Comprehend the theory of Orthographic and Isometric projections and views

Course Outcomes and their mapping with PO and PSO: ENGINEERING GRAPHICS (MEUBLL1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2									2					
CO2	1									1					
CO3	3									3					
CO4	3									3				1	
CO5	1									1				1	

Weightage: 1-Slightly; 2-Moderately; 3-Strongly



NSS

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Viva/ Assessment	Grand total	Credits
Subject Code:	NSUBLS1	L	T	P	Attendance	Activities	TOTAL			
Subject:	NSS	-	-	2	5	20	25	25	50	01

Objectives:

1. To develop Personality
2. To do Community Service
3. To do social Awareness and Empowerment
4. To enhance Skill
5. To work for National Integration

Course:

Program Head 1: Cleaning Program (06 Hours/ Semester)

Program Head 2: Plantation (06 Hours/ Semester)

Program Head 3: Health Camp/Special Days celebration (10 Hours/ Semester)

Program Head 4: Awareness program/Ralley (06 Hours/ Semester)

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Observe his/her internal ability and develop own personality.
2. Apply knowledge of the importance of cleanliness and hygiene in their surroundings, and develop skills in waste management and recycling.
3. Apply knowledge towards the significance of greenery and environmental conservation, participate in tree plantation drives, and understand the process of nurturing and caring for plants.
4. Apply knowledge of health issues prevalent in the community and methods of prevention and organizing health camps and awareness programs on special days like World Health Day or World AIDS Day.
5. Express social issues and their impact on the community. Actively participate in awareness programs and rallies to create awareness about social problems like gender inequality, or environmental degradation.

Course Outcomes and their mapping with PO and PSO: NSS (NSUBLS1)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									1						
CO2			1			1	2								



CO3			1			1	2							
CO4			1			1	2							
CO5			1			1	2							

Weightage: 1-Sightly; 2-Moderately; 3-Strongly