

# 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 2023-2024)

I-SEMESTER BTech ECE/ IT/CSE										
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	
			L	T	P					
1	AMUATB4	Engineering Mathematics - B	3	1	-	03	40	60	100	4
2	PPUATB2	Engineering Physics	3	1	-	03	40	60	100	4
3	ITUATE2	Introduction to Information Technology	3	-	-	03	40	60	100	3
4	ECUATE3	Basic Electrical Engineering	3	-	-	03	40	60	100	3
5	ELUATH1	English for Communication	3	-	-	03	40	60	100	3
6	ECUATH2/ CSUATH2/ITUATH2	Human Values & Ethics	1	-	-	02	50	-	50	1
7	PPUALB2	Engineering Physics Laboratory	-	-	2	03	25	25	50	1
8	MEUALL1	Engineering Graphics	1	-	3	03	25	25	50	3
9	ECUALE3	Basic Electrical Engineering Laboratory	-	-	2	03	25	25	50	1
10	NSUALS1	NSS	-	-	2	01	25	25	50	1
<b>Total</b>			<b>17</b>	<b>2</b>	<b>09</b>	<b>27</b>	<b>350</b>	<b>400</b>	<b>750</b>	<b>24</b>
<p><b>Note:</b> AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial &amp; Production Engineering, CE: Civil Engineering, CS: Computer Sc. &amp; Engg., IT: Information Technology, PE: Physical Education, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,</p>										
<b>BASIC SCIENCE (B)</b> 1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B	<b>ENGINEERING SCIENCE (E)</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	<b>SKILL ENHANCEMENT COURSE (L)</b> 1. Engineering Graphics 2. Engineering Workshop Practices	<b>HUMANITIES SCIENCE (H)</b> 1. English for communication 2. Human Values and Ethics	<b>MANDATORY COURSE (C)</b> 1. Indian Constitution 2. Environmental Science & Ecology	<b>EXTRA-CURRICULAR ACTIVITIES (S)</b> 1. NSS 2.Sports and Yoga					
<p><b>Credit Definition:</b>                      &gt;1-hour lecture (L) per week per semester = <b>1Credit</b>                      &gt;1-hour tutorial (T) per week per semester = <b>1Credit</b>                      &gt;2-hour Practical/Drawing(P) per week per semester = <b>1 Credit</b></p>			<p>&gt;<b>Four credit</b> courses are to be designed for <b>50</b> hours of Teaching-Learning process.                      &gt;<b>Three credit</b> courses are to be designed for <b>40</b> hours of Teaching-Learning process.                      &gt;<b>Two credit</b> courses are to be designed for <b>30</b> hours of Teaching-Learning process.                      &gt;<b>One credit</b> courses are to be designed for <b>15</b> hours of Teaching-Learning process  <b>Note: The above is applicable only to THEORY courses</b></p>							
<p><b>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):</b>                      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.</p>										

**Eligibility for UG Certificate:**

- A. Undergraduate Certificate will be offered by all departments of SoS(E&T), GGV.
- B. For applicability of UG Certificate, the candidate who wants to exit after completing 1<sup>st</sup> 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.
- C. 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

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			Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
			L	T	P					
1	AMUBTB1	Engineering Mathematics - A	3	1	-	03	40	60	100	4
2	CYUBTB3	Engineering Chemistry	3	-	-	03	40	60	100	3
3	CSUBTE5	Computer Programming	3	-	-	03	40	60	100	3
4	ECUBTE7	Introduction to Electronics & Communication Engineering	3	-	-	03	40	60	100	3
5	LAUBTC1	Indian Constitution	1	-	-	01	50	-	50	1
6	FOUBTC2	Environmental Science and Ecology	2	-	-	03	40	60	100	2
7	CYUBLB3	Engineering Chemistry Laboratory	-	-	2	03	25	25	50	1
8	IPUBLL2	Engineering Workshop Practices	-	-	2	03	25	25	50	1
9	CSUBLE5	Computer Programming Laboratory	-	-	2	03	25	25	50	1
10	PEUBLS2	Sports and Yoga	-	-	2		25	25	50	1
<b>Total</b>			<b>15</b>	<b>1</b>	<b>08</b>	<b>25</b>	<b>350</b>	<b>400</b>	<b>750</b>	<b>20</b>
<p><b>Note:</b> AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial &amp; Production Engineering, CE: Civil Engineering, CS: Computer Sc. &amp; Engg., IT: Information Technology, PE: Physical Education, FO: Forestry, LA: Law, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,</p>										
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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment ( IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<i>Subject Code:</i>	ECUATH2 (for ECE) CSUATH2 (for CSE) ITUATH2 (for IT)								-	50	1
<i>Subject:</i>	HUMAN VALUES & ETHICS	1	0	-	20	20	10	50			

### 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.

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

## 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.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject Code:	ELUATH1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	ENGLISH FOR COMMUNICATION	3	0	-	15	15	10	40			

## COURSE OBJECTIVE:

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

**UNIT I: 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 II: 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 III: Identifying Common Errors in Writing:** Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

**UNIT IV: Nature and Style of sensible Writing:** Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

**UNIT V: 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 to 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.

## TEXT/ REFERENCE BOOKS:

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

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject Code:	AMUATB4										
Subject:	ENGINEERING MATHEMATICS - B	3	1	-	15	15	10	40	60	100	04

### UNIT I: 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, Cayley-Hamilton theorem and its application to find the inverse.

### UNIT II: 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 III: 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 IV: 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 V: Infinite Series

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

### TEXT/ REFERENCE BOOKS:

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

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject Code:	PPUATB2										
Subject:	ENGINEERING PHYSICS	3	1	-	15	15	10	40	60	100	04

### COURSE OBJECTIVE:

- 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.

**UNIT I: 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 II: 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 III: 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 IV: 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 V: 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.
- Students demonstrate appropriate competence and working knowledge of laws of electromagnetic theory and semiconductor physics and devices for their advance applications.

**TEXT/ REFERENCE BOOKS:**

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. NewDelhi
3. Engg. Physics by Uma Mukherjee, NarosaPublication.
4. Engg. Physics by M.N. Avadhanulu, S. ChandPub.
5. Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill.1998
6. Concepts of Physics Part-II by H.C.Verma, BharatiBhawan (P&D),1998
7. Modern physics by Beiser, McGraw Hill Inc. New York, Publication1995
8. Modern physics by Mani and Mehta, East-West PressPvt.Ltd.1998
9. Introduction to Electrodynamics, DavidGriffith
10. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-HillInc.(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 onNPTEL.
16. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak onNPTEL.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<i>Subject Code:</i>	ITUATE2										
<i>Subject:</i>	INTRODUCTION TO INFORMATION TECHNOLOGY	3	-	-	15	15	10	40	60	100	03

### COURSE OBJECTIVE:

- To illustrate the concepts of cyber security and familiar and aware with various cybercrimes attack and their prevention.
- To describe the different services model of Cloud Computing and understand Understanding of different evaluating computer model of cloud computing.
- To relate theoretical concepts with problem solving approach in IoT and assess the comparative advantages and disadvantages of Virtualization technology.
- 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.
- To integrate classroom learning into an everyday communicative activity in distributed system. Familiar with various web services activity.

**UNIT I: 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 II: 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 III: 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 IV: 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 V: 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. Understand the details of web services Evolution of Distributed Computing.

### TEXT/ REFERENCE BOOKS:

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.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<i>Subject Code:</i>	ECUATE3	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
<i>Subject:</i>	BASIC ELECTRICAL ENGINEERING	3	-	-	15	15	10	40			

### COURSE OBJECTIVE:

- To analyse basic concepts of DC and AC circuits.
- To explain construction and operation of transformers,
- To explain the concept and working of DC machines and Induction motor.
- To explain electric installation, wiring, billing and safety measures.

**UNIT I: DC CIRCUITS:** Electrical circuit elements (R, L and C), voltage and current sources, Ohms Law, Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits. Mesh & nodal analysis, Star-Delta transformation and 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: ELECTROMAGNETISM:** Concept of Magnetic effect of electric current, faraday's law of electromagnetism. BH curve, Analogy of Electric and magnetic Circuits. Concept of flux flow in magnetic circuits. TRANSFORMERS Construction, classification, ideal and practical transformer, equivalent circuit, losses in transformers, tests, voltage regulation and efficiency. Introduction to three phase transformers.

**UNIT IV: DC AND AC MACHINES:** Construction, Working Principle, losses and efficiency of DC Machines and three phase Induction Machine, Torque Equations, DC motor: Principle of operation, speed control.

**UNIT V: ELECTRICAL INSTALLATIONS& SAFETY:** Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, Earthing – Types of earthing and its importance. Electrical wiring: Conduit and concealed wiring, Two way and Three-way control of lamps. Safety precautions for electrical appliances. Calculations for energy consumption and billing.

**COURSE OUTCOME:** At the end of the course, the student will be able to

CO1: Analyse basic DC and AC electric circuits.

CO2: Explain the working principles of transformers and its tests.

CO3: Explain the concepts of DC and AC machines and their applications

CO4: Understand the wiring methods, working principles of circuit protective devices, electrical billing and safety measures.

### TEXT/ REFERENCE BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.



3. B L Theraja and AK Theraja,” A Textbook of Electrical Technology- Vol-I & II, S. CHAND &Co ltd, 2013.
4. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
5. P.V. Prasad et al., Basic Electrical Engineering, Cengage 2019

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<b>Subject Code:</b>	<b>ECUALE3</b>									
<b>Subject:</b>	<b>BASIC ELECTRICAL ENGINEERING LABORATORY</b>	-	-	2	25	--	25	25	50	01

### COURSE OBJECTIVE:

- To understand basic instruments and safety measures.
- To practically provide the concept of different theorems.
- To understand the concept of RLC circuits.
- To understand the working of transformers
- To understand the concept of DC and AC machines.

### List of experiments/demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- To verify various theorems on DC circuits
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L-C circuits – Single-phase and Three-phase circuit measurement
- Transformers: Polarity test, OC & SC tests. Loading of a transformer: measurement of primary and secondary voltages and currents and power.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), and single-phase induction machine.

### COURSE OUTCOME:

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

- Acquire knowledge about different types of meters and construct circuits and measure different electrical quantities.
- Analyse the DC circuits
- Analyse Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Work on machines like transformers
- Understand the construction of DC and AC machines

SYLLABUS	(SEMESTER-I)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<i>Subject Code:</i>	PPUALB2							25	50	01
<i>Subject:</i>	ENGINEERING PHYSICS LABORATORY	-	-	2	25	--	25			

### COURSE OBJECTIVE:

- To learn and perform the various practical related to optical components characterization, semiconductor material and devices characterization and know their applications in advance areas such as communication, industries, defence, navigation etc.

### List of experiments/demonstrations:

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

**COURSE OUTCOME:** At the end of the course students will be able to:

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

SYLLABUS	(SEMESTER-I)	Periods/Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<i>Subject Code:</i>	MEUALL1							25	50	01
<i>Subject:</i>	ENGINEERING GRAPHICS	1	-	3	25	--	25			

### COURSE OBJECTIVE:

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

**UNIT I: 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 II: 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 III: 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 IV: 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 V: 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.

**COURSE OUTCOME:** At the end of the course, the student shall be able to:

1. Draw engineering curves, orthographic projections of lines, planes and solids.
2. Draw sections of solids including cylinders, cones, prisms and pyramids.
3. Make development of surfaces, Orthographic and Isometric projections
4. Overview of Computer Graphics.

**TEXT/ REFERENCE BOOKS:**

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

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Viva/ Assessment	Grand total	Credits
		L	T	P	Attendance	Activities	TOTAL			
<i>Subject Code:</i>	<b>NSUALS1</b>							<b>25</b>	<b>50</b>	<b>01</b>
<i>Subject:</i>	<b>NSS</b>	-	-	<b>2</b>	<b>5</b>	<b>20</b>	<b>25</b>			

S.N.	PROGRAM HEADS	HOURS/SEM
1	Cleaning program	06
2	Plantation	06
3	Health Camp/Special Days celebration	10
4	Awareness program/Rally	06

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject Code:</b>	<b>LAUBTC1</b>	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject:</b>	<b>INDIAN CONSTITUTION</b>	1	-	-	20	20	10	50	-	50	01

### COURSE OBJECTIVE:

- 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.

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

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

**UNIT III:** 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 IV:** State Government: Governor: Role and position, Chief Minister and council of ministers, State Secretariat

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

**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

### TEXT/ REFERENCE BOOKS:

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

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject Code:</b>	<b>FOUBTC2</b>	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject:</b>	<b>ENVIRONMENTAL SCIENCE AND ECOLOGY</b>	2	-	-	15	15	10	40	60	100	02

**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/ REFERENCE BOOKS:**

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

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject Code:	AMUBTB1										
Subject:	ENGINEERING MATHEMATICS - A	3	1	-	15	15	10	40	60	100	04

**UNIT I: Differential Calculus:** 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 II:** Indeterminate forms, Asymptotes, Radius of curvature, Partial differentiation, Total differentiation

**UNIT III: Integral Calculus:** Reduction formulae, Curve tracing, Area, Volume, Length, Surface area, Double and triple integrals, Gamma and beta function.

**UNIT IV: Differential Equations:** 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 V:** 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.

**TEXT/ REFERENCE BOOKS:**

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

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject Code:	CYUBTB3	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	ENGINEERING CHEMISTRY	3	-	-	15	15	10	40			

### COURSE OBJECTIVE:

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

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

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

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

**UNIT V:** 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 OUTCOME:** At the end of the course students will be able to:

Understand and solve the practical problems of their higher Engineering classes on the basis of understanding of Chemistry developed in their B. Tech. I sem classes.

### TEXT/ REFERENCE BOOKS:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
5. A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
6. Applied Chemistry by H.D. Gesser, Springer Publishers
7. Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM
8. B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
9. S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
10. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject Code:</b>	<b>CSUBTE5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CT-1</b>	<b>CT-II</b>	<b>Attendance &amp; Assignments</b>	<b>TOTAL</b>	<b>60</b>	<b>100</b>	<b>03</b>
<b>Subject:</b>	<b>COMPUTER PROGRAMMING</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>40</b>			

**COURSE OBJECTIVE:**

- To understand the basic of Idea of Algorithm.
- To understand the programing concept of Arithmetic expressions and Basic Algorithms
- To learn the Functions and Structure of array.

**UNIT I: 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 II: 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 III: Basic Algorithms:** Searching, concept of binary search etc, Basic Sorting Algorithms Bubble sort etc, Finding roots of equations, introduction of Algorithm complexity

**UNIT IV: 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 V: 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 OUTCOME:** At the end of the course students will be able to:

- Develop the algorithm and programmers for various applications using Arithmetic expressions, arrays, pointers and Functions.

**TEXT/ REFERENCE BOOKS:**

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

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
<b>Subject Code:</b>	<b>ECUBTE7</b>										
<b>Subject:</b>	<b>INTRODUCTION TO ELECTRONICS &amp; COMMUNICATION ENGINEERING</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>40</b>	<b>60</b>	<b>100</b>	<b>03</b>

### COURSE OBJECTIVE:

- To equip students with foundational knowledge and a comprehensive overview in the field of electronics and communication engineering.
- To provide students with a fundamental grounding in electronic engineering principles essential for understanding the functionality and utilization of electronic devices, circuits, logic design, and communication systems.
- To cultivate ethical and professional attitudes in first-year engineering students, creating an academic environment that encourages teamwork, the ability to contextualize engineering issues within a broader social framework, and the pursuit of lifelong learning essential for a successful professional career.

**UNIT I: Introduction to Electronics Engineering:** Outline, Scope and goal of learning electronics engineering, **Introduction to semiconductor devices:** Energy bands in solids, Semiconductor & its classification, Energy band model of semiconductor, Equilibrium carrier concentration inside the energy bands, Basic principle and operation of semiconductor devices-diode, bipolar junction transistor, field effect transistors, Introduction to VLSI.

**UNIT II: Applications of Semiconductor Devices:** Basic concepts of rectifiers, Filters, Voltage regulators, Amplifiers and Oscillators.

**UNIT III: Introduction to Digital Systems:** Numbers systems, Number base conversion, Complements, Basic theorems and properties of Boolean algebra, Boolean functions, Logic gates, Logic circuit implementation using diodes and transistors, Reduction of Boolean expressions and implementation with logic gates, Karnaugh's Map and Combinational circuits.

**UNIT IV: Transducers and Sensors:** Introduction, Passive Electrical Transducers, Resistive Transducers, Resistance Thermometers, Thermistor. Active Electrical Transducers, Piezoelectric Transducer, Photoelectric Transducer.

**UNIT V: Basics of Communication System:** Definition of signal, Standard test signals, Signals operations and its representation: shifting, folding and scaling, Classification of signals, Definition of system, System classification, System properties: additivity and homogeneity, Causality, Stability, Invertibility. Electromagnetic spectrum used for communication, Fourier transform, Elements of a communication system-transmitter and receiver, Need of modulation, Introduction to analog and digital communication systems, Examples of telecommunication systems-telephone, radio, television, mobile communication and satellite communication.

**COURSE OUTCOME:** At the end of the course students will be able to:

CO1 Describe the overview of electronics and illustrate the concepts of semiconductor devices.

CO2 Elucidate and analyze the application of semiconductor device.

CO3 Develop competence knowledge to construct basic digital circuit by use of basic gate & its function.

CO4 Illustrates the principle of Transducers and sensors.

CO5 Comprehend the need of communication & explain the different modes of communications from wired to wireless and the computing involved.

### TEXT/ REFERENCE BOOKS:

1. M. S. Tyagi, "Introduction to Semiconductor Materials and Devices" Wiley, 2008.
2. D. A. Neamen, "Electronic Circuits," Tata McGrawHill Education, 2006.
3. S. C. Lee, "Digital Circuits and Logic Design," PHI Learning, 2009.
4. J. G. Proakis and M. Salehi, "Fundamentals of Communication Systems," Prentice Hall, 2004.
5. G. Kennedy, B. Davis, "Electronic Communication Systems", TMH, 4<sup>th</sup> ed., 2008.
6. W. Tomasi, "Advanced Electronic Communication Systems", Pearson/Prentice-Hall, 6<sup>th</sup> ed., 2004.
7. A. K. Sawhney, "A Course in Electrical and Electronics Measurements and Instrumentation", 18<sup>th</sup> ed., Dhanpat Rai & Company Private Limited, 2007.



SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<i>Subject Code:</i>	CYUBLB3									
<i>Subject:</i>	ENGINEERING CHEMISTRY LABORATORY	-	-	2	25	--	25	25	50	01

### COURSE OBJECTIVE:

- 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 KMnO<sub>4</sub> solution as an intermediate.
3. To determine the concentration of hypo solution (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>.5H<sub>2</sub>O) 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 dibenzalpropanone.
9. [4+2] Cycloaddition Reaction: Diels-Alder reaction.
10. Preparation of aspirin and calculate its yield.

#### Group – C:

11. To calculate the  $\lambda_{\max}$  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 OUTCOME:** At the end of the course students will be able to:

Handle the chemicals of synthesis as well as titration that will ultimately make them efficient and develop their future chemistry laboratory skills.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<b>Subject Code:</b>	<b>IPUBLL2</b>									
<b>Subject:</b>	<b>ENGINEERING WORKSHOP PRACTICES</b>	-	-	2	25	--	25	25	50	01

### COURSE OBJECTIVE:

- To impart student knowledge on various hand tools for usage in engineering applications.
- Be able to use analytical skills for the production of components.
- Design and model different prototypes using carpentry, sheet metal and welding.
- Make electrical connections for daily applications.
- To make student aware of safety rules in working environments.

### Course Content:

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

### COURSE OUTCOME: At the end of the course students will be able to:

- Make half lap joint, Dovetail joint and Mortise & Tenon joint
- Produce Lap joint, Tee joint and Butt joint using Gas welding
- Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
- Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring

### TEXT/ REFERENCE BOOKS:

1. 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.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4<sup>th</sup> edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.
- (iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4<sup>th</sup> edition, Prentice Hall India, 1998.
4. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata Mc-Graw Hill House, 2017.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
<i>Subject Code:</i>	CSUBLE5									
<i>Subject:</i>	COMPUTER PROGRAMMING LABORATORY	-	-	2	25	--	25	25	50	01

### COURSE OBJECTIVE:

- 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 OUTCOME:** At the end of the course students will be able to:

- Utilization of Branching and logical expressions and Loops, Arrays and Function and Numerical methods and Recursion for writing the programmes for various engineering applications

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Assessment	Grand total	Credits
		L	T	P	Attendance	Activities	TOTAL			
<i>Subject Code:</i>	PEUBLS2									
<i>Subject:</i>	SPORTS AND YOGA		-	2	5	20	25	25	50	01

### 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:

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

### TEXT/ REFERENCE BOOKS:

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