COMMON CURRICULAM
FOR
FIRST YEAR
B. TECH DEGREE COURSES
IN
ENGINEERING & TECHNOLOGY

(Applicable from the academic session 2024-2025 onwards for the branches of ***CSE, CSE(AI&ML), CSE(DS), CSE(CS), CHE, BT, ME, AEIE, EE, ECE, IT, CE, FT, AE****)*

Haldia Institute of Technology
An Autonomous Institute, NAAC Accredited Grade 'A' Institute, NBA Accredited Departments

Approved by : All India Council for Technical Education (AICTE)

Affiliated to : Maulana Abul Kalam Azad University of Technology, West Bengal (Formerly Known as - WBUT)

Haldia, Purba Medinipur, West Bengal, India, 721657

A. **Definition of Credit**

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credits

B. **Range of credits**

All B. Tech. programs include a range of credits from 160 to 165.

C. **Mandatory Additional Requirement (MAR) for earning B. Tech Degree**

Every student, who is admitted to the 4 years B. Tech program from the academic year 2024-25 onwards, is required to earn *minimum 100* Activity Points, in addition to the required academic grades for getting B. Tech degree.

The MAR activities, (as per guideline of AICTE / affiliating University, MAKAUT) will provide necessary needs of modern industry and the society. Through this program, irrespective of one's technological field, each student develops the skill of active participation in the co-curricular and extra-curricular activities through SAWYAM based learning activities. Such activities enhance student's employability and global acceptances. Details are given in *Annexure-I*.

D. **MOOCs for B. Tech Honours**

A student will be eligible to get B. Tech Degree *with Honours*, if he/she completes an *additional 20 credits*, through Massive Open Online Courses (MOOCs). The complete description of the MOOCs relevant for the first-year course is given in *Annexure-II.*

E. **Guidelines regarding Mandatory Induction Program for the new students**

The aim of the Induction Programme is to acclimatize the students to the environment of their engineering institution, give them a flavour of the exciting new world of education that they are entering, provide them with mentoring schemes, and make them aware of their neighbourhood, society and people. This will allow them to evolve as well-rounded individuals. Details are given in *Annexure-III*.

F. **Group division**

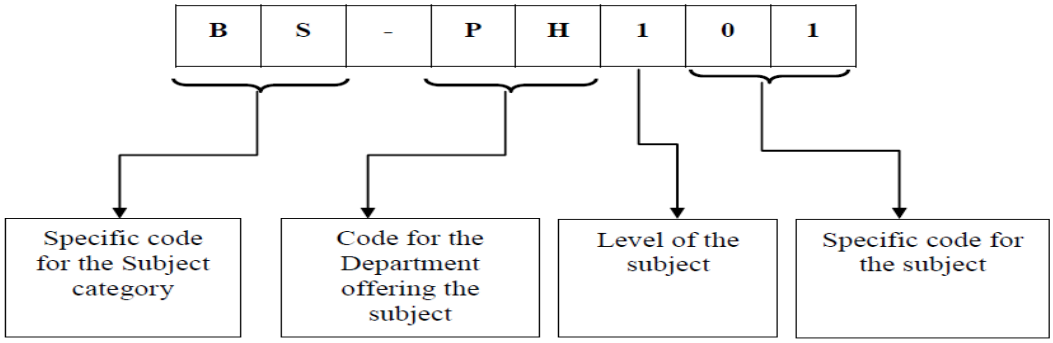
Group-A

All non-IT based programme like - Mechanical Engineering (ME), Chemical Engineering (CHE), Civil Engineering (CE), Electrical Engineering (EE), Applied Electronics & Instrumentation Engineering (AEIE), Biotechnology (BT), Food Technology (FT), Agriculture Engineering (AE), Electronics & Communication Engineering (ECE).

Group-B

All IT-based programme like – Computer Science & Engineering (CSE), Computer Science & Engineering (Cyber Security), Computer Science & Engineering (Data Science), Computer Science & Engineering (Artificial Intelligence & Machine Learning), Information Technology.

Subject Numbering Scheme:



COURSE CURRICULA

B.TECH, 1ST YR-1ST SEMESTER

Theory							
Sl No.	Paper Name	Paper Code	Marks	L	T	P	Credit
1	Mathematics-I [Group-A & B]	BS-M 101	100	3	1	0	4
2	Physics-I [Group-A] /Chemistry-I [Group-B]	BS-PH 101/ BS-CH101	100	3	1	0	4
3	Basic Elec. & Electro. Engg. [Group-A] / Programming for Problem Solving [Group-B]	ES-EE 101/ ES-CS 101	100	3	1	0	4
4	Biology for Engineers [Group- A]/ Values, Ethics and Indian Knowledge System [Group- B]	ES-BT 101/ HS-MC 101	100	2	0	0	2
5	English Language and Technical Communication. [Group-B]	HM-HU 101	100	2	0	0	2
Total Marks: 400 Total Credit: 14.0 [Group-A] Total Marks: 500 Total Credit: 16.0 [Group-B]							
Practical							
6	Physics-I Lab [Group-A]/ Chemistry-I Lab [Group-B]	BS-PH 191/ BS-CH 191	100	0	0	3	1.5
7	Basic Elec. & Electro. Engg. Lab [Group-A] / Programming Lab [Group-B]	ES-EE 191/ ES-CS 191	100	0	0	3	1.5
8	Workshop Practice [Group-A]/ Engg. Drawing [Group-B]	ES-ME 191/ ES-ME 192	100	0	0	3	1.5
9	Language Lab [Group-B]	HM-HU 191	100	0	0	2	1
Extra-Curricular Activity							
10	NSS[Group-A]						
Total Marks: 300 &Total Credit: 4.5 [Group-A] Total Marks: 400 &Total Credit: 5.5 [Group-B]							

COURSE CURRICULA

B. TECH, 1ST YR-2ND SEMESTER

Theory							
Sl No.	Paper Name	Paper Code	Marks	L	T	P	Credit
1	Mathematics-II [Group-A & B]	BS-M 201	100	3	1	0	4
2	Chemistry-I [Group-A]/ Physics-I [Group-B]	BS-CH 201/ BS-PH 201	100	3	1	0	4
3	Programming for Problem Solving [Group-A]/ Basic Elec. & Electro. Engg. [Group-B]	ES-CS 201 / ES-EE 201	100	3	1	0	4
4	Values, Ethics and Indian Knowledge System [Group- A]/ Biology for Engineers [Group- B]	HS-MC 201/ ES-BT 201	100	2	0	0	2
5	English Language and Technical Communication [Group-A]	HM-HU 201	100	2	0	0	2
Total Marks: 500 Total Credit: 16.0 [Group-A] Total Marks: 400 Total Credit: 14.0 [Group-B]							
Practical							
6	Chemistry-I Lab [Group-A]/ Physics-I Lab [Group-B]	BS-CH 291/ BS-PH 291	100	0	0	3	1.5
7	Programming Lab [Group-A]/ Basic Elec. & Electro. Engg. Lab [Group-B]	ES-CS 291/ ES-EE 291	100	0	0	3	1.5
8	Engg. Drawing [Group-A] / Workshop Practice [Group-B]	ES-ME291 /ES-ME292	100	0	0	3	1.5
9	Language Lab [Group-A]	HM-HU 291	100	0	0	2	1
Extra-Curricular Activity							
10	NSS [Group-B]						
Total Marks: 400 &Total Credit: 5.5 [Group-A] Total Marks: 300 &Total Credit: 4.5 [Group-B]							

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Paper Name: Mathematics-I	Category: Basic Science Course
Paper Code: BS-M101	Semester: First
L-T-P: 3-1-0	Credit: 4

Total Lecture: 45L

Course Objectives:

- Providing the core concepts of higher Engineering Mathematics and describing the techniques, this works as an essential tool to solve the problems in their field of applications.

- To provide an overview of Differential Equations, Laplace Transform and Complex Analysis to engineers.

COURSE CONTENTS

Module-1 [8L]
Matrix & Determinant:
Elementary row and column operations over a matrix; Rank of a matrix; Rank and nullity; System of linear equations and its consistency; Cayley-Hamilton theorem; Eigen values and Eigen vectors; Diagonalization of matrices.

Module-2 [9L]
Differential Calculus & Integral Calculus:
Leibnitz's Theorem; Rolle's Theorem, Mean value theorem, Taylor's and Maclaurin's theorems with remainders; Improper integrals; Beta and Gamma functions and their properties; Convergence of improper integrals. Differentiation under integral sign.

Module-3 [8L]
Sequence and Series:
Basic concept of Convergence of sequence and series; Tests for convergence: Comparison test, Cauchy's Root test, D' Alembert's Ratio test (statements and related problems on these tests), Rabbe's test; Alternating series; Leibnitz's Test (statement only); Absolute convergence and Conditional convergence.

Module-4[10L]
Calculus of function of several variables:
Introduction to functions of several variables; Limit and continuity, Partial derivatives, Homogeneous functions and Euler's theorem up to three variables, Chain rules, Differentiation of implicit functions, Total differentials and their applications, Jacobians up to three variables Maxima, minima; Saddle points of functions; Lagrange Multiplier method and their applications; Concept of line integrals, Double and triple integrals.

Module-5[10L]
Vector Calculus:
Vector function of a scalar variable, Differentiation of a vector function, Scalar andvector point functions, Gradient of a scalar point function, divergence and curl of a vector point function,

Directional derivative. Related problems on these topics. Green's theorem, Gauss Divergence Theorem and Stoke's theorem (Applications only, proofs not required).

Course Outcomes (COs)

CO1: Represent, solve and formulate systems of linear equations, which are fundamental in engineering for modelling various physical problems; eigen values /eigen vectors to understand dynamic behavior of systems and analyze their stability, multivariate statistics system analysis.

CO2: Arrange and assess knowledge of characteristics of function at intermediate points, continuity pertaining to proper and improper integrals leading to convergence, convergency of sequence and series.

CO3: Model complex systems with several variables to understand their interactions; comprehend optimization in multidimensional spaces.

CO 4: Describe, analyze and compose physical phenomena that involve quantities with both magnitude and direction amalgamated with the concept of gradient, divergence, and curl to ascertain how quantities change in space and time.

Learning Resources:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India.
2. B.S. Grewal (S. Chand & Co.), Engineering Mathematics.
3. John Bird, Higher Engineering Mathematics (4th Edition, 1st Indian Reprint 2006, Elsevier).
4. S. S. Sastry, Engineering Mathematics (PHI, 4PthP Edition, 2008).
5. M.C. Potter, J.L. Goldberg and E.F.Abonfadel, Advanced Engineering Mathematics, 3E: (OUP), Indian Edition.

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Paper Name: Mathematics-II	**Category: Basic Science Course**
Paper Code: BS-M201	**Semester: Second**
L-T-P: 3-1-0	**Credit: 4**

Total Lecture: 45L

Course Objectives

- Providing the core concepts of higher Engineering Mathematics and describing the Techniques, this works as an essential tool to solve the problems in their field of applications.

- To provide an overview of Differential Equations, Laplace Transform and Complex Analysis to engineers.

COURSE CONTENTS

Module -1 [8L]

Ordinary differential equations (ODE)- Linear and non-linear differential equations, Bernoulli's equation. General solution of ODE of first order and higher degree (different forms with special reference to Clairaut's equation). Solvable for x, solvable for y, solvable for p. Second order and first degree: General linear ODE of order two with constant coefficients, Method of variation of parameters, Cauchy-Euler equations. Simultaneous linear differential equations.

Module -2 [7L]

Basics of Graph Theory: Graphs, Digraphs, Weighted graph, Connected and disconnected graphs, Complement of a graph, Regular graph, Complete graph, Subgraph, Walks, Paths, Circuits, Euler Graph, Matrix representation of a graph, Adjacency and incidence matrices of a graph, Graph isomorphism, Bipartite graph. Shortest path and Dijkstra's algorithm. Floyd-Algorithm. Trees and Spanning Trees.

Module -3 [10L]

Laplace Transform: Introduction to integral transformation, functions of exponential order, Definition and existence of LT (Initial and final value theorems with applications, proofs not required), LT of elementary functions, Properties of Laplace Transformations, Evaluation of sine, cosine and exponential integrals, periodic and step functions using LT.

Definition and properties of inverse LT, Convolution Theorem (statement only) and its application to the evaluation of inverse LT, Solution of initial value problem using LT.

Module -4 [12L]

Complex Variable: Complex functions, Concept of Limit, Continuity and Differentiability. Analytic functions, Cauchy-Riemann Equations (statement only). Sufficient conditions for a function to be analytic. Harmonic function and Conjugate Harmonic function, related problems. Construction of Analytic functions, Milne Thomson method etc. Conformal mappings, Bilinear transformation and its applications.

Complex Integration: Concept of simple curve, closed curve, smooth curve & contour. Some elementary properties of complex Integrals. Line integrals along a piecewise smooth curve. Cauchy's theorem (statement only). Cauchy's integral formula and its applications.

Module -5 [8L]

Zeros and Singularities of an Analytic Function & Residue Theorem.

Zero of an Analytic function, Singularities of an analytic function. Different types of singularities. Poles. Examples on determination of singularities and their nature. Series of complex valued functions, Taylor's series, Laurent's series.

Residue, Cauchy's Residue theorem (statement only) and its applications, evaluation of definite integrals: $\int_0^{\infty} \frac{\sin x}{x} dx, \int_0^{2\pi} \frac{d\theta}{a+b\cos\theta+c\sin\theta}, \oint_C \frac{P(z)}{Q(z)} dz$ (elementary cases, P(z) & Q(z) are polynomials of 2nd order or less).

Course Outcomes (COs)

CO1: Comprehend and solve ODE as a mathematical tool necessary to model, analyze, design complex problems in engineering practice.

CO2: Get acclimatize and propose graph as powerful framework for modelling and analyzing complex systems of interconnected components to predict connectivity and reliability of networks.

CO3: Describe, analyze and compose LT as a mathematical tool for analyzing linear systems, solving differential equations, performing frequency domain analysis, and designing systems with desired performance characteristics.

CO4: Solve problems which are impossible to solve with real variables alone by encompassing contour integration, series expansions, singularities and the residue theorem for solving integrals, differential equations and inverse problems.

Learning Resources

1. Miller & Freund R.A.Johnson, Probability and Statistics for Engineers, Prentice Hall of India.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern.
3. V. K. Balakrishnan, Graph Theory, Schaum's Outline, TMH.
4. B.S. Grewal, Engineering Mathematics, S. Chand & Co.
5. Daniel A. Murray, Introductory Course in Differential Equations, Longmans & Green.
6. N. Deo, Graph Theory, Prentice-Hall of India.
7. Sahajahan Ali Mollah, Numerical Analysis and Computational Procedures, Books & Allied Ltd.
8. Gupta & Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
9. Murray R. Spiegel, Schaum's Outlines: Laplace Transforms.

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Paper Name: Physics –I	**Category: Basic Science Course**
Paper Code: BS-PH 101 / BS-PH 201	**Semester: First / Second**
L-T-P: 3-1-0	**Credit: 4**

Total Lecture: 42L

Course Objectives

- To introduce the rudimental and relevant concepts of physics to different branches of Engineering and Technology.

- To compile all the knowledge acquired from the course and to apply in industry, academia and research keeping in the mind about ethical awareness and impact in the field of environmental (pollution), social (legal) and safety.

COURSE CONTENTS

Module-1 [7L]
Oscillations and Waves: Harmonic Oscillation -Simple Harmonic Motion –Damped Oscillation -Relaxation time& log decrement. Forced oscillation – Electromechanical Analogy between Mechanical Oscillator with Electrical circuit – Mechanical Impedance - Transient and Steady state oscillations – Resonance - Bandwidth – Quality factor - Sharpness of Resonance.

Module -2 [11L]
Optics

Wave Optics*:* Interference–- Superposition of waves, Division of wave front and division of amplitude, Interference in parallel and wedge-shaped film-Thin film Interference, Newton's rings - determination of wave length and thickness.
Diffraction– Fresnel and Fraunhofer diffraction - Single Slit, Double Slit and Garting (Qualitative discussion only)
Polarization – Introduction – States of Polarization – Brewster's law–Malus Law – Phase Retardation Plate.

Lasers– Characteristics of Laser –Spontaneous and Stimulated Emission-Population Inversion-Classification of Laser - construction and working -Einstein's coefficients – Example of Gas Laser (He-Ne), Solid state laser (Ruby) and LED and p-n junction semiconductor lasers-Quantum well Lasers (concept only) -Applications of Laser

Module -3 [9L]
Electromagnetism, Dielectric and Magnetic Properties of Material

Basic Electromagnetism- Gradient of a Scalar function, Divergence and Curl of Vector field, Vector Integration –Line, surface and volume integration - Divergence and Stoke's Theorem-Maxwell's equations of Electromagnetism.
Dielectric Properties- Dielectric polarization – Polar and Non-polar dielectric, Electronic, Ionic, Orientational and Space charge polarization (Qualitative overview) - Application of dielectric materials
Magnetic Properties- Introduction**,** Classification (Dia, Para, Ferro) of magnetic materials – Curie temperature – Hysteresis – hard and soft magnetic materials –Applications of Magnetic materials- Superconductivity (only concepts)

Module -4 [10L]
Quantum Mechanics: Blackbody Radiation –Planck's Radiation law, Compton Effect, Dual Nature of Matter – De' Broglie hypothesis – Heisenberg's Uncertainty Principle – Group velocity and Phase velocity, Wave function – Postulates of Quantum Mechanics – Quantum Mechanical operator –Eigen function and Eigen value - Schrödinger's time dependent and time independent wave equation-Particle in 1D box –Particle in 3D box – Concept of degeneracy-Stationary Perturbation (Concepts Only)

Module -5 [5L]
Statistical Mechanics: Phase Space (μ- and Γ- phase space) – Macro states and Microstates – Density of States -Statistical Ensemble and Thermodynamic Probability-Classical Statistical systems (Maxwell - Boltzmann statistics) and quantum statistical systems (Fermi-Dirac and Bose-Einstein Statistics) and their applications.

Course Outcomes (COs)

CO 1: Represent, solve and formulate the phenomena of Simple Harmonic Motion, Damped & Forced oscillations and realize the problem of simple mechanical systems and their electrical analogy.

CO 2: Understand and correlate interference, diffraction, polarization of light and analyze the mechanism of LASER along with their applications.

CO 3: Use the knowledge of vector calculus to describe and analyze electromagnetic fields and apply them in dielectric and magnetic properties of matter.

CO 4: Formulate principles of quantum mechanics to analyze radiation and to solve problems of particle in infinite potential well with the concept of wave function. In abreast a student must compose statistical methods and probability theory to study the behaviour of systems consisting of a large number of particles.

Learning Resources:

1. M. R. Spiegel, Vector Analysis.
2. N. K. Bajaj, Waves and Oscillation.
3. David Halliday, Robert Resnick Jearl Walker, Principles of Physics, 10ed, Wiley.
4. A .K. Ghatak, Optics, McGraw Hill Education India Private Limited.
5. J. R. Taylor, C.D. Zafiratos and M. A. Dubson, Modern Physics for Scientists and Engineers, 2nd Ed., Pearson (2007).
6. J. J. Sakurai, Modern Quantum Mechanics, Cambridge University Press.

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Paper Name: Chemistry-I	**Category: Basic Science Course**
Paper Code: BS-CH-101 / BS-CH-201	**Semester: First / Second**
L-T-P: 3-1-0	**Credit: 4**

Total Lecture: 42L

Course Objective

- To develop the interest among the students regarding chemistry and their applications in engineering
- To develop confidence among students about chemistry, how the knowledge of chemistry is applied in technological field.

COURSE CONTENTS

Module I (8 L)

Thermodynamics (4L): First Law of Thermodynamics (general discussion, and numerical), Second Law, Engine; Carnot's Cycle; Entropy, Entropy change; Entropy of system/surrounding/Universe; Free Energy, Free energy expression; Gibbs-Helmholtz equation;

Clausius-Clapeyron equation; TdS relationship, Maxwell relationship.

Electrochemistry and Corrosion (4L): Cell construction; Primary and Secondary Cell; Nernst Equation (without derivation); Relationship with ΔG, ΔH and ΔS; Standard Hydrogen Electrode (SHE), pH of Cell; Fuel Cell (Hydrogen fuel), Batteries (Lithium-ion battery).
Electrochemical theory of corrosion, Types of corrosion (dry, wet), Rust formation, Pitting corrosion, Crevice corrosion, Galvanic series, Stress corrosion cracking, Caustic embrittlement, Prevention from Corrosion (Electroplating, Anodization, Biofilm coatings) Sacrificial anode, Passivation.

Module II (6L)

Atomic structure (3L): Bohr's atomic model-Sommerfeld's extension of atomic structure; Electronic configuration and Quantum numbers; Shapes of s, p, d, f orbitals - Pauli's exclusion principle - Hund's Rule of maximum multiplicity- Aufbau principle. Atomic emission and absorption spectra, line and band spectra; Hydrogen spectrum (Numerical only); de-Broglie's theory; Heisenberg's uncertainty principle – wave nature of electron – Schrodinger wave equation (No derivation). Eigen values and Eigen functions.

Chemical bonding and Coordination Chemistry (3L): Theory of Chemical Bonding, Molecular orbital and Bond order of H_2, N_2, He_2, O_2, N_2, CO, HF. Pi-molecular orbital of ethylene and butadiene. Crystal field theory of coordination compounds- magnetism, spin and orbital contribution: d-d transitions, C-T transition, Colour (w.r.t. MnO_4^-, and CrO_4^{2-}).

Module III (6L)

Stereochemistry (3L): Stereoisomerism; concept of chirality and optical activity (up to two carbon atoms); elements of symmetry (plane and centre); interconversion of Fischer and Newman representations; threo and erythro, D and L, CIP Rules: R/S (up to 2 chiral carbon atoms), E/Z nomenclature. Conformational analysis of ethane, n-butane.

Green Chemistry Approach to Organic Reactions (3L): Green chemistry Principle, oxidation of p-Xylene to PTA, Jones Oxidation, Use of KMnO4; Reduction reactions of organic compounds using NaBH4, LAH. Some name reactions: Wittig reaction), Suzuki, and Heck Coupling, Synthesis of Immidazolium salt (1-Methyl immidazole with Chloro pyridine.

Module IV (7L)
Organic Spectroscopy:

UV-Vis Spectroscopy (3L): Types of electronic transitions, chromophores and auxochromes; Bathochromic and Hypochromic shifts; intensity of absorptions (Hyper-/Hypochromic effects); application of Lambert-Beers law (no derivation, only numerical), Absorbency and Transparency, Woodward's Rules for calculation of λ_{max} for conjugated diene, relative positions of λ_{max} considering conjugative effect, solvent effect. Fluorescence, phosphorescence (Jablonski diagram) and their application.

IR Spectroscopy (2L): Introduction; modes of molecular vibrations (fundamental and nonfundamental); IR active/inactive molecules.

NMR Spectroscopy (2L): Basic principles of Proton Magnetic Resonance; NMR active molecules; equivalent and non-equivalent protons with example; chemical shift.

Module V (7L)

Chemical Kinetics (3L): Rate equation; Activation Theory; Collision Theory; Transition state theory; Consecutive reaction (explanation and example only, derivation not required); Homogeneous and Heterogeneous Catalysis; Enzyme Catalysis; Michaelis Menten equation.

Polymer (4L): Introduction, Molecular weight of Polymers (number average, weight average), Polymerization processes (addition and condensation polymerization), Mechanism of addition polymerization. (w.r.t polyethylene), Poly dispersity index (PDI), degree of polymerization, stereo-regularity of polymer (tacticity). Synthesis and use of Polyethylene, Polypropylene, Bakelite and PET. Synthesis of rubber, Vulcanization of rubber. Conducting polymers (Polyaniline, polythiophene). Polymer and Environment; Biodegradable polymers (Poly lactic acid, Polyurethane).

Module VI (8L)

Water Treatment (3L): Hardness of water, Water treatment (surface and waste), Alkalinity, Scale-sludge, Phosphate Conditioning and its application to Boiler and Laundry, Reaction involved in DO analysis, BOD and COD analysis.

Elementary Chemical Biology (3L): Origin of Life and Chemical Elements; Trace and Ultrarace elements and their importance; Biological system and roles of metal ions (with special reference to function of Fe in Haemoglobin and Myoglobin and Cu to Hemocyanin). Heavy metal Toxicity of Hg, As, Pb, Cd.

Some commonly used drug molecules (2L): Synthesis, Structure and use of Aspirin, Paracetamol and Metronidazole, and structure and use of Fluoroquinolone, penicillin, cis-platin, doxorubicin

Course Outcomes (COs)

CO1: Formulate the concept of work, energy and their interchangeability, thermodynamic parameters, cells and batteries, gradual deterioration of materials by chemical or electrochemical reactions in the environment, to substantiate respective engineering fields of applications.

CO2: Comprehend the physical and chemical properties of materials, such as strength, conductivity and durability, from the knowledge of atomic and molecular structure, bonding and reactivity; by understanding reaction rates.

CO3: Arrange and assess the structure and conformation of molecules to identify the substances by using various spectroscopic techniques, and also to correlate the molecular

structure and properties of polymers to substantiate with the concept of polymerization reactions, encompassing the views of its applications.

CO4: Synthesize some selective molecules efficacious on biological systems and also to study the essence of water treatment processes to remove contaminants and pollutants, assessing the environmental impact.

Learning Resources

1. P.C.Rakshit, Physical Chemistry Sarat Book House.
2. S. Pahari, Physical Chemistry New Central Book Agency.
3. P. W. Atkins, & Paula, J. de Atkins', Physical Chemistry, Oxford University Press.
4. J. D. Lee, Concise Inorganic Chemistry, 5th Ed., Wiley India Pvt. Ltd.
5. F.A. Cotton, G. Wilkinson, and P.L. Gaus, Basic Inorganic Chemistry 3rdEd.; Wiley India.
6. J. E. Huheey, E. A. Keiter, & R. L. Keiter, Inorganic Chemistry, Principles of Structure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.
7. J. Clayden, N. Greeves, S. Warren, Organic Chemistry, Second edition, Oxford University Press.
8. S. Sen Gupta, Reaction Mechanisms in Organic Chemistry, Oxford University Press.
9. L. Finar, Organic Chemistry (Volume 1) Pearson Education.
10. R. N. Morrison, & R. N. Boyd, Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
11. D. Nasipuri, Stereochemistry of Organic Compounds, Wiley Eastern Limited.
12. E. L. Eliel, & S. H. Wilen, Stereochemistry of Organic Compounds, Wiley: London, 1994.
13. Sharma, Industrial Chemistry (including Chemical Engineering), GOEL Publishing House.

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Paper Name: English Language and Technical Communication	**Category: Humanities and Social Sciences including Management course**
Paper Code: HM-HU 101/HM-HU201	**Semester: First / Second**
L-T-P: 2-0-0	**Credit: 2**

Total Lecture: 32L

Course Objectives

- To acquire language skills
- To develop linguistic and communicative competencies for Engineering students.
- To study academic subjects more effectively using the theoretical and practical components of English syllabus, and hence will develop study skills and communication skills in formal and informal situations.

COURSE CONTENTS

Module 1: Theories of Communication [6L]

Theories and Principles of Communication: Definition, Process, Model (Linear model, Interactive model and Transactional model), Types of Communication – Verbal and Non-verbal communication, Flows of communication
Barriers to communication
Workplace/ Business Communication which can have the following items:

a) Scope of Oral Communication
b) Oral Business Communication: Introducing oneself in a professional setup - brevity, context, understatement, body language –
Task: Introducing others - introducing a junior professional to a senior professional, introducing an employee to a customer, introducing a colleague from your firm to anemployee of another firm.
c) Telephone (audio and video) communication: choice of words, body language, paralinguistic elements of speech, enunciation, brevity, clarification, effective closure

Module 2 : Applied Grammar [9L]
Common Errors in English

- Subject-verb agreement
- Tenses
- Noun-pronoun agreement
- Articles and Prepositions
- Misplaced or dangling modifiers
- Redundancies
- Cliché

Transformation of Sentences

- Active and Passive voice
- Direct and Indirect speech
- Degrees of Comparison
- Use of phrases and clauses in sentences
- Synthesis of Sentences: Simple, Complex and Compound

Module 3 Vocabulary Building [3L]
The concept of word formation: Compounding, Backformation, Clipping and Blending
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to formderivatives.
Synonym, antonym, phrasal verbs, one word substitution and standard abbreviation

Module 4 Basic Writing Skills [4L]

Documenting: definition, meaning, basic concept of documenting (print and online media), types of technical documents
Importance of proper punctuation
Writing Drafts and Revising: drafting, drafting process, first draft, revising, writing the final draft

Editing and Proofreading: types of editing, editing process, proofreading, differences between editing and proofreading

Techniques for writing precisely

Module 5 Professional Writing Skills [10L]

Technical Report Writing: Types and formats

Comprehension, Précis and Expansion Writing, Essay Writing, Writing Statement of Purpose and Project Proposals. Business Letters; Cover letter & CV

Office Correspondence:

- Notice
- Agenda
- Minutes
- Circular
- E-mail

Course Outcomes (COs)

CO1: Apply the basic principles, types and prominent methods and models of communication.

CO2: Synthesize flawless sentence structures incorporating tense, active and passive voices, degrees of comparison, transformation of sentences and speech indices.

CO3: Cultivate strategies for mastering vocabulary, etymology, phrasal verbs, idioms and other tools to enhance sentence coherence.

CO4: Develop essential skills for drafting, documenting, editing and proof reading technical work to hone writing and correspondence skills.

Learning Resources

1. Debashis Bandyopadhyay and MalathyKrishnan, Connect: A Course in Communicative English, Cambridge University Press. 2018.
2. Sanjay Kumar and Pushp Lata, Communication Skills, Oxford University Press. 2015.
3. Nira Konar, Communication Skills for Professionals, Prentice Hall of India 2nd edition,New Delhi, 2011.
4. Wren and Martin, High School English Grammar.
5. S.Prasad & K.P.Thakur, Common Errors in English, Bharti Bhhawan Publishers.
6. R.C. Sharma and Krishna Mohon, Business Correspondence and Report Writing, Tata McGraw-Hill Publishing company Ltd., New Delhi.
7. McCarthy, English Vocabulary in Use.
8. E. Sureshkumar and P. Sreehari, Communicative English, Orient Blackswan , 2007.
9. Jeremy Comfort, Speaking Effectively**,** Developing Speaking Skills for Business English, Cambridge University Press, 1994
10.Michael Swan, Practical English Usage, OUP. 1995.
11.F.T. Wood, Remedial English Grammar, Macmillan.2007.

12. A.J. Thomson, A.V. Martinet, A Practical English Grammar, Oxford University Press.
13.David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey, New York, 2004.

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Paper Name: **Programming for Problem Solving**	**Category: Engineering Science Course**
Paper Code: ES-CS-101/ES-CS -201	**Semester: First / Second**
L-T-P: 3-1-0	**Credit: 4**

Total Lecture: 40L

Course Objectives

- To introduce students to the field of programming using language.
- To enhance their analyzing and problem-solving skills.

COURSE CONTENTS

Module 1 [12L]
Unit 1: Introduction to Programming (4 L)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Overview of Number system and its conversion: Binary, Octal & HEX

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

Unit 2: Arithmetic expressions and precedence (**2 L**)
Unit 3: Conditional Branching and Loops (**6 L**)
Writing and evaluation of conditionals and consequent branching; Iteration and loops

Module 2 [10L]
Unit 1: Arrays (**4 L**)
Arrays (1-D, 2-D), Character arrays and Strings
Unit 2: Basic Algorithms (**6 L**)
Searching algorithm (Linear & Binary search), Basic Sorting Algorithms (Bubble, Selection), notion of order of complexity through example programs (no formal definition required)

Module 3 [8L]

Unit 1: Function (**4 L**)

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

Unit 2: Recursion (**4 L**)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Tower of Hanoi problem.

Module 4 [10 L]

Unit 1: Structure & Union (**4 L**)

Basic concepts of Structures & Union; Array of Structures, Structure-Union comparison with implementation.

Unit 2: **Pointers** (**4 L**)

Concept of pointers, Pointer arithmetic, array of pointers, passing pointer to function, function returning pointer, Array-pointer relationship-basic idea.

Unit 3: File handling (**2 L)**

Basic idea about read, write, append in file operation. Sample file creating and reading a file.

Course Outcomes (COs)

CO1: Understand and remember the basic concepts of C programming.

CO2: Apply control structures such as loops and conditionals to develop and solve problems.

CO3: Apply concept of array, strings, pointers for efficient data storage and manipulation.

CO4: Design complex data structures and manage file operations.

Learning Resources

1. R. S. Salaria, Computer Concepts and Programming in C, Khanna Publishers .
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
3. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

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Paper Name: Basic Electrical and Electronics Engineering	Category: Engineering Science Courses
Paper Code: ES-EE101 / ES-EE201	Semester: First / Second
L-T-P: 3-1-0	Credit: 4

Total Lecture: 48L

Course Objectives

- To introduce the basic concepts of electrical and electronics engineering

COURSE CONTENTS

DC Circuits: (7 L)
Introduction to circuit elements; independent and dependent current and voltage sources; Kirchhoff's laws; mesh and node analysis; source transformations; network theorems: Superposition Theorem, Thevenin's and Norton's Theorem, Maximum power transfer theorem; star-delta transformation

AC Circuits: (12 L)
Production of alternating voltage, RMS and average values for different wave shapes, Concept of phasor, phasor representation of circuit elements; analysis of series and parallel AC circuits; concept of real, reactive and apparent powers; resonance in RLC series and parallel circuits; balanced three phase circuit: voltage, current and power relations for star and delta arrangement; analysis of balanced and unbalanced circuits; three phase power measurement using three- wattmeter and two-wattmeter methods.

Magnetic circuits: (13 L)
Analogy between electric and magnetic circuits; series and parallel magnetic circuits; operating principles of electrical appliances: single-phase transformer and rotating machines (3-φIM); tests and performance of single-phase transformer.

Electronic Devices: (10 L)
Semiconductor, p-n junction diode: V-I characteristics of diode, Operation of Bipolar Junction Transistor, CB and CE configuration, Transistor as a switch, Basic concepts of FET.

Operational Amplifier Circuits: (6 L)
The ideal operational amplifier, the inverting, non-inverting amplifiers, Op-Amp Characteristics, Applications of Op-amp summing amplifier, differentiator and integrator.

Course Outcomes (COs)

CO 1: **Remember** the concepts of different theorems for electrical , magnetic circuit and semiconductor physics of the device.

CO 2: **Understand** the concepts of basic laws of electricity, network theorems, magnetic circuits, electronics circuit and its applications.

CO 3. **Apply** relevant theorems and concepts to provide efficient solutions of electrical and electronic circuit and machine related problems.

CO 4. **Assess** the efficiency and performance of electrical and electronic systems, making recommendations for improvements based on design specifications, operational constraints, and real-world performance data.

Learning Resources:

1. Hughes, E., Smith, I.M., Hiley, J. and Brown, K., Electrical and Electronic Technology, Prentice Hall (2008) 10th ed.
2. Nagrath, IJ. and Kothari, D.P., Basic Electrical Engineering, Tata McGraw Hill (2002).
3. Boylestad, R.L. and Nashelsky, L., Electronic Devices & Circuit Theory, Perason (2009).
4. Chakraborti, A., Basic Electrical Engineering, Tata McGraw-Hill (2008).
5. Del Toro, V., Electrical Engineering Fundamentals, Prentice-Hall of India Private Limited (2004).
6. David Bell, Electronics Devices and Circuits, Oxford Publications (2009).

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Paper Name: Values, Ethics & Indian Knowledge System	**Category: Humanities & Social Sciences**
Paper Code: HS-MC 101/ HS-MC 201	**Semester: First / Second**
L-T-P : 2 -0-0	**Credit: 2.0**

Total Lecture: 20 L

Course objectives:

- To find out how ethics guides one's moral action and judgments.
- How the value system in work culture builds a sustainable organization.
- To students explore the essence of personal, social and environmental responsibility and Global Warming.
- To gain an insight about the impact of moral philosophies in business activities, wellbeing and promoting peace and harmony.

COURSE CONTENTS

Understanding Values & Ethics (6 L)
Ethics, Ethical values, Moral values, Virtue theory, Civic virtue, Empathy, Trustworthiness, Harmony, Maslow's need hierarchy theory, Societal values, Aesthetic values, Value spectrum of a good life, Value education, Changing value system in contemporary society

Professional Ethics (4 L)

Ethical principles in Workplace, Ethical Leadership, Good corporate governance, Corporate social responsibility, Role of CSR in enhancing brand reputation

Engineering Ethics and Global Issues (4 L)

Ethical duties and responsibilities of an engineer, Conflict between business deal and professional ideal, Whistle blowing, Environmental and Sustainability Ethics, Research Ethics, Bio-Ethics.

Indian Knowledge System (6 L)

Introduction and Importance of Indian Knowledge System, Indian Knowledge System – Contribution to the world- Zero and Decimal System, Ayurveda medicine, Philosophical concepts of the four Vedas, Yoga, etc. Psychological aspects of Health and wellness, Knowledge Triangle.

Course Outcomes (COs):

CO1: Recognize the professional Code of Ethics and to remain committed to it.

CO2: Integrate ethical vision while implementing Technologies and Management to create harmony at workplace.

CO3: Categorize and calculate the moral reasoning and to lessen the moral dilemma in decision making.

CO4: Imbibing moral values through philosophy propounded by the Indian Knowledge System and formulating the spectrum of quality life in the 21st Century.

Learning Resources:

1. B Mahadevan, IIM Bengaluru, Textbook on IKS.
2. A. Mishra, W. Biswas, A Giri, Ethics, Values and Indian Ethos, New Age publishers, 2022.
3. Kapur K and Singh A. K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of Sankaracharya, Central Chinmay Mission Trust, Bombay, 1995.
4. Reshmi Ramdhoni, Ancient Indian Culture and Civilisation, Star Publication, 2018.

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Paper Name: Biology for Engineers	Category: Engineering Science
Paper Code: ES-BT101/ ES-BT201	Semester: First / Second
L-T-P : 2 -0-0	Credit: 2.0

Total Lecture: 24 L

Course objectives:

- To familiarize the students with the basic biological concepts and their engineering applications.

- To provide the students with an insight of how biological systems can be redesigned as substitute products for natural systems.

- To motivate the students to develop the multidisciplinary vision of biological engineering

COURSE CONTENTS

Introduction to Biological Sciences (5 L)
Introduction to Biology: Science and comparison with other disciplines. Differences between Science & Engineering and Biologist & Biological Engineer.
The concept of biomimicry and its modern-day applications. The interdisciplinary nature of biological sciences.
Diversity of the living world, Taxonomy, Nomenclature, Taxonomic hierarchy, Biological classification.
Cell: Basic unit of life - Prokaryotes and Eukaryotes, Cell theory.

Biomolecules (7 L)
Introduction to Biomolecules: Sources, Structure, Characteristics and functions of the biomolecules (Carbohydrates, Proteins, Lipids and Nucleic acids).
Enzymology: Properties of enzymes, Enzyme structure, Classification and functions, Mechanism of enzyme reaction, Enzyme activity, Factors affecting enzyme activity.
Introduction to Metabolism in biological systems

Molecular aspects of life (7 L)
Molecular basis of Information Transfer: Central dogma, Replication, Transcription, Genetic code, Translation.
Immunity to Infection - Innate and Acquired immunity, Organs and cells of the immune system, Classification of antibodies. Microbes as Infectious Agents: Examples from human diseases

Biology and its Industrial Applications (5 L)

Applications of Biology: Agriculture, Medicine, Industry, Environment, Bio-robotics, 3D bio-printing, Biosensors, Bioinformatics etc. New generation bio-fabricated products and future challenges

Course Outcomes (COs):

CO1: Remember and understand the biological concepts from an engineering perspective

CO2: Understand the classification, structure and functions of various Biomolecules

CO3: Perception of the various biomolecular aspects of life

CO4: Apply and implement biological principles for the development of next generation technologies

Learning Resources:

1. Gabi Nindl Waite, Lee Waite, Applied Cell and Molecular Biology for Engineers, McGraw-Hill Education, 2007.
2. Arthur T. Johnson, Biology for Engineers, Second Edition, CRC Press, 2019.
3. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, —Biology: A global approach, Pearson Education Ltd, 2014.
4. G. S. Stent and R. Calendar, —Molecular Genetics, Freeman and company, 1978.

Web Reference:

NPTEL: https://onlinecourses.nptel.ac.in/noc19_ge31/preview

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Paper Name: Basic Electrical and Electronics Engineering Laboratory	**Category: Engineering Science Courses**
Paper Code: ES-EE191 / ES-EE291	**Semester: First / Second**
L-T-P :0-0-3	**Credit: 1.5**

Course objectives:

- To understand the concept of circuit laws and network theorems and apply them to laboratory measurements.

Name of the Experiments:

1. Network theorems: Thevenin, Norton and Superposition
2. AC series circuit
3. Three phase power measurement
4. Magnetic circuit: tests on transformer
5. Resonance in AC circuit

6. pn-junction diode characteristics
7. Diode use as rectifies.
8. BJT characteristics.
9. FET characteristics.
10. OPAMP Application (Adder, Subtractor and Amplifier)

Course Outcomes (COs):

CO1: Understand the use of various electrical measuring devices

CO2: Practice different types of wiring and devices connections keeping in mind technical and economical safety issues.

CO3: Evaluate and judge whether the solutions obtained are correct and matches the required parameters and characteristics.

CO4: Choose the proper type and specification of measuring procedure and measuring instruments for different industrial/commercial/domestic applications.

CO5: Familiarize with different active and passive electronic and electrical components, Trainer Kit, Function Generator, CRO and different measuring equipments and apply network theorems on DC and AC networks

Text Books:

1. D.P Kothari & I.J Nagrath, TMH, Basic Electrical engineering, Second Edition.
2. V.N Mittle & Arvind Mittal, TMH, Basic Electrical Engineering, Second Edition.
3. Nath & Chakraborti, Basic Electrical Engineering.
4. Surinder Pal Bali, Electrical Technology, Vol-I,Vol-II, Pearson Publication.
5. B.L. Theraja, A.K.Theraja, A Text Book of Electrical Technology, Vol. I & II, S. Chand & Company.

Reference Books:

1. Vincent Del Toro, Prentice-Hall, Electrical Engineering Fundamentals.
2. H. Cotton, Advance Electrical Technology, Reem Publication.
3. R.A. Natarajan, P.R. Babu, Basic Electrical Engineering, Sictech Publishers.
4. N.K. Mondal, Dhanpat Rai, Basic Electrical Engineering.

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Paper Name: **Physics Laboratory –I**	**Category: Basic Science Course**
Paper Code: (BS-PH-191 & BS-PH-291)	**Semester: First / Second**
L-T-P: 0-0-3	**Credit: 1.5**

Periods: 36P

Course Objectives

- To provide exposure to the students with hand on experience for data acquisition, precession, statistical data analysis, graph plotting calculation of fundamental quantities and error estimation of different fundamental physics experiments relevant to various engineering discipline.

All students have to perform total 10 experiments taking at least one from Optics, Electricity & Magnetism, Quantum Mechanics, Miscellaneous experiments and Innovative experiment sections. (One Innovative experiment is mandatory)

List of Experiments

Optics Experiments

1. Determination of dispersive power of the material of a prism
2. Determination of wavelength of a monochromatic light by Newton's ring
3. Determination of wavelength of a monochromatic light by Fresnel's bi-prism
4. Determination of wavelength of the given laser source by diffraction method
5. Determination of numerical aperture, angle of acceptance and bending energy losses of an optical fiber

Electricity & Magnetism Experiments

1. Determination of thermo electric power of a given thermocouple.
2. Determination of specific charge (e/m) of electron by J.J. Thompson's method.
3. Determination of dielectric constant of a given dielectric material.
4. Determination of Hall coefficient of a semiconductor by four probe method.
5. Determination of resistance of ballistic galvanometer by half deflection method and study of variationof logarithmic decrement with series resistance.
6. Determination of unknown resistance using Carey Foster's bridge
7. Study of Transient Response in LR, RC and LCR circuits using Exp EYES
8. Generating sound from electrical energy using Exp EYES

Quantum Physics Experiments

1. Determination of Stefan-Boltzmann constant.
2. Determination of Planck constant using photocell.
3. Determination of Lande-g factor using Electron spin resonance spectrometer.
4. Determination of Rydberg constant by studying Hydrogen spectrum.
5. Determination of Band gap of semiconductor.
6. To study current voltage characteristics, load response, areal characteristic and spectral response of a photovoltaic solar cell.

Miscellaneous Experiments

1. To determine the moment of inertia of a body about an axis passing through its centre of gravity.
2. Determination of modulus of rigidity of the material of a rod by static method
3. Determination of rigidity modulus of the material of a wire by dynamic method
4. Determination of Young's modulus of elasticity of the material of a bar by the method of flexure
5. Determination of bending moment and shear force of a rectangular beam of uniform cross-section
6. Determination of coefficient of viscosity by Poiseuille's capillary flow method
7. Measurement of wavelength and velocity of Ultrasonic wave by using Ultrasonic Interferometer**.**

Innovative Experiments

1. Studies on Bandgap measurement of thin film using UV-VIS spectrophotometer.
2. Basic UV-VIS absorbance study of organic dyes.

3. Basic UV-VIS study of nano-particles (NPs) and quantum dots (Q Dots).
4. Basic photoluminescence study of organic dyes.
5. Basic photoluminescence study of nano-particles (NPs) and quantum dots (Q Dots).
6. Studies on Basics of Vacuum system and Vacuum measurements.
7. Fabrication of RC and LC Filters.

Course Outcomes (COs)

CO 1: Describe and understand the working formulas, uses of instruments, and apparatus used in diverse experiments.

CO 2: Apply theoretical concepts to effectively execute experiments and record experimental data.

CO 3: Analyze experimentally collected data, validate it through calculations, graphical representation, and error estimation, while adhering to necessary precautions.

CO 4: Integrate acquired knowledge and apply it across various engineering disciplines.

Learning Resources

1. C.L. Arora, B.Sc. Practical Physics.
2. Harnam Singh and Dr. P.S.Hemne, B.Sc. Practical Physics.

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Paper Name: Chemistry Laboratory –I	**Category: Basic Science Course**
Paper Code: (BS-CH-191 & BS-CH-291)	**Semester: First / Second**
L-T-P: 0-0-3	**Credit: 1.5**

Periods: 36P

Course Objective

- To be able to design, carry out, record and analyze the results of chemical experiments.
- To demonstrate creative and independent thinking in both learning and work environments.
- To be able to use modern instrumentation and classical techniques, to design experiments and to properly record the results of their experiments.
- The students will be able to understand the safety features in chemistry lab and MSDS.

Name of the Experiments

1. Standardization of NaOH solution with standard Oxalic acid solution.
2. Standardization of KMnO4 solution by standard Oxalic acid solution

3. Conductometric and pH- metric titration for determination of strength of a given HCl solution against a standard NaOH solution.
4. Determination of the partition coefficient of a substance between two immiscible liquids.
5. Determination of chloride ion in a given water sample by Argentometric method (using chromate indicator solution)
6. Determination of dissolved oxygen present in a given water sample.
7. Complexometric titration for determination of calcium and magnesium hardness of water.

Course Outcomes (COs)

CO1: Demonstrate the preparation and standardization of secondary standard solutions by using primary standard solutions employing conventional titration methodology.

CO2: Assess the concentration, purity and impurity of chemical substances correlating with potentiometric acid vs. base titration in view of industrial applications.

CO3: Apply the Nernst's distribution law to determine partition coefficient of a substance between two immiscible liquids.

CO4: Implement and validate experimental methods of chloride ion, dissolved oxygen and hardness estimation for water quality assessment.

Learning Resources

1. A. I. Vogel, Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.
2. A. K. Nad, B. Mahapatra, A. Ghoshal, An Advanced Curse in Practical Chemistry, New Central Book Agency; 3rd edition.
2. University Hand Book of Undergraduate Chemistry Experiments, edited by Mukherjee, G. N. University of Calcutta, 2003.
3. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry, 5th Ed.,Pearson (2012).
4. H. T. Clarke, A Handbook of Organic Analysis (Qualitative and Quantitative), Fourth Edition, CBS Publishers and Distributors (2007).
5. Practical Workbook Chemistry (Honours), UGBS, Chemistry, University of Calcutta, 2015.

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Paper Name: Programming for Problem Solving	**Category: Engineering Science Course**
Paper Code: ES-CS-191/ES-CS -291	**Semester: First / Second**
L-T-P: 0-0-3	**Credit:1.5**

Periods: 36P

Course Objectives

- To formulate and test simple algorithms for arithmetic and logical problems, execute the programs and correct syntax and logical errors for implementing conditional branching, iteration and recursion.

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, Variable types and type conversions
Lab1: Familiarization with programming environment; Simple computational problems using arithmetic expressions
Tutorial 2: Branching and logical expressions:
Lab 2: Problems involving if-then-else structures
Tutorial 3: Loops, while and for loops:
Lab 3: Iterative problems e.g., sum of series
Tutorial 4: 1D Arrays: searching, sorting:
Lab 4: 1D Array manipulation
Tutorial 5: 2D arrays and Strings
Lab 5: Matrix problems, String operations
Tutorial 6: Functions, call by value:
Lab 6: Simple functions
Tutorial 7: Recursion, structure of recursive calls
Lab 7**:** Recursive functions
Tutorial 8: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8: Programming for solving Numerical methods problems
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures
Tutorial 10: File handling:
Lab 10: File operations

Course Outcomes (COs)

CO1: Demonstrate the ability to write. Compile and execute basic C program.

CO2: Develop algorithms and solve problems using control structures.

CO3: Implement programs that utilize array, string, pointers for storage, memory access amd manipulation.

CO4: Use structures and unions to create, manipulate complex data type and perform file operational for reading and writing data.

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Paper Name: Workshop Practice	Category: Engineering Science Course
Paper Code: ES-ME191 / ES-ME291	Semester: First / Second
L-T-P: 0-0-3	Credit: 1.5

Periods: 39P

Course Objectives

- To gives the basic working knowledge required in various engineering-based constructions, function, use and application of different working tools, equipment, and machines as well as the technique of manufacturing a product from its raw material.

[Before practice, background lectures will be delivered on the topics. Tool specifications and their materials will be described. Brief reports on the work done will be submitted by the students and evaluation will be made on the basis of examination of the report and viva, conducted by the teachers.]

Theory

1. Carpentry (Wood Working): Timber, Seasoning and Preservation, Plywood and Plyboards, Carpentry Tools, Engineering applications. Different Joints

2. Metal Joining: Definitions of welding, brazing and soldering processes, and their applications. Oxy-acetylene gas welding process, equipment and techniques. Types of flames and their applications. Manual metal arc welding technique and equipment. AC and DC welding, electrodes, constituents and functions of electrodes. Welding positions. Types of weld joint. Common welding defects such as cracks, slag inclusion and porosity.

3. Bench work and Fitting: Tools for laying out, chisels, files, hammers, hand hacksaw, their specifications and uses.

4. Metal Cutting: Introduction to machining and common machining operations. Cutting tool materials, geometry of cutting tool, cutting fluid. Definition of machine tools, specification and block diagram of lathe, shaper, milling, drilling machine and grinder. Common lathe operations such as turning, facing and chamfering and parting. Difference between drilling and boring. Use of measuring instruments like micrometer / verniercaliper.

5. Tin Smithy: Sheet metal introduction, tools and operations, Shearing and Bending of sheets, types of joints

Jobs to be made in the Workshop

Group A (6 P)

Carpentry Shop: T-Lap joints and Dovetail joints

Group B (6 P)

a. Gas Welding practice on mild steel flat/sheet (up to 3mm thick)
b. Lap joint by Gas Welding (up to 3mm thick)
c. Manual Metal Arc Welding practice (up to 5mm thick)
d. square butt joint by MMA Welding
e. Lap joint by MMA Welding

Group C
Fittings work: Sawing and Finishing by Filing. (6 P)

Group D
a. Jobs on lathe with turning, facing, chamfering and parting operations (6 P)
b. Job on shaper and milling machine for finishing two sides of a job (6 P)
c. Drilling of holes of size 5- and 12-mm diameters on the jobs / External threads making by dies, Tap size drill hole/ hand tapping operations

Group E
Smithy - making simple products on sheet metal (6 P)

Learning Resources

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", 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.
4. Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
5. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGraw Hill House, 2017.

Course Outcomes (COs)

CO1: Train the students in metal joining process like welding, soldering, etc

CO2: Impart skill in fabricating simple components using sheet metal

CO3: Cultivate safety aspects in handling of tools and equipment.

CO4: Define, describe and determine the types and nature of the physical parameters like cutting speed, feed, depth of cut etc applied on mechanical manufacturing systems.

CO5: Classify and explain the effects of the above physical parameters as applied on mechanical manufacturing systems for proper comprehension.

CO6: Develop the collective skill and potentiality and leadership quality to work in a group or team.

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Paper Name: Engineering Drawing	Category: Engineering Science Course
Paper Code: ES-ME192 / ES-ME292	Semester: First / Second
L-T-P: 0-0-3	Credit: 1.5

Periods: 42P

Course Objectives

- To teach students to communicate using **graphic** techniques.
- To accomplish the principles and standards of mechanical **drawing** and dimensioning.

[Sessional work should be completed in the class. Problems sheet will be provided. Students should attempt to solve the problems given in the Problem Sheet. Home assignments will be given. Evaluation will be made on the basis of seasonal work and viva-voce examination.]

Scales (3P)

Plain scales, Diagonal scales, Vernier scales

Geometrical Construction and Curves (3P): Conic Section: Parabola, Hyperbola, Ellipse

Projection of Points, Lines, Surfaces (9P): Orthographic Projection – First angle and third angle projection More no. of problems should be practiced in first angle projection. Projection of lines inclined to the planes Projection of surfaces Pentagon, Hexagon

Projection of Solids (12P): Cube, Pyramid, Prism, Cylinder, Cone, Frustums

Isometric View and Isometric Projection (6 P): Prism, Pyramid, Cylinder, Cone and examples of simple solid objects / models.

Sectional Views of Solids, True Shape of a Section (6 P)

Development of Surfaces (3 P): Cube, Prism, Cylinder, Truncated Cone

Learning Resources:

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

Course Outcomes (COs)

CO1: To represent pictorially different elements and components using basic engineering drawing guidelines.

CO2: To gain significance of scaling pertinent to engineering drawing problems. The incumbents should also have knowledge about analytical curves and their relevance to understand different higher level mechanical engineering problems.

CO3: To understand the concept of projections for 1D, 2D and 3D object representation.

CO4: To develop an idea and ability to view complex interior sections of a solid object, and they will also be able to analyze and explain how different surfaces are generated when a solid object is cut along a plane and its surfaces are stretched out.

CO5: To draw isometric to orthographic views and vice versa.

CO6: To apply comprehensive knowledge to develop the surface of a solid.

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Paper Name: Language Laboratory	**Category: Humanities and Social Sciences including Management**
Paper Code: HM-HU 191/ HM-HU291	**Semester: First / Second**
L-T-P: 0-0-2	**Credit: 1**

Periods: 22P

Course Objectives

- To provide advanced skills of Technical Communication in English through various activities performed in the Language Lab Practice Sessions to 1st Semester U.G. students of Engineering and Technology.

- To instill confidence in them so that they can competently communicate in English language in all spheres.

- To make them efficient enough to communicate about day-to day events and experiences of life, comprehend lectures delivered in English, read and understand relevant materials written in English and also to write grammatically correct English.

- To make them capable of shedding their fear of communication and public speaking.

List of Experiments

1. Developing active 'Listening Skill' and its sub skills through Language Lab Audio device; (Listening to conversations, passages, stories, news bulletin, speeches by famous personalities – Listening for general and specific information etc.,) (3P)

2. Developing 'Speaking Skill' and its sub skills; (Interpersonal Communication, Oral

Presentations — Debate –Extempore – Speech Presentation– Conversational Practice – Face to Face / Telephonic Conversation) (5P)
3. Developing 'Reading Skills' and its sub skills through reading excerpts from plays, poetry, news and various technical/non technical passages using Visual / Graphics/Diagrams /Chart Display etc. and using Literary text(s):
The Kabuliwallah by R. N. Tagore and The Night Train at Deoli by Ruskin Bond (4P)
4. Developing 'Writing Skill' and its sub skills by using Language Lab Audio –Visual input; Practice Sessions (Analytical essay writing, dialogue writing, story writing, etc.) (3P)
5. Pronunciation: Basic Rules (with emphasis on Accent Neutralisation)Organs of Speech (2P)
6. Introducing 'Group Discussion' through audio –Visual input and acquainting them with key strategies for success; GD practice sessions (unstructured and structured) (4P)
7. SWOT analysis (1P)

Learning Resources:

1. Nira Konar: English Language Laboratories, A Comprehensive Manual, PHILearning Pvt. Ltd.
2. Dr. D. Sudharani: Manual for English Language Laboratory. Pearson Education (WB edition),2010.
3. Board of Editors: Contemporary Communicative English for TechnicalCommunication, Pearson Longman, 2010.
4. T. Balasubramanian, A Textbook of English Phonetics for Indian Students, Macmillan India Ltd.
5. E. Sureshkumar and P. Sreehari, Communicative English, Orient Blackswan , 2007.
6. Jeremy Comfort, Speaking Effectively, Developing Speaking Skills for Business English, Cambridge University Press , 1994.
7. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843).

Course Outcomes (COs)

CO1: Construct English sentence structures with (neutralized accents) appropriate grammar rules and vocabulary.

CO2: Enhance pronunciation, intonation and language fluency by utilizing language laboratory resources.

CO3: Build active listening ability to respond effectively in various real-life situations.

CO4: Develop real life communication skills by taking part in language laboratory activities to mitigate various industrial communication needs.

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Paper Name: NSS	Category: Universal Human Value
Paper Code: XC-181	Semester: First / Second
L-T-P: 0-0-2	Credit: 0

Periods: 24P

Course Objectives

- To create awareness for women's education, old age education saving of girl child. Medical issue-blood donation and Thalassemia test.
- To realize, synthesize, and evaluate their personal readiness for leadership by group work, communicating effectively and to overcome & eliminate different constraints those may arises in their academic and daily life.

1. **Creating Awareness in Social Issues**
   Blood Donation Camp, Road Safety Awareness, Poster Competition (Saving of Girl child, saving of water and fuel for future, Pollution and control, Global warming, Equal education for girls),Thalassemia awareness Programme, Eye Check-Up Camp.

2. **Participating in Mass-Education Programme**
   a. Poster Presentation on Education for All
   b. Elocution competition, SA writing on education for all
   c. National Education Day celebration (11th Nov)

3. **Proposal for Local Slum Area Development**
   a. Road and Costal Side Cleaning Programme
   b. Local Hospital Area Cleaning Programme (with collaboration Haldia Minicipality)
   c. Campus Cleaning Programme

4. **Environmental Awareness Programme**
   a. Resource Conversation (By Poster Competition)
      i. Water
      ii. Energy
   b. Poster Competition on Global warming
   c. Plantation Programme (5th September)
   d. Fire Safety Awareness Programme (With Haldia Fire Station)

5. **Relief and Rehabilitation work during Natural Calamities**

Course Outcomes (COs)

CO1. To Create awareness for women's education, old age education saving of girl child. Medical issue-blood donation and Thalassemia test.

CO2. To Realize, synthesize, and evaluate their personal readiness for leadership by group work, communicating effectively and to overcome & eliminate different constraints those may arises in their academic and daily life.

CO3. To Define and correlate different kind of social, cultural and ethical issue in light of saving of girl child, women education, saving of fuel. Manifest an ethics and service to the nation as a fundamental duty by organizing seminar symposia, workshop, essay writing, poster presentation etc.

CO4. To Apply problem solving skills by taking on volunteer and community service in their professional and social life and show interest to think about eco-friendly projects for the betterment of the society.

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Annexture-I

Mandatory Additional Requirement (MAR) for earning B. Tech Degree

The additional requirement of MAR points applies to - every student, who is admitted to the 4 years B.Tech program under Autonomy, as per following:

Level of Entry in B. Tech Course	Total duration for earning Points	Minimum Points
1st Year from the academic year 2024-25 onwards	1st to 4th Year	100
2nd Year from the academic year 2024-25 onwards (Lateral Entry)	2nd to 4th Year	75

Mandatory Additional Requirement is compulsory for acquiring B.Tech./B.Tech. (Honours) degree for all the students under autonomy.

Total hundred (100) points are required in different fields mentioned in the MAR table in syllabus to achieve B.Tech./B.Tech. (Honours) degree in the four years of study. For lateral entry students the total MAR points will be 75.

These 100 (75 for 3 years B.Tech/Lateral Entry) points are equally divided in four/three (for lateral entry) years of study, i.e., students have to acquire minimum 25 points in each and every year. If any candidate is failed to achieve the minimum MAR points, it will be treated as backlog and he/she should clear it in the immediate next year. For final year students, no degree will be conferred if he/she has unable to achieve total 100/75 (for 3 years B.Tech/ Lateral Entry) points from MAR.

Certification and awarding on the activities of MAR for outstanding activities/special achievements in these areas would be considered.

Students may achieve more than maximum admissible points and total MAR points would be reflected in the final certificate.

These points must be earned on the basis of active participation in co-curricular and extracurricular activities spanning through all the semesters of study. Every student may choose, as per his/her liking, activities in order to achieve the mandatory points (as per Table- I, depending on his/her entry level), before becoming eligible for award of the Degree. These activities can be spread over the years, as per convenience of the student.

Notes:

- Every student shall participate in the co-curricular and extra-curricular activities and produce documentary proof to the designated Faculty Members appointed by the Head of Department / Principal / Director in the respective college. Thereby the student should earn the required Points before *her* she appears for his/ her Final Examinations.
- A student's result of his/her Final Examinations will be withheld until he/she completes the minimum Activity Points by the end of his/her B.Tech Program.
- In every semester, every student is required to prepare a file containing documentary
- proofs of activities, done by him / her. This file will be duly verified and Activity Points will be assigned by the teachers as appointed above, at the end of every semester.
- The college will form a 3 members committee and finalize the Activity Points for each
- student before entering them into the Online Point Entry System of the Institute
- Every student has to earn at least 100 / 75 (for lateral) activity points. The points students have earned will be reflected in the student's mark sheet.
- Activity points earned by Lateral Entry students will be multiplied by 1.33.

Table I provides a List of Activity Heads and Sub-Activity Heads along with their capping of the Activity Points that can be earned by the students during the entire B.Tech duration.

Sl. No.	Name of the Activity	Points	Maximum Points Allowed
1.	**MOOCS (SWAYAM/NPTEL/Spoken Tutorial) (per course)**	2 weeks: 5 4 weeks: 10 8 weeks: 16 12 weeks: 20	40
2.	**Tech Fest/Teachers Day/Freshers Welcome**		
	Organizer	5	10
	Participants	3	6
5.	**Rural Reporting**	5	10
6.	**Tree Plantation (per tree)**	1	10
7.	**Participation in Relief Camps**	20	40
8.	**Participation in Debate/Group Discussion/ Tech quiz/Seminar/Workshop**	10	20
9.	**Publication of Wall magazine in institutional level (magazine/article/internet)**	10	20
10.	**Publication in News Paper, Magazine & Blogs**	10	20
11.	**Research Publication (per publication)**	15	30
12.	**Innovative Projects (other than course curriculum)**	30	60
13.	**Blood donation**	8	16
	Blood donation camp Organization	10	20
15.	**Participation in Sports/Games**		
	College level	5	10
	University Level	10	20
	District Level	12	24
	State Level	15	30
	National/International Level	20	20
21.	**Cultural Programme (Dance, Drama, Elocution, Music**	10	20

	etc.)		
22.	**Member of Professional Society**	10	20
23.	**Student Chapter**	10	20
24.	**Relevant Industry Visit & Report**	10	20
25.	Photography activities in different Club (Photography club, Cine Club, Gitisansad)	5	10
26.	Participation in Yoga Camp (Certificate to be submitted)	5	10
27.	Self-Entrepreneurship Programme	20	20
28.	Adventure Sports with Certification	10	20
29.	Training to under privileged/Physically challenged	15	30
30.	Community Service & Allied Activities	10	20

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MOOCs for B. Tech. (Honours) Degree:

The additional 20 (12 for 3 years B.Tech/Lateral Entry) credits (for obtaining B. Tech with Honours) are to be achieved through MOOCs. The complete description of the MOOCS relevant for the first year to fourth year course is given in the respective syllabus.

Total 20 credits will be divided as under:

1st year:: 4-8credits; 2nd year:: 4-8 credits
3rd year: 4-8 credits; 4th year:: 4 credits

A student of first year has to cover courses from at least three skills:

1. Computer Programming with Python / R
2. Soft skills
3. Values and Ethics

Students of all streams are to be equipped with Programming skill in the language that is in high demand worldwide in the first year itself so that they can apply this skill in the subsequent semesters in their different areas including their core area of study.

Soft skill is very essential for grooming of the student and student must be exposed to it in the very beginning of the 4-year long program.

Ethics is something that one should practice. Students are to be made aware of the ethics right in the beginning of the 4-year long program so that they can practice at least some of the ethical norms as applicable to Institutional environment and society, and be prepared to practice ethics in their working life.

All of the MOOCs courses are to be taken **any MOOCS platform as per following scheme of credit points. There would not be any concept of fixed basket anymore. However, during choosing courses in the online platform students would essentially avoid the courses taught / offered through the curriculum in the offline / classroom mode.**

For NPTEL / Swayam platform: Credit points as specified in the platform

For other MOOCS platforms like Coursera, edX, Udemy etc.

Courses of 4 weeks to 7 weeks: 1 credit point

Courses of 8 weeks to 11 weeks: 2 credit point

Courses of 12 weeks to 15 weeks: 3 credit point

Courses of 16 weeks or more: 4 credit point

Where duration of MOOCs courses is available in hours

For every 8 hours of course: 1 credit point

However, for the courses with duration less than 8 hours, multiple courses could be taken together (preferably in the same area) to consider 1 credit point. But where duration is available in week, count of hours will not be applicable.

The above structure is indicative only. And BOS / DC concerned may propose credit points of the courses offered through MOOCS platform based on the content and level beginner/ intermediate/ advanced) of the courses.

Credit Transfer of MOOCS:

University / Institute had already introduced provision of credit transfer through MOOCS courses. Therefore, different courses of curriculum could be taken from MOOCS platform and credits could be transferred, if offered through online and credits are earned. However, to offer courses of curriculum through MOOCS platform like NETEL/SWAYAM / Coursera / edX / Simplilearn etc, offering institute must get the course mapping (Mapping between the University / Institute course and that offered from the online platform) approved from the University for appropriate Credit Transfer Scheme.

If student of the university is unable to attend a theory course due to attending internship or any other justified reason, the student may be allowed with special permission of the University / Institute to pursue equivalent MOOCs for against the theory course. However, content mapping to be completed preferably by BoS or appropriate authority is essential before opting the courses in MOOCS platform. More than one MOOCS courses may be necessary to be mapped to cover the syllabus of the theory course and the student has to complete all the MOOCS to cover the course. Credits earned in total in all the courses will be considered for equivalence and credit transfer.

Evaluation of the MOOCs courses:

Evaluation of the MOOCS courses would be done by the organization by whom it is being offered. In extraordinary circumstances, the modality of evaluation through certified personnel, online or offline will be decided by the appropriate authority.

Uploading of MOOCS Data:

Every UG Department has to upload the details of MOOCS data in respect of each student time to time in Institute's examinations portal and/or hard / soft copy as per instruction of the Controller of Examinations of the Institute.

MOOCs for Mandatory Additional Requirements (MAR):

MOOCs in MAR is provided for encouraging every student to enter in Digital Content form of Education from well-known Universities or organizations.

Students can choose any MOOCs course as per their interest area. There is no credit system for MOOCs in MAR as points could be earned as specified **in** the scheme and the MOOCS courses which are taken for earning credits for Honours degree will not be considered in MAR purpose.

The validity of uploaded certificates in the University portal is subject to acceptance of appropriate committee/expert review.

Colleges interested to deliver any course(s) online through MOOCS platform, should get vetted from the University regarding mapping of course for credit transfer / assessment process.

Annexture- II

MOOCS list for B.Tech (Hons) 1st Yr
(Credit based courses are only opt by students from this bucket, which may change time to time as on the basis of availability of online courses)

Module	Courses	Provider	Duration (Weeks/ Hours)	Credits
Ethics	Ethics in Engineering Practice	NPTEL	8	2
	Moral Thinking: An Introduction to Values and Ethics	NPTEL	4	1
	Data Science Ethics	edX	4	1
	A Life of Happiness and Fulfilment	Coursera	27 Hrs	3
	Moralities of Everyday Life	Coursera	24 Hrs	3
	Introduction to Philosophy	Coursera	19 Hrs	2
	The Science of Well-Being	Coursera	19 Hrs	2
	Business Communication and Ethics in Organizations	Udemy	22 Hrs	2
Soft Skills	Enhancing Soft Skills and Personality	NPTEL	8	2
	Soft Skill Development	NPTEL	8	2
	Public Speaking	NPTEL	12	3
	Soft Skills	NPTEL	12	3
	Feminist Writings	NPTEL	12	3
	The Science of Happiness and Wellbeing	NPTEL	8	2
	Body Language: Key to Professional Success	edX	4	1
	Working in Teams: A Practical Guide	edX	4	1
	Writing in the Sciences	Coursera	30 Hrs	3
	Interpersonal Communication for Engineering Leaders	Coursera	22 Hrs	2
	Successful Career Development	Coursera	19 Hrs	2
	Listening Skills - The Ultimate Workplace Soft Skills	Udemy	30.5 Hrs	3
	Soft Skills: The 11 Essential Career Soft Skills	Udemy	34 Hrs	4
	Soft Skills Masterclass - 5 in 1, Communication, Leadership	Udemy	31.5 Hrs	3
	The Complete Communication Skills Master Class for Life	Udemy	31 Hrs	3

Programming Skills	Joy of computing using Python	NPTEL	12	3
	Programming, Data Structures and Algorithm Using Python	NPTEL	8	2
	An Introduction to Programming Through C++	NPTEL	12	3
	Scientific Computing using Python	NPTEL	12	3
	Python for Data Science	NPTEL	4	1
	Problem Solving Through Programming in C	NPTEL	12	3
	Foundations of R Software	NPTEL	12	3
	Getting Started with Competitive Programming	NPTEL	12	3
	Programming in Java	NPTEL	12	3
	IBM: Introduction to Statistics for Data Science using Python	edX	4	1
	Introduction to Computer Science and Programming Using Python	edX	9	2
	Introduction to R for Data Science	edX	4	1
	University of Cape Town: Data Science with Python	edX	8	2
	Introduction to Programming with MATLAB	Coursera	35 Hrs	4
	Java Programming: Solving Problems with Software	Coursera	17 Hrs	2
	Responsive Website Basics: Code with HTML, CSS, and JavaScript	Coursera	25 Hrs	3
	Python Basics	Coursera	26 Hrs	3
	Crash Course on Python	Coursera	32 Hrs	4
	The Complete Python Developer	Udemy	30 Hrs 53Mins	3
	Python Programming: The Complete Python Bootcamp 2024	Udemy	28 Hrs 13Mins	3
	The Complete Python Bootcamp From Zero to Hero in Python	Udemy	22 Hrs 13Mins	2

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Annexture-III

Guidelines regarding Mandatory Induction Program for the new students

Engineering education has evolved globally in a continuous manner to address the twin needs of industry and society. It is now an accepted fact that the institutions imparting technical education should aspire to create manpower who will possess strong technical knowledge and skill, have leadership qualities and be a team player, capable of coming up with innovative solutions and be alive to societal and community concerns. The aim of the Induction Programme is to acclimatize the students to the environment of their engineering institution, give them a flavour of the exciting new world of education that they are entering, provide them with mentoring schemes, and make them aware of their neighbourhood, society and people. This will allow them to evolve as well-rounded individuals.

Institute follow the AICTE guideline to implement the three weeklong Induction Programme.

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