Al Almaas Haider Charitable Trust

Al Haider College of Technology at Ranchi, Jharkhand

SYLLABUS OF

B. Tech in Computer Science & Engineering

Semester I-VIII

Table of Content

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –I

Sr. No.	Name of the Subject	L-T-P	Credit	Contact Hours Per Week
1	Engineering Mathematics–I	3-1-0	4	3
2	Engineering Chemistry	3-0-0	3	3
	Programming for Problem Solving	3-0-0	3	3
3	Basic Electrical Engineering	3-1-0	4	3
	Engineering physics	3-1-0	4	3
4	Engineering Mechanics	3-0-0	3	3
	English for Communication	3-0-0	3	2
5	Constitution of India	0-0-0	0	2
	Practical			3
6	Engineering Chemistry Lab	0-0-1	1	
	Engineering Physics Lab	0-0-1	1	4
7	Basic Electrical Engineering Lab	0-0-1	1	4
	Programming for Problem Solving Lab	0-0-2	2	4
8	Engineering Mechanics Lab	0-0-1	1	2
9	Engineering Graphics & Design	0-0-2	2	4
	Workshop Practices	0-0-2	2	2
	TOTAL	12-2-5	19	45

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –II

Sr. No.	Name of the Subject	L-T-P	Credit	Contact Hours Per Week
1	Engineering Mathematics–II	3-1-0	4	3
2	Engineering Chemistry	3-0-0	3	3
	Programming for Problem Solving	3-0-0	3	3
3	Basic Electrical Engineering	3-1-0	4	3
	Engineering physics	3-1-0	4	3
4	Engineering Mechanics	3-0-0	3	3
	English for Communication	3-0-0	3	2
5	Constitution of India	0-0-0	0	2
	Practical			3
6	Engineering Chemistry Lab	0-0-1	1	
	Engineering Physics Lab	0-0-1	1	4
7	Basic Electrical Engineering Lab	0-0-1	1	4
	Programming for Problem Solving Lab	0-0-2	2	4
8	Engineering Mechanics Lab	0-0-1	1	2
	Engineering Graphics& Design	0-0-2	2	4
9	Workshop Practices	0-0-2	2	2
	TOTAL	12-2-5	19	45

AAHCT, Ranchi, Jharkhand

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Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Analog Electronic Circuits	PCC	3	3
2	Data structure	PCC	3	3
3	Digital Electronics	PCC	3	3
4	Engineering Mathematics -III	BSC	4	3
5	Humanities-I Professional Practice, Law & Ethics Organizational Behavior	HSMC	3	3
6	Environmental Science	MC	0	2
7	Python Programming	PCC	3	3
	PRACTICAL			
8	Analog Electronic Circuits Lab	PCC	2	4
9	Data structure Lab	PCC	2	4
10	Digital Electronics Lab	PCC	2	4
11	IT Workshop (MAT LAB)	PCC	1	2
12	Python Programming Lab	PCC	2	4
	TOTAL		28	38

AAHCT, Ranchi, Jharkhand

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SEMESTER –IV

S. No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Discrete Mathematics	BSC	4	4
2	Computer Organization & Architecture	PCC	3	3
3	Operating Systems	PCC	3	3
4	Design & Analysis of Algorithms	PCC	3	3
5	Microprocessor & Microcontroller	PCC	3	3
6	Software Engineering	PCC	3	3
	PRACTICAL			
6	Operating Systems Lab	PCC	2	4
7	Design & Analysis of Algorithms Lab	PCC	2	4
8	Computer Organization & Architecture Lab	PCC	2	4
	TOTAL		25	31

AAHCT, Ranchi, Jharkhand

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SEMESTER –V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Signals & Systems	PCC	3	3
2	Database Management Systems	PCC	3	3
3	Formal Language &Automata Theory	PCC	3	3
4	Object Oriented Programming	PCC	3	3
5	Humanities-II Soft Skills and Interpersonal Communication	HSMC	3	3
6	Elective-1 Graph Theory ImageProcessing Advanced Algorithms	PEC	3	3
	PRACTICAL			
7	Database Management Systems Lab	PCC	2	4
8	Object Oriented Programming Lab	PCC	2	4
9	Summer Internship-I (3-4 Weeks)	PCC	1	0
	TOTAL		**23**	**26**

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Compiler Design	PCC	3	3
2	Computer Networks	PCC	3	3
3	Advance Java Programming	PCC	3	3
4	Elective-II	PEC	3	3
	Artificial Intelligence			
	Machine Learning			
	Visual Programming			
5	Elective-III	PEC	3	3
	Web Technology			
	Neural Networks and Deep Learning			
6	Open Elective –I	HSMC	3	3
	Cyber Law and Ethics			
	Human Resource Development and Organizational Behavior			
	Advanced Algorithms			
	Practical			
7	Compiler Design Lab	PCC	2	4
8	Computer Networks Lab	PCC	2	4
9	Advance Java Programming Lab	PCC	2	4
	TOTAL		**24**	**30**

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

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SEMESTER –VII

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Elective-IV Cryptography & Network Security Advanced Operating Systems Web and Internet	PEC	3	3
2	Elective-V Quantum Computing Optimization Techniques Real Time Systems	PEC	3	3
3	Open Elective-II Electronic Design Automation Computer Graphics Data mining and warehousing Semantic Web and Social Networks	OEC	3	3
4	Biology For Engineers	BSC	3	3
5	Data Analytics	PCC	3	3
	Practical			
5	Minor Project	PROJ	4	8
6	Industrial Training (Summer Internship-4-6 Week)	PROJ	4	0
	TOTAL		23	23

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Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –VIII

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week
1	Elective-VI Cloud Computing Data Mining Advanced Computer Architecture	PEC	3	3
2	Open Elective-III Signals and systems Advanced Operating Systems	OEC	3	3
3	Open Elective-IV Cyber security Soft Computing	OEC	3	3
4	VLSI System Design	PCC	3	3
	PRACTICAL			
5	Major Project	PROJ	6	12
6	Extra- Curricular/ Co-Curricular Activity	PROJ	0	0
	Total		18	24

PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Engineering knowledge: An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to get the solution of the engineering problems.

[PO.2]. Problem analysis: Ability to Identify, formulates, review research literature, and analyze complex engineering problems.

[PO.3]. Design/Development of Solutions: Ability to design solutions for complex Engineering Problems by considering social, Economic and Environmental aspects.

[PO.4]. Conduct investigations of complex problems: Use research-based knowledge to design, conduct analyze experiments to get valid conclusion.

[PO.5]. Modern tool usage: ability to create, select, and apply appropriate techniques, and to model complex engineering activities with an understanding of the limitations.

[PO.6]. The engineer and society: Ability to apply knowledge by considering social health, safety, legal and cultural issues.

[PO.7]. Environment and sustainability: Understanding of the impact of the adopted engineering solutions in social and environmental contexts.

[PO.8]. Ethics: Understanding of the ethical issues of the civil engineering and applying ethical principles in engineering practices.

[PO.9]. Individual and teamwork: Ability to work effectively as an individual or in team, as a member or as a leader.

[PO.10]. Communication: An ability to communicate clearly and effectively through different modes of communication.

[PO.11]. Project management and finance: Ability to handle project and to manage finance related issue.

[PO.12]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning.

PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES

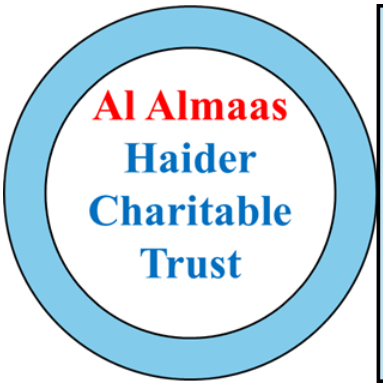
PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Understand the principles, architecture and organization of computers, embedded systems and computer networks.

[PSO.2]. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems that include both hardware and software.

[PSO.3]. Apply software design and development practices to develop software applications in emerging areas such as IoT, Data Analytics, Social Networks, Cloud and High-Performance Computing.

[PSO.4]. Demonstrate & communicate Ability to demonstrate the knowledge, skill to analyze the cause and effect on Computer Science Engineering.



Al Haider College of Technology at Ranchi, Jharkhand

SYLLABUS OF

B. Tech in Computer Science & Engineering

Semester- I

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –I

Sr. No.	Name of the Subject	L-T-P	Credit	Contact Hours Per Week
1	Engineering Mathematics–I	3-1-0	4	3
2	Engineering Chemistry	3-0-0	3	3
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	English for Communication	3-0-0	3	2
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8	Engineering Mechanics Lab	0-0-1	1	2
9	Engineering Graphics & Design	0-0-2	2	4
	Workshop Practices	0-0-2	2	2
	TOTAL	12-2-5	19	45

Subject: Engineering Chemistry

Code: BTE22011

3 Credits | Semester 1

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- The following are the objectives of this course:
- To understand the Concepts of chemical bonding.
- To know the importance of the Periodic Table of the Elements, how it came to be, and its role in organizing chemical information.
- To learn about the basic concepts of Spectroscopy.

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

[CO1]	Understand the skills required to succeed in graduate school, the chemical industry or professional school.
[CO2]	Acquire a foundation of chemistry of sufficient breadth and depth to enable them to understand and critically interpret the primary chemical literature.
[CO3]	Recognize the exigency and importance of engineering chemistry in the use of industrial and domestic determination.
[CO4]	Design economic and new methods of synthesis of new materials and apply their knowledge for the protection of the environment and application in their field.
[CO5]	Understand an insight into the latest (R&D oriented) topics, to enable the engineering student to upgrade the existing technologies and pursue further research.

C. SYLLABUS

ATOMIC AND MOLECULAR STRUCTURE: Molecular orbital of diatomic molecules and plots of the multi-centre orbital. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic. Pi-molecular orbital of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Numerical based on Crystal field stabilization energy. Band structure of solids

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS: Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibration and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterization techniques. Diffraction and scattering
USE OF FREE ENERGY IN CHEMICAL EQUILIBRIA: Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Cell potentials, the Nernst equation and applications, Relation of free energy with EMF. Acid base, oxidation reduction and solubility equilibrium. Corrosion, Types of corrosion, galvanic series, Cathodic and anodic reactions, corrosion prevention methods.
PERIODIC PROPERTIES: Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electro negativity, polarizability, oxidation states, coordination numbers and geometries. Hard soft acids and bases (Classification, pearsons HSAB principle, its application and limitation), molecular geometries (VSEPR theory to NH3, H3O+, SF4, CLF3, ICl2and H2O)
INDUSTRIAL CHEMISTRY: Polymers: types of polymers, polymerization, applications, and important synthetic polymers. Ceramics material: Classification and Applications, Water treatment, Air pollution and Control techniques.

D. TEXTBOOKS

1. A textbook of Engg. Chemistry-ShashiChawla T2. Engineering Chemistry by Wiley
2. Physical Chemistry by Atkins
3. Engineering chemistry by P.C. Jain (Dhantpat Rai Publishing company)
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Fundamentals of Molecular Spectroscopy, by C. N. Banwell

E. REFERENCE BOOKS

1. Environmental Engg. - Keiley
2. Selected topics in inorganic chemistry-MMT
3. I. A Levine, Physical chemistry, McGraw Hill
4. Organic chemistry by Clayden.
5. Essentials of Physical Chemistry, Bahl& Tuli, S. Chand Publishing.
6. Inorganic Chemistry by J D Lee.

Subject: Engineering Mathematics–I

Code: BTE21001

Credit - 4 | Semester 1

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level
- Serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

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

[CO1]	Remember the differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications, they will have a basic Understand of Beta and Gamma functions.
[CO2]	Understand the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
[CO3]	Demonstrate the tool of power series and Fourier series for learning advanced Engineering Mathematics.
[CO4]	Analyze functions of several variables that is essential in most branches of engineering
[CO5]	Evaluate the essential tool of matrices and linear algebra in a comprehensive manner.

C. SYLLABUS

CALCULUS: Evolutes and involutes, Evaluation of definite and improper integrals, Beta and Gamma functions and their properties Application of definite integral, Curve tracing, area, evaluate surface areas and volumes of revolutions
CALCULUS: Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin's theorems with remainders, Indeterminate forms and Hospitals rule, Maxima and minima

SEQUENCE AND SERIES: Convergence of sequence and series, tests for convergence, Power series, Taylors series, series for exponential, trigonometric and logarithmfunctions,2 Fourier series: Half range sine and cosine series, Parseval's theorem
MULTIVARIABLE CALCULUS (DIFFERENTIATION): Limit, continuity and partial derivatives, directional derivatives, total derivative, Tangent plane and normal line; Maxima, minima and saddle points, Method of Lagrange multipliers; Gradient, curl and divergence
MATRICES: Symmetric, skew- symmetric and orthogonal matrices, ,complex matrix, hermitian, skew hermitian matrix, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations, Eigen values and Eigen vectors; Diagonalization of matrices, Cayley-Hamilton Theorem, and Orthogonal transformation

D. TEXTBOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006

E. REFERENCE BOOKS

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008

B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

Subject: Basic Electrical Engineering

Code: BTE21003

Credits- 4 | Semester 1

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To Enhance understanding the basic concepts of Core Electrical Engineering subjects. The topics covered under this subject will help
- To enhance the basic understanding of Electrical machines and power systems and basic electronics through the topic covered under this Subject

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

[CO1]	Understand the basic knowledge of electrical quantities such as current, voltage,power, energy and frequency
[CO2]	Predict the behavior of any electrical and magnetic circuits.
[CO3]	Formulate and solve complex AC, DC circuits.
[CO4]	Identify the type of electrical machine used for that particular application.
[CO5]	Realize the requirement of transformers in transmission and distribution of electric power and other applications.

C. SYLLABUS

D. C. CIRCUITS: Electrical circuit elements (R, L and C), voltage and current sources, dependent and independent sources, Units and dimensions, Source Conversion, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin' s theorem and their application for analysis of series and parallel resistive circuits excited by independent voltage sources, Power & Energy in such circuits. Mesh & nodal analysis, Star Delta transformation & circuits and Norton theorems. Time- domain analysis of first-order RL and RC circuits.
A.C. CIRCUITS : Representation and Generation of sinusoidal AC voltage, definition of average value, R.M.S. value, form factor and peak factor of AC quantity , Concept of phasor, Concept of Power factor, Concept of impedance and admittance, Active, reactive and apparent power, Analysis of single-phase ac circuits consisting of R, L, C R-L, R-C, R-L-C series &parallel circuit Resonance Necessity and advantages of three phase systems, Meaning of Phase sequence, balanced and unbalanced supply and loads. Relationship between line and phase values for

balanced star and delta connections. Power in balanced & unbalanced three- phase system and their measurements
TRANSFORMERS: Types of Magnetic Material, BH characteristics (magnetization characteristics) of Ferro magnetic materials, self - inductance and mutual inductance, energy in linear magnetic systems, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency Auto-transformer and three-phase transformer connections
ELECTRICAL MACHINES: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators
POWER CONVERTERS &ELECTRICAL INSTALLATIONS: DC-DC buck and boost converters, duty ratio control Single-phase and three-phase voltage source inverters; sinusoidal modulation Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup

D. TEXTBOOKS

1. B.L. Theraja & A.K Theraja, Electrical Technology Volume-I, S. Chand & Co
2. V.N. Mittle, Basic Electrical Engineering, Tata McGraw Hill
3. S.N. Singh Basic Electrical Engineering, P.H.I
4. Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall
5. C.L. Wadhwa Basic Electrical Engineering, New Age International
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

E. REFERENCE BOOKS

1. L.S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press
2. E. Hughes, Electrical and Electronics Technology, Pearson

Subject: Engineering Mechanics

Code: BTE22009

Credits- 3 | Semester I

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- To obtain resultant of various forces
- To obtain resultant of various forces
- To understand role of friction in equilibrium problems
- To know fundamental laws of machines and their applications to various engineering problems

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

[CO1]	Identify the force systems for given conditions by applying the basics of mechanics.
[CO2]	Determine unknown force(s) of different engineering systems.
[CO3]	Apply the principles of friction in various conditions for useful purposes.
[CO4]	Find the centroid and center of gravity of various components in engineering systems.
[CO5]	Select the relevant simple lifting machine(s) for given purposes.

C. SYLLABUS

BASICS OF MECHANICS AND FORCE SYSTEM: Basic concepts, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

EQUILIBRIUM: Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analyzing equilibrium**,** Lami's Theorem – statement and explanation, Application for various engineering problems. Types of beams, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple), Beam reaction for cantilever, simply supported beam with or without overhang –subjected

to combination of Point load and uniformly distributed load, Beam reaction graphically for simply supported beam subjected to vertical point loads only
FRICTION & VIRTUAL WORK: Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction. Introduction, laws of coulomb friction, simple contact friction problems, belt friction, the square crew thread rolling resistance, Equilibrium of bodies on level surface subjected to force parallel and inclined to plane. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only. Work of a force, Principle of Virtual work and its application.
CENTROID AND CENTRE OF GRAVITY& TRUSS: Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle), Centroid of composite figures composed of not more than three geometrical figures, Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre of Gravity of composite solids composed of not more than two simple solids. The structural model, simple trusses, analysis of simple trusses: method of joints, Method of sections, graphical method.
SIMPLE LIFTING MACHINE: Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility, Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

D. TEXTBOOKS

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.

E. REFERENCE BOOKS

1. Dhade, Jamadar &Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
2. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, CambridgeUniversity Press.
3. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

Subject: Engineering Chemistry Lab

Code: BTE22015

Credits- 1 | Semester I

Total Lecture: 30

A. Introduction:

- To expose the students to a breadth of experimental techniques using modern instrumentation.
- The student will learn the laboratory skills needed to design, safely conduct and interpret chemical research.

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

[CO1]	Understand the principles of chemistry relevant to the study of science and engineering
[CO2]	Estimate rate constants of reactions from concentration of reactants/products as a function of time
[CO3]	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
[CO4]	Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.

C. SYLLABUS

S.No.	Name of Experiments
1	To determine the viscosity and relative viscosity of given sample by using Ostwald's Viscometer.
2	To prepare buffer solution and standardization of pH meter.
3	Determination of chloride content of water.
4	Determination of cell constant and conductance of solutions.
5	Determination of the amount of iron in an iron ore solution by KMnO4
6	To determine adsorption isotherm of acetic acid by activated charcoal

7	To determine alkalinity of a given water sample.
8	To synthesis a polymer/drug.

D. TEXT BOOKS

1. Practical Chemistry by S.S. Dara
2. Practical Chemistry by D N Bajpai – S. Chand Publishing

E. REFERENCE BOOKS

1. Advanced Practical Chemistry Book by pragati prakashan

Subject: Basic Electrical Engineering Lab

Code: BTE21005

Credits- 1 | Semester I

Total Lecture: 30

A. Introduction:

- To impart a basic knowledge of electrical instruments voltmeter, ammeter, multi-meter, and oscilloscope. Real-life resistors, capacitors and inductors.
- Measurement such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Emphasize the effects of electric shock and precautionary measures.
- Improve the ability to function on a multi-disciplinary team.

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

[CO1]	Understand different meters and instruments for the measurement of electrical quantities
[CO2]	Understand the linear and nonlinear characteristics of different types of loads experimentally
[CO3]	Design and experiment with potential divider circuits
[CO4]	Experimentally verify the basic circuit theorems
[CO5]	Measure power and power factor in ac circuits

C. SYLLABUS

S.No.	Name of Experiments
1	Demonstrate the verification of Ohm's law.
2	Demonstrate the verification of Resistance in series and parallel apparatus.
3	Demonstrate the verification of Kirchhoff's current law (KCL).
4	Demonstrate the verification of Kirchhoff's voltage law (KVL).
5	Demonstrate the characteristics of half wave rectifier.
6	Demonstrate the characteristics of full wave rectifier.

7	Demonstrate the verification of Thevenin's theorem.
8	Demonstrate the verification of Norton's theorem.

D. TEXTBOOKS

1. D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition.
2. S.N. Singh, Basic Electrical Engineering, P.H.I.,2013
3. Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall,2014
4. M.S. Sukhija, T. K. Nagsarkar, Basic Electrical and Electronics Engineering, Oxford University press, 2012

E. REFERENCE BOOKS

1. C.L. Wadhwa, Basic Electrical Engineering. New Age International.
2. B.L. Theraja & A.K Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication
3. E. Hughes & I.M. Smith Hughes Electrical Technology Pearson
4. Vincent Del Toro Electrical Engineering Fundamentals

Subject: Engineering Mechanics Lab

Code: BTE22013

Credits- 1 | Semester I

Total Lecture: 30

A. Introduction:

- To obtain resultant of various forces.
- To calculate support reactions through conditions of equilibrium for various structures
- To understand role of friction in equilibrium problems
- To know fundamental laws of machines and their applications to various engineering problems

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

[CO1]	Identify the force systems for given conditions by applying the basics of mechanics.
[CO2]	Determine unknown force(s) of different engineering systems.
[CO3]	Apply the principles of friction in various conditions for useful purposes.
[CO4]	Find the centroid and center of gravity of various components in engineering systems.
[CO5]	Select the relevant simple lifting machine(s) for given purposes.

C. SYLLABUS

S.No.	Name of Experiments
1	To verify the law of moment by using bell crank lever
2	To verify the support reactions of a simply supported beam
3	To calculate the Mechanical advantage, Velocity Ratio and efficiency of Single Winch Crab.
4	To calculate the Mechanical Advantage, Velocity Ratio and efficiency of double Winch Crab.
5	To calculate the Mechanical Advantage, Velocity Ratio, and efficiency of Single start Worm & Worm Wheel
6	To calculate the Mechanical Advantage, Velocity Ratio, and efficiency of Double start Worm & Worm Wheel.

7	To calculate the Mechanical Advantage, Velocity Ratio, and efficiency of Triple start Worm & Worm Wheel
8	To verify triangle and parallelogram law of forces with the help of Gravesend's apparatus.

D. TEXT BOOKS

1. Bedi D.S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R.S., Applied Mechanics, S. Chand& Co. New Delhi.
3. Bansal R K, A textbook of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S.,S Chand & Co. New Delhi.

E. REFERENCE BOOKS

1. Dhade, Jamadar &Wala welkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
2. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge University Press.
3. Meriam, J. L., Kraige, L. G. Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

Subject: Engineering Graphics & Design

Code: BTE21004

Credits- 2 | Semester I

Total Lecture: 60

A. Introduction:

- Increase ability to communicate with people
- Learn to sketch and take field dimensions.
- Learn to take data and transform it into graphic drawings.
- Learn basic Auto Cad skills.
- Learn basic engineering drawing formats
- Prepare the student for future Engineering positions

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

[CO1]	Perform basic sketching techniques
[CO2]	Understand of architectural and engineering scales will increase.
[CO3]	Draw orthographic projections and sections.
[CO4]	Draft the engineering drawings in practical application
[CO5]	Become familiar with office practice and standards

C. SYLLABUS

S.No.	Name of Experiments
1	Introduction to Engineering Drawing
2	Projection of Points and Straight Lines
3	Projection Straight Lines
4	Projection of Planes
5	Isometric Axes, Lines, Planes, Solids.
6	Orthographic Projection
7	Development of Surface

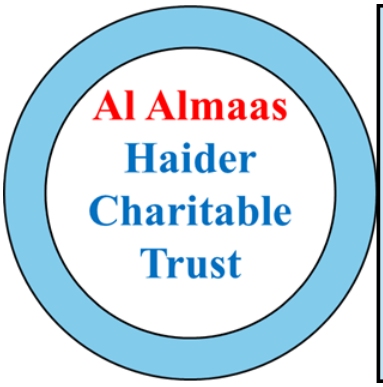
8	Introduction to AUTO CAD

D. TEXTBOOKS

1. Engineering Graphics, N.D Bhatt, Charotar Publishing House Pvt. Limited
2. Principle of Engineering Graphics and Drawing, R.K Dhawan, S. Chand Publishing
3. Engineering Graphics and Drafting, P.S GILL, S. K. Kataria& Sons

E. REFERENCE BOOKS

1. Engineering Drawing and Computer Graphics, Shah, M.B. & Rana B.C. Pearson Education
2. Engineering Graphics, Agrawal B. & Agrawal C. M TMH Publication
3. Textbook on Engineering Drawing, Narayana, K.L. & P. Kannaiah, Scitech Publishers



Al Haider College of Technology at Ranchi, Jharkhand

SYLLABUS OF

B. Tech in Computer Science & Engineering

Semester- II

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Computer Science Engineering

SEMESTER –II

Sr. No.	Name of the Subject	L-T-P	Credit	Contact Hours Per Week
1	Engineering Mathematics–II	3-1-0	4	3
2	Engineering Chemistry	3-0-0	3	3
	Programming for Problem Solving	3-0-0	3	3
3	Basic Electrical Engineering	3-1-0	4	3
	Engineering physics	3-1-0	4	3
4	Engineering Mechanics	3-0-0	3	3
	English for Communication	3-0-0	3	2
5	Constitution of India	0-0-0	0	2
	Practical			3
6	Engineering Chemistry Lab	0-0-1	1	
	Engineering Physics Lab	0-0-1	1	4
7	Basic Electrical Engineering Lab	0-0-1	1	4
	Programming for Problem Solving Lab	0-0-2	2	4
8	Engineering Mechanics Lab	0-0-1	1	2
	Engineering Graphics& Design	0-0-2	2	4
9	Workshop Practices	0-0-2	2	2
	TOTAL	12-2-5	19	45

Subject: Engineering Physics

Code: BTE22010

4 Credits | Semester II

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To acquire fundamental knowledge about nature and its phenomena including quantitative expression.
- To enhance intellectual, computational, experimental, communication and analytical skills of the students Physics is necessary to satisfy the basic sciences requirement, as appropriate for various engineering disciplines

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

[CO1]	Identify and understand the kinds of experimental results which are incompatible with classical Physics leading to the development of a quantum theory of matter and light.
[CO2]	Use basic concepts to analyze and design a wide range of semiconductor devices.
[CO3]	Understand & solve different types of wave equations.
[CO4]	Use the principles of optics to solve various complex engineering problems.
[CO5]	Use fundamental laws and relations to solve problems in electricity, electromagnetism

C. SYLLABUS

QUANTUM MECHANICS: Introduction to Quantum Physics, black body radiation, Explanation using the photon concept, Photoelectric effect, Compton effect, Wave-particle duality, De-Broglie hypothesis, Heisenberg's Uncertainty principle. Born interpretation for wave function, Free-particle wave function and wave-packets, Time-dependent and time-independent Schrodinger equation, particle in a box, Finite Potential barrier and tunnelling.
ELECTRONIC MATERIALS AND SEMICONDUTOR: Free electron theory, Energy bands in solids, E-k diagram, Direct and indirect band gaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Occupation probability, Fermi level, and Effective mass.Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction,

WAVES AND OSCILLATION: Simple harmonic motion, damped and forced simple harmonic oscillator Mechanical and electrical simple harmonic oscillators,damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators, electrical and mechanical impedance, resonance.
OPTICS AND LASER: Introduction to interference, Analytical treatment of interference, Displacement of fringes, Thin film, Wedge shaped film, Newton's Ring,Concept of diffraction, Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and diffraction grating, Limit of Resolution, Resolving power of grating,Introduction to interaction of radiation with matter, Stimulated and spontaneous emission, Einstein's coefficient, principles and working of laser: population inversion, pumping, types of laser: He-Ne laser, Ruby laser , application of lasers.
ELECTROMAGNETISM: Electric field and electrostatic potential for a charge distribution; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution. Boundary conditions of electric field and electrostatic potential,Bio-Savart law, vector potential and calculating it for a given magnetic field; the equation for the vector potential and its solution for given current densities. Faraday's law of electromagnetic induction, Equation of continuity, displacement current, Maxwell's equation, Poyting theorem, Electromagnetic waves in free space, conducting and non-conducting medium

D. TEXTBOOKS

1. Concept of Modern Physics by Arthur Beiser: Publication: TMH
2. Elements of electromagnetics by Mathew N.O. Sadiku: Publication: Oxford University Press.
3. Introduction to electrodynamics by David J. Griffiths; Pub.: Pearson Education.
4. Optics by Ajoy Ghatak Pub; TMH
5. Fundamentals of Physics extended volume by Resnick, Halliday and Walker; Pub John Wiley & Sons. Inc. Asian Edition.
6. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).

E. REFERENCE BOOKS

1. Modern Physics by G. Aruldhas & P. Rajagopal; Pub: Prentice Hall of India.
2. Quantum Physics by H.C. Verma Pub.: Surya Publication.

Subject: Engineering Mathematics –II

Code: BTE22008

4 Credits |Semester II

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables.
- To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines
- To equip the students with standard concepts and tools at an intermediate to advanced level

B. Course Outcomes: At the end of the course,

[CO1]	Remember the mathematical tools needed in the multiple integrals and their usage.
[CO2]	Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
[CO3]	Demonstrate the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing with engineering problems.
[CO4]	Calculate the analytic function**.**
[CO5]	Evaluate complex integrals by using the Cauchy-Goursat integral theorem.

C. **SYLLABUS**

MULTIVARIABLE CALCULUS (INTEGRATION): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity. Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds, Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes
FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: solvable for p, solvable for y Equations solvable for x and Clairaut's equation

ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER: Second-order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties
COMPLEX VARIABLE – DIFFERENTIATION: Differentiation, Cauchy-Riemann equations, Analytic functions, harmonic functions, finding harmonic conjugate, Elementary analytic functions (exponential, trigonometric, logarithm) and their properties, Conformal mappings, Mobius transformations and their properties.
COMPLEX VARIABLE – INTEGRATION: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum , Modulus theorem (without proof) Taylor's series, zeros of analytic functions, singularities, Series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich

D. TEXT BOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

E. REFERENCE BOOKS

1. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

Subject: Programming for Problem Solving

Code: BTE21259

3 Credits | Semester II

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- To understand concept of algorithm and programming
- To know various logical components and
- Syntax used in programming
- To learn different ways of transforming a real-world problem into a system problem

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

[CO1]	Formulate simple algorithms for arithmetic and logical problems.
[CO2]	Test and execute the programs and correct syntax and logical errors and to implement conditional branching, iteration and recursion
[CO3]	Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
[CO4]	Use arrays, pointers and structures to formulate algorithms and programs
[CO5]	Decompose a problem into functions and synthesize a complete program using divide and conquer approach

C. SYLLABUS

FUNDAMENTALS OF INFORMATION TECHNOLOGY: Evolution of Computers, Generation and Classification of Computers Application of Computers, etc**.** Memory Hierarchy, RAM, ROM, Types of Secondary Storage Devices, etc.Information, Technology, Role of Information Technology, Information Technology and Internet and etc. **Introduction**, Evolution of the Internet, Basic Internet Terms, Getting Connected to the Internet, Internet Applications, Data over the Internet, Web Browser, Browsing Internet Using Internet Explorer, E-mail, search Engines, Instant Messaging. E-Commerce, Electronic Data Interchange, Smart Cards, Mobile Communication etc.
C FUNDAMENTALS, DECISION & LOOPING STATEMENTS: The C language. Phases of developing a running computer program in C. Data Concepts in C: Constants, Variables, Expressions, Operators, and Operator precedence in C. Different basic data types and their sizes. Managing input and output statements and sequential control statements. Decision-making statements (If-Else constructs). Loop control statements (While construct, Do While construct, For construct)

ARRAYS, STRINGS &FUNCTIONS: One-dimensional Arrays: Declaration and Initialization. String variables, Reading and writing strings, Arithmetic operations on characters, Putting strings together, Comparison of two strings. Functions: The prototype declaration, Function definition. Function call: Passing arguments to a function (by value, by reference). Scope of variables. Recursive function calls, Tail recursion, Tree of recursion. Sorting problems: Selection sort, Insertion sort. Sorting in multidimensional arrays. Sorting in arrays. Search problems: Linear search and binary search. Recursive and iterative formulations.
POINTERS &STRUCTURE: Pointers: Declaring and dereferencing pointer variables. Pointer arithmetic. Accessing arrays through pointers. Pointer types, Pointer and strings. Structures in C: Motivation, examples, declaration, and use. Operations on structures. Passing structures as function arguments. Type defining structures.
LINKED LISTS & FILE HANDLING: Self-referential structures, Dynamic data structures, Linked lists with examples. File operations in C: Input, output, and error streams. Opening, closing, and reading from files. Searching through files using functions such as fseek (), ftell (), and rewind(). Programming for command line arguments

D. TEXTBOOKS

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

E. REFERENCE BOOKS

1. Let us C, Yashwant Kanetkar, BPI publications
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

English for Communication

Code: BTE22370

3 Credits | Semester II

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- To impart basic skills of Communication in English through intensive practice.
- Students of Engineering to enable them to enhance their communicative knowledge and soft skills.

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

[CO1]	Understanding the basics of communication represents the communication process and knowing the practical implementations in the workplace.
[CO2]	Understand verbal and non-verbal modes of communication effectively in practical situations
[CO3]	Analyze vocalics and basic grammar.
[CO4]	Create competence in reading and writing.
[CO5]	Evaluate the speaking process.

C. SYLLABUS

VOCABULARY BUILDING: 'Ancient Architecture in India' from prescribed textbook 'English for Engineers published by Cambridge University. Vocabulary: Synonyms and Antonyms Lexical set of words- Formation of hints with lexical set of words- Usage of Lexical sets in framing meaningful sentences. Standard Abbreviation in English.

IDENTIFYING COMMON ERRORS IN WRITING: Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

SELF DEVELOPMENT AND ASSESSMENT: Self-assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning Self-esteem. Managing Time; Personal memory, Rapid reading,

ORAL COMMUNICATION : Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

NATURE AND STYLE OF SENSIBLE WRITING: Business letters: Enquiry/claim complaint and order. Technical reports, Email writing, Technical articles, Writing reports, Paragraph writing, Techniques for writing precisely. Graphic presentation, Project proposals.

D. TEXTBOOKS

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000.
8. English for Engineers, Cambridge university.

E. REFERENCE BOOKS

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001 R4. AICTE Modal

Subject: Constitution of India

Code: BTE25095

0 Credits | Semester II

Total Lecture: 30 Total Tutorial: 6

A. Introduction:

- The objective of the Constitution of India is to establish a society where there are:
- Justice social, economic and political.
- Liberty - thought, expression, faith, belief and worship

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

[CO1]	Understand the emergence and evolution of the Indian Constitution. Understand and analyse federalism in the Indian context
[CO2]	Understand and explain the significance of the Indian Constitution as the fundamental law of the land.
[CO3]	Exercise his fundamental rights in the proper sense at the same time identify his responsibilities in national building.
[CO4]	Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail
[CO5]	Understand the Electoral Process, Emergency provisions and Amendment procedure.

C. SYLLABUS

INTRODUCTION: Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNION GOVERNMENT AND ITS ADMINISTRATION: Structure of the Indian Union: Federalism Centre-State relationship President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat Lok Sabha, Rajya Sabha

STATE GOVERNMENT AND ITS ADMINISTRATION: Governor: Role and Position, CM and Council of Ministers State Secretariat: Organization, Structure and Functions.

LOCAL ADMINISTRATION: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation Panchayati raj: Introduction, PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Position and role, Block level: Organizational Hierarchy (Different

departments), Village level: Role of Elected and Appointed Officials, Importance of grass root democracy

ELECTION COMMISSION: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women

D. TEXTBOOKS

1. Indian Polity' by Laxmikanth
2. Indian Administration' by Subhash Kashyap

E. REFERENCE BOOKS

1. Indian Constitution' by D.D. Basu
2. Indian Administration' by Avasti and Avastin

Subject: Engineering Physics Lab

Code: BTE21261

Credits | Semester II

Total Lecture: 30

A. Introduction:

- To study the use of physical principles and analysis in various fields of engineering and technology.
- To supplement the theoretical knowledge gained in the lecture by hands-on experience with the equipment.
- This will develop a scientific temper and help to apply the basic concepts and principles in solving engineering problems.
- Demonstrate an ability to make physical measurements & understand the limits of precision measurement.

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

[CO1]	Understand the calculation of specific resistance of wire by Carey Foster bridge
[CO2]	Calculate the thermal conductivity of poor conductors
[CO3]	Measure resonance frequency and quality factor of LCR Circuit & RC circuit with AC current
[CO4]	Understand the characteristics of transistors, and photoelectric cells and determine operational parameters associated with their performance.
[CO5]	Work with laboratory sodium light and lasers. Understand the method to measure the wavelength of the light emitted from a laser and Sodium light.

C. SYLLABUS

S. No.:	Name of Experiments
1	To determine the Planck's constant using LED.
2	To study various types of losses that occur in optical fibers and measure loss in dB of two optical patch cords
3	To study the series and parallel resonance with LCR Circuits
4	To determine V-I Characteristics of P-N Junction Diode
5	To the Charge to mass (e/m) ratio of Electron by Lorentz Force Apparatus
7	To determine the number of lines per centimetre of the plane diffraction grating by using sodium light
8	To find the wavelength of sodium light using Fresnel's biprism
9	To determine input & output characteristics of a PNP Junction Transistor in CE and CB configuration.

10	To determine input & output characteristics of an NPN Junction Transistor in CE and CB configuration.

D. TEXT BOOKS

1. A Text Book of Engineering Physics Practical by Dr. Ruby Das, C.S. Robinson, Dr. Rajesh Kumar & Prashant Kumar Sahu; Pub University Science Press
2. Fundamentals of Physics extended volume by Resnick, Halliday and Walker; Pub John Wiley & Sons. Inc. Asian Edition.

E. **REFERENCE BOOKS:**

1. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, Heinemann Educational Publishers.
2. Engineering Practical Physics, S. Panigrahi & B. Mallick,2015, Cengage Learning India Pvt. Ltd.

Subject: Programming for Problem Solving Lab

Code: BTE21262

Credits- 2 | Semester II

Total Lecture: 60

A. Introduction:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.

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

[CO1]	**F**ormulate simple algorithms for arithmetic and logical problems. To translate the algorithms to programs (in C language).To test and execute the programs and correct syntax and logical errors.
[CO2]	Program for solving simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
[CO3]	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
[CO4]	Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

C. SYLLABUS

S. No.:	**Name of Experiments**
1	Write a C program to find sum and average of three numbers. Write a C program to find the sum of individual digits of a given positive integer
2	Write a C program to generate the first n terms of the Fibonacci sequence Write a C program to generate prime numbers between 1 to n. Write a C program to check if the given number is Armstrong or not
3	Write a C program to check whether the given number is perfect or not Write a C program to check whether the given number is strong or not.
4	Write a C program to find the roots of a quadratic equation. Write a C program to perform arithmetic operations using a switch statement.

5	Write a C program to find the factorial of a given integer using a non-recursive function Write a C program to find the factorial of a given integer using a recursive function
6	Write a C program to find the GCD of two integers by using a recursive function. Write a C program to find the GCD of two integers by using a non-recursive function
7	Write a C program to find the largest and smallest number in a list of integers. Write a C program to Sort the Array in an Ascending Order. Write a C program to find whether the given matrix is symmetric or not.
8	Write a C program to perform the addition of two matrices. Write a C program using the function to perform the multiplication of two matrices.
9	Write a C program to use the function to insert a sub-string in to given main string from a given position. Write a C program to swap the values of two variables using (i) Call by value (ii) Call by reference
10	Write a C program using user-defined functions to determine whether the given string is palindrome or not. Write a C program that displays the position or index in the main string S where the substring T begins, or - 1 if S doesn't contain T
11	Write a C program to count the number of lines, words and characters in a given text. Write a C program to find the sum of integer array elements using pointers
12	a) Write a C Program to Calculate Total and Percentage marks of a student using structure

D. TEXTBOOKS

1. C Programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V. Rajaraman, PHI Publishers.
3. C Programming, E. Balagurusamy, 3rd edition, TMH Publishers.

E. REFERENCE BOOKS

1. C Programming, M.V.S.S. N Venkateswarlu and E. V. Prasad, S. Chand Publishers.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

Subject: Engineering Workshop Practice

Code: BTE22267

Credits | Semester II

Total Lecture: 60

A. Introduction:

- To understand basic engineering processes for manufacturing and assembly
- To understand, identify, select and use various marking, measuring, holding, striking and cutting tools and equipment
- To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions.

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

[CO1]	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment and machines
[CO2]	Understand job drawing and complete jobs as per specifications in the allotted time
[CO3]	Inspect the job for the desired dimensions and shape
[**CO4**]	Operate, and control different machines and equipment adopting safety practices

C. SYLLABUS

S. No.:	**Name of Experiments**
1	To make a V- fitting from the given two M.S pieces.
2	To make a T- lap joint
3	To Make a tray by using GI sheet as per given Drawing
4	To make a Butt joint using the given two M.S pieces by arc welding.
5	To make the taper turning operation in cylindrical piece of required angle on lathe machine.
6	To make an internal thread using tap M10x1.5
7	Machining a block on shaper machine.
8	To make a step turning operation on cylindrical M.S. work piece using lathe machine.

D. TEXTBOOKS

1. Workshop Technology Vol-I, II, III Hajra Choudry., Media Promotors and Publishers P Ltd.
2. Manufacturing Technology vol 1 by P.N. Rao Mc. Grow Hill.

E. REFERENCE BOOKS

1. Workshop technology by R.S. Raghuwanshi. Dhanpat Ray & co
2. Workshop technology by R.S. Khurmi &J. K. Gupta S. Chand Co.