IES College of Technology, Bhopal
AUTONOMOUS COLLEGE
New Scheme of Examination as per AICTE Flexible Curriculum
I Semester , Bachelor of Technology (B.Tech.)
W.E.F. JULY2025
GROUP A:(CS, EC, EX) July-Dec 2025

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory			Practical						
			End Sem.	Mid Sem.	Quiz/ Assignment	End Se.	Lab-work & Sessional		L	T	P	
Mandatory Induction Program (First three weeks)			Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations									
First week onwards classes will start												
1.	BS 101	Engineering Chemistry (A)	70	20	10	30	20	150	2	-	2	3
2.	BS 102	Mathematics-I	70	20	10	-	-	100	3	1	-	4
3.	ES 103	Basic Electrical & Electronics Engineering	70	20	10	30	20	150	2	1	2	4
4.	ES 104	Programming and Data structures-I	70	20	10	30	20	150	2	-	2	3
5.	ES 105	Engineering Graphics/CAD				30	20	50	-	-	4	2
6.	HSS 106	Professional Communication - I (Vocabulary, Grammar, Writer)	70	20	10	30	20	150	2	-	2	3
7.	HSS 107	Design Thinking				15	15	30	-	-	2	1
8.	MAND 108	Indian Knowledge Heritage				-	30	30	-	-	2	1
9.	HSS 109	Universal Human Values-II				-	30	30	-	-	2	1
10	Mand 110	Activity Participation (NCC/NSS/Cultural/Sports/Rural Outreach/Green Initiative/Swachh bharat/ Social work Participation)					30	30	-	-	1	1
		Total	350	100	50	165	205	870	11	2	20	23

1HrLecture	1Hr Tutorial	2HrPractical
1Credit	**1Credit**	**1Credit**

IES College of Technology, Bhopal

AUTONOMOUS COLLEGE

New Scheme of Examination as per AICTE Flexible Curricula

II Semester, Bachelor of Technology (B.Tech.)

W.E.F.JULY2025

GROUP A: (CS, EC, EX) Jan-May 26

S.No	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Labwork & Sessional		L	T	P	
1.	BS 201	Engineering Physics	70	20	10	30	20	150	2	1	2	4
2.	BS 202	Mathematics-II	70	20	10	-	-	100	3	1	-	4
3.	ES 203	Basic Mechanical Engineering	70	20	10	30	20	150	2	-	2	3
4.	ES 204	Programming and Data structures-II	70	20	10	30	20	150	2	-	2	3
5.	ES 205	Basic Civil Engineering & Applied Mechanics	70	20	10	30	20	150	2	-	2	3
6.	HSS 206	Professional Communication- II (SVAR)	70	20	10	30	20	150	2	-	2	3
7.	ES 207	Computer Hardware WORKSHOP/IDEA LAB/WORKSHOP				15	15	30			4	2
8	Mand 208	Skill Based Course-1 (MOOCs Course)(Minimum of 4 week course, NPTEL,C++)	Credit transfer through certification									1
9	Mand 209	Internship-I (60 Hrs Duration) at the Institute level To be completed during first/second semester.	Its evaluation/credit to be added in third semester.									
		Total	420	120	60	165	115	880	13	2	14	23

1HrLecture	1Hr Tutorial	2HrPractical
1Credit	**1Credit**	**1Credit**

IES College of Technology, Bhopal, AUTONOMOUS COLLEGE

New Scheme of Examination as per AICTE Flexible Curriculum

II Semester Bachelor of Technology (B.Tech.)

W.E.F. JULY 2025

GROUP B : (CE, ME, AL, DS, AD, CY) Jan-May 26

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory		Practical							
			End Sem	Mid Sem	Quiz/ Assignment	End Sem	Lab-work & Sessional		L	T	P	
1.	BS 101	Engineering Chemistry (B)	70	20	10	30	20	150	2	-	2	3
2.	BS 202	Mathematics-II	70	20	10	-	-	100	3	1	-	4
3.	ES 103	Basic Electrical & Electronics Engineering	70	20	10	30	20	150	2	1	2	4
4.	ES 204	Programming and Data structures-II	70	20	10	30	20	150	2	-	2	3
5.	ES 105	Engineering Graphics/CAD				30	20	50	-	-	4	2
6.	HSS 106	Professional Communication-I (Vocabulary, Grammar, Writer)	70	20	10	30	20	150	2	-	2	3
7.	HSS 107	Design Thinking				15	15	30	-		2	1
8.	MAND 108	Indian Knowledge Heritage				-	30	30	-	-	2	1
9.	HSS 109	Universal Human Values-II				-	30	30	-	-	2	1
10	Mand 208	Skill Based Course-1 (MOOCs Course)(Minimum of 4 week course, NPTEL,C++)	Credit transfer through certification									1
11	Mand 209	Internship-I (60 Hrs Duration) at the Institute level To be completed during first/second semester.	Its evaluation/credit to be added in third semester.									
		Total	350	100	50	165	175	840	11	2	18	23

1HrLecture	1Hr Tutorial	2HrPractical
1Credit	**1Credit**	**1Credit**

IES College of Technology, Bhopal

AUTONOMOUS COLLEGE

New Scheme of Examination as per AICTE Flexible Curriculum

I Semester (Group B), Bachelor of Technology(B.Tech.)

***W.E.F.JULY 2025*, GROUP B: (CE,ME,AL,DS,AD,CY) July-Dec 2025**

S.No .	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Labwork & Sessional		L	T	P	
Mandatory Induction Program(First three weeks) First week onwards classes will start					Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas , Familiarization to Dept./Branch & Innovations							
1.	BS 201	Engineering Physics	70	20	10	30	20	150	2	1	2	4
2.	BS 102	Mathematics-I	70	20	10	-	-	100	3	1	-	4
3.	ES 203	Basic Mechanical Engineering	70	20	10	30	20	150	2	-	2	3
4.	ES 104	Programming and Data structures-I	70	20	10	30	20	150	2	-	2	3
5.	ES 205	Basic Civil Engineering & Applied Mechanics	70	20	10	30	20	150	2	-	2	3
6.	HSS 206	Professional Communication-II (SVAR)	70	20	10	30	20	150	2	-	2	3
7.	ES 207	Computer Hardware WORKSHOP/IDEA LAB/WORKSHOP				15	15	30			4	2
8	Mand 110	Activity Participation-I (NCC/NSS/Cultural/Sports/Rural Outreach/Green Initiative/ swachh Bharat/Social work Participation)					30	30			2	1
		Total	420	120	60	165	145	910	13	2	16	23

1HrLecture	1Hr Tutorial	2HrPractical
1Credit	**1Credit**	**1Credit**

IES COLLEGE OF TECHNOLOGY, BHOPAL

Autonomous College

Syllabus

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch-Common to All SET-A Disciplines

BS-101	**Engineering Chemistry (A)**	**2L-0T-2P**	**3 Credits**

Course Content:

Unit 1: Water Chemistry & Data Center Applications

- Sources, impurities, hardness & its units, Determination of hardness by EDTA method, alkalinity & its determination, related numerical problems., Boiler troubles (sludge & scale, priming & foaming, caustic embrittelement) their cases and preventions.
- Softening methods (lime–soda method, zeolite, ion-exchange process), numerical problems.
- **Applications in CS:** Cooling of servers & data centers, water recycling in IT parks, sustainable computing infrastructure.

Unit 2: Electrochemistry, Energy Storage & Hardware Protection

- Electrochemical cells: galvanic & electrolytic cells, Nernst equation, EMF.
- Batteries: Lead-acid, lithium-ion,
- Corrosion: Causes and its effects. Theories of Corrosion -Dry or Chemical corrosion and Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion –Waterline and Pitting Corrosion, Galvanic. Factors influencing rate of corrosion. Corrosion control methods: Cathodic protection methods - Sacrificial and anodic Surface coating methods: Galvanizing, Electroplating, Tinning.
- **Applications in CS:** Laptop/mobile batteries, UPS systems, energy backup in data centers, protection of hardware from corrosion.

Unit 3: Engineering Materials for Electronics & Computing

- Polymers: Definition, Properties and Classification, thermoplastics & thermosets, number average and weight average molecular weight of polymer, Degree of polymerization, Practical significance of molecular weight, biodegradable polymers.
- Ceramic & nanomaterials. Definition, properties, Synthesis and Applications.
- **Applications in CS:** Semiconductors, circuit boards, fiber optics, flexible displays, wearable devices, biodegradable electronics.

Unit 4: Lubricants, Fuels & Green Computing

- Lubricants and Lubrication: Introduction, Classification of lubricants, Mechanism of lubrication, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Aniline Point, Steam Emulsification Number.
- Fuels: Classification, calorific value, coal, natural gas.
- Green chemistry principles.
- **Applications in CS:** Energy efficiency in supercomputers, sustainable fuels for backup power, reducing carbon footprint in IT industries, green computing & eco-friendly materials.

Unit 5: Spectroscopy, Radiation & Information Technology

- Interaction of radiation with matter: absorption, emission, scattering.
- Spectroscopic techniques : **UV-VIS spectroscopy**- Principles, instrumentation, applications of electronic spectroscopy, Lambert–Beers law.
- **Infrared Spectroscopy**- Principles, instrumentation, applications of IR (vibrational & rotational), spectroscopy of diatomic molecules-Modes of vibrations,
- **Applications in CS:** Fiber optic communication, lasers in data transfer, optical storage (CD/DVD/Blu-ray), security (spectroscopy in scanners).

Course Outcomes

The course should enable the students to:

CO101.1	Analyze water quality parameters (hardness, alkalinity, impurities) and apply softening methods to address boiler and cooling water issues relevant to sustainable operation of servers and data centers.
CO101.2	Apply electrochemical principles to evaluate batteries, fuel cells, and corrosion mechanisms, and recommend protection methods for electronic hardware and energy backup systems in IT infrastructure.
CO101.3	Differentiate between polymers, ceramics, and nanomaterials based on their structure, properties, and synthesis methods, and evaluate their applications in semiconductors, circuit boards, and emerging computing devices.
CO101.4	Examine lubricant and fuel properties using experimental methods, and assess their role in energy efficiency, eco-friendly backup systems, and green computing practices.
CO101.5	Interpret spectroscopic data (UV-VIS, IR) and explain radiation–matter interactions to demonstrate their applications in fiber-optic communication, optical storage, and IT security systems.

Chemistry Practical List

1. Water testing

(i) Determination of Total hardness by Complexometric titration method.

(ii) Determination of mixed alkalinity

a) OH & CO_3

b) CO_3 & HCO_3

(iii) Chloride ion estimation by Argentometric method.

2. Fuels & Lubricant testing

(i) Flash & fire points determination by

a) Pensky Martin Apparatus

b) Abel's Apparatus

c) Cleveland's open cup Apparatus

d) Calorific value by bomb calorimeter

(ii) Viscosity and Viscosity index determination by

a) Redwood viscometer No.1

b) Redwood viscometer No.2

(iii) Proximate analysis of coal

a) Moisture content

b) Ash content

c) Volatile matter content
d) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloy by Iodometric Titration.

(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

IES COLLEGE OF TECHNOLOGY, BHOPAL

Autonomous College

Syllabus

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch-Common to All SET-B Disciplines

BS-101	**Engineering Chemistry (B)**	**2L-0T-2P**	**3 Credits**

Course Content:

Unit 1: Water Analysis, Treatments and Industrial Applications

Water: Sources, impurities, hardness & its units, Determination of hardness by EDTA method, alkalinity & its determination, related numerical problems. Boiler Problems & Softening Methods, Boiler troubles (sludge & scale, priming & foaming, boiler corrosion, caustic embrittelement) their cases and preventions. Softening methods (lime–soda, zeolite, ion-exchange), numerical problems.

Unit 2: Thermodynamics and Phase rule

Thermodynamics and its limitations, types of System, Intensive and extensive properties, Thermodynamic process, Heat, work and Gibbs's free energy, reversible and irreversible processes, Enthalpy. Entropy, laws of thermodynamics.

Phase rule: Single-component (water) phase diagrams; Corrosion types, mechanisms, and prevention of corrosion.

Unit 3: Engineering Materials

- **Polymers**: Definition, Properties and Classification, thermoplastics & thermosets, number average and weight average molecular weight of polymer, Degree of polymerization Practical significance of molecular weight, biodegradable polymers, Elastomers-vulcanization of rubber
- Preparation, properties & Applications : PVC, Nylon 66, Teflon, Bakelite, Rubber

- **Alloys, Cement:** Definition, properties, Synthesis and Characterization and Applications.

Unit 4: Lubricants, Fuels & Green Chemistry

- **Lubricants** and Lubrication: Introduction, Classification of lubricants, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Aniline Point, Saponification Number, Steam Emulsification Number, Mechanism of lubrication-Thick film and thin film,.
- **Fuels:** Classification, calorific value, determination of calorific value using bomb calorimeter, coal, petroleum, natural gas,
- **Green fuels:** Introduction, power alcohol, synthesis and applications of biodiesel Green.

Unit 5: Spectroscopy Techniques

- Interaction of radiation with matter: absorption, emission, scattering.
- Spectroscopic techniques : **UV-VIS spectroscopy**- Principles, instrumentation, applications of electronic, spectroscopy, Lambert–Beers law, Shift/Effects in UV spectroscopy,
- **Infrared Spectroscopy**- Principles, instrumentation, applications of IR (vibrational & rotational), spectroscopy of diatomic molecules-Modes of vibrations, Hook's law.

Course Outcomes

CO101.1	Analyze water quality parameters (hardness, alkalinity, impurities) and apply softening methods to address boiler and cooling water issues relevant to sustainable operation of servers and data centers.
CO101.2	Explain the fundamental principles of thermodynamics and phase rule, interpret energy changes and feasibility of processes using thermodynamic properties and laws, and describe corrosion mechanisms along with suitable prevention methods.
CO101.3	Differentiate between polymers, ceramics, and nanomaterials based on their structure, properties, and synthesis methods, and evaluate their applications in semiconductors, circuit boards, and emerging computing devices.
CO101.4	Examine lubricant and fuel properties using experimental methods, and assess their role in energy efficiency, eco-friendly backup systems, and green computing practices.
CO101.5	Interpret spectroscopic data (UV-VIS, IR) and explain radiation–matter interactions to demonstrate their applications in fiber-optic communication, optical storage, and IT security systems.

Reference Books:

1. Enginnering Chemistry, Shashi Chawla Dhanpar Rai and Co Ltd
Chemistry in Engineering and Technology – Vol. 1 & 2, Kuriacose and Rajaram, McGraw Hill Education
2. Fundamentals of Molecular Spectroscopy, C. N. Banwell, McGraw Hill Education
3. Engineering Chemistry, B. K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut
4. Basics of Engineering Chemistry, S. S. Dara & A. K. Singh, S. Chand & Company Ltd., Delhi
5. Applied Chemistry – Theory and Practice, O. P. Viramani, A. K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi
6. Elementary Spectroscopy, Y. R. Sharma, S. Chand Publishing
7. Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd.
8. Advanced Inorganic Chemistry, G. R. Chatwal, Goal Publishing House
9. Engineering Chemistry (NPTEL Web-book), B. L. Tembe, Kamaluddin and M. S. Krishna

Chemistry Practical List

1. Water testing

(i) Determination of Total hardness by Complexometric titration method.
(ii) Determination of mixed alkalinity
   a) OH & CO_3
   b) CO_3 & HCO_3
(iii) Chloride ion estimation by Argentometric method.

2. Fuels & Lubricant testing

(i) Flash & fire points determination by
   a) Pensky Martin Apparatus
   b) Abel's Apparatus
   c) Cleveland's open cup Apparatus
   d) Calorific value by bomb calorimeter

(ii) Viscosity and Viscosity index determination by
   a) Redwood viscometer No.1
   b) Redwood viscometer No.2

(iii) Proximate analysis of coal
   a) Moisture content
   b) Ash content
   c) Volatile matter content
   d) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloy by Iodometric Titration.

(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

IES COLLEGE OF TECHNOLOGY SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch- Common to All Disciplines

BS-102	**MATHEMATICS-I**	**3L-1T-0P**	**4Credits**

Course Contents:

Unit 1: Calculus (10 hours): Rolle's theorem, Mean Value theorems, Expansion of functions by Mc. Laurin's and Taylor's for one variable; Taylor's theorem for function of two variables, Partial Differentiation, Maxima & Minima (two and three variables), Method of Lagranges Multipliers.

Unit 2: Calculus (8 hours): Definite Integral as a limit of a sum and Its application in summation of series; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Multiple Integral, Change the order of the integration, Applications of multiple integral for calculating area and volumes of the curves.

Unit 3: Sequences and series (6 hours): Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit 4: Vector Spaces (8 hours): Vector Space, Vector Sub Space, Linear Combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space, Linear Transformations.

Unit 5: Matrices (8 hours): Rank of a Matrix, Solution of Simultaneous Linear Equations by Elementary Transformation, Consistency of Equation, Eigen Values and Eigen Vectors, Diagonalization of Matrices, Cayley-Hamilton theorem and its applications to find inverse.

Course Outcomes

C102.1 To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.

C102.2 To introduce the fallouts of Rolle's Theorem that is fundamental to application of

analysis to Engineering problems.

C102.3 To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.

C102.4 To familiarize the student with functions of several variables that is essential in most branches of engineering.

C102.5 To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Textbooks/References:

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.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

IES COLLEGE OF TECHNOLOGY- SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch- Common to All Disciplines

ES-103	**Basic Electrical & Electronics Engineering**	**2L-1T-2P**	**4Credits**

Course Contents:

Unit - I:

D. C. Circuits: Voltage and current sources, dependent and independent sources, Units and dimensions, Source Conversion, Ohm's Law, Kirchhoff's Law, Superposition theorem, 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.

Unit – II:

1 - phase A. C. Circuits: Generation of sinusoidal A. C. voltage, definition of average value, R. M. S. value, form factor and peak factor of A. C. quantity, Concept of phasor, Concept of Power factor, Concept of impedance and admittance, Active, reactive and apparent power, analysis of R- L, R- C, R- L- C series & parallel circuit.

3 - phase A. C. Circuits: 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.

Unit – III:

Magnetic Circuits: Basic definitions, magnetization characteristics of Ferro magnetic materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, A. C. excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Induced voltage, laws of electromagnetic Induction, direction of induced E. M. F.

Single phase transformer - General construction, working principle, e. m. f. equation, equivalent

circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test.

Unit - IV:

Electrical Machines: Construction, Classification & Working Principle of D. C. machine, induction machine and synchronous machine. Working principle of 3 - Phase induction motor, Concept of slip in 3 - Phase induction motor, Explanation of Torque - slip characteristics of 3 - Phase induction motor. Types of losses occurring in electrical machines. Applications of D. C. machine, induction machine and synchronous machine.

Unit - V:

Basic Electronics: Number systems & Their conversion used in digital electronics, De morgan's theorem, Logic Gates, half and full adder circuits, R- S flip flop, J- K flip flop. Introduction to Semiconductors, Diodes, V- I characteristics, Bipolar junction transistors (BJT) and their working, introduction to C. C., C. B. & C. E. transistor configurations, different configurations and modes of operation of BJT.

Course Outcome

C103.1 List the electrical and electronics components for specified application.
C103.2 Analyze the AC and DC circuits for given application.
C103.3 Classify the electrical machines for real time practical problems.
C103.4 Categorize the characteristics of semiconductor material for diodes and transistor.
C103.5 Classify the digital circuits using logical families.

List of experiments / demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi - meter, oscilloscope. Real - life resistors, capacitors and inductors.
- Measuring the steady - state and transient time - response of R- L, R- C, and R- L- C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R- L, and R- C circuits – impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R- L- C circuits.
- Transformers: Observation of the no - load current waveform on an oscilloscope (non - sinusoidal wave - shape due to B- H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Determination of equivalent circuit parameters of a single phase transformer by

O. C. and S. C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.

- Demonstration of cut - out sections of machines: D. C. machine (commutator - brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single - phase induction machine.
- Torque - Speed Characteristic of separately excited D. C. motor.
- Synchronous speed of two and four - pole, three - phase induction motors. Direction reversal by change of phase - sequence of connections. Torque - Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super - synchronous speed.
- Synchronous Machine operating as a generator: stand - alone operation with a load. Control of voltage through field excitation.
- Study of V- I Characteristics of Diodes.
- Applications of Diodes and their verification.
- Transistor applications as amplifier and switch.
- Verification of truth table for various gates, Flip - Flops.
- Realizations of Various gates, Flip - Flops etc.
- Verification of De morgan's theorems.

References:

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

5. C. L. Wadhwa, Basic Electrical Engineering. New Age International.

6. B. L. Theraja & A. K. Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication

7. E. Hughes & I. M. Smith Hughes Electrical Technology Pearson

8. Vincent Del Toro Electrical Engineering Fundamentals

IES COLLEGE OF TECHNOLOGY, SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch- Common to All Disciplines

ES-104	**PROGRAMMING & DATA STRUCTURE-I**	**2L-0T-2P**	**3 Credits**

Syllabus

Unit 1

C Language Fundamentals, Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input – output Assignments, Control structures, Decision making and Branching, Decision making & looping statements.

Unit 2

Array, One dimensional, Multi-Dimensional array. String: Declaring, Initializing, Printing and reading strings, string manipulation functions, String input and output functions, array of strings.

Unit 3

Monolithic vs Modular programs, User defined vs standard functions, formal vs Actual arguments, Functions category, function prototypes, parameter passing, Recursion, Storage Classes: Auto, Extern, Global, Static.

Basic of structures and Union, Array of structures, file handling in C. opening and closing of files, Input and output operations.

Unit 4:

Pointer variable and its importance, Pointers and address, pointers and functions (call by reference) arguments, pointers and arrays, address arithmetic, character pointer and functions, pointers to pointer ,Initialization of pointer arrays, Dynamic memory allocations methods

Unit 5:

Introduction to Data Structures: Primitive and non primitive data types, Abstract data types, Definition and applications of Stacks, Queues, Linked Lists and Trees.

Course outcomes

CO104.1: Understanding of C language fundamentals including data types, operators, expressions, control structures, and decision-making constructs to develop basic programs.

CO104.2: Apply knowledge of arrays, strings for efficient data storage and manipulation, including multidimensional arrays and string-handling functions.

CO104.3: Differentiate between monolithic and modular programming, implement functions with recursion, manage storage classes, utilize structures, unions, and file handling for real-world programming needs.

CO104.4: Implement and analyse programs using pointers, covering pointer arithmetic, dynamic memory allocation, and call-by-reference to enhance program efficiency and flexibility.

CO104.5: Gain foundational knowledge of data structures such as stacks, queues, linked lists, trees, and demonstrate their applications in problem-solving.

1. Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, Second Edition, "Fundamentals of Data in C", Universities Press

2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition, "Fundamentals of Computer Algorithms", Universities Press

Reference Books

1. Seymour Lipschutz, "Data Structures with C", First Edition, Schaum's outline series in computers, Tata McGraw Hill

2. R. Krishnamoorthy and G. Indirani Kumaravel, Data Structures using C, Tata McGraw Hill – 2008

3. A. K. Sharma, Data Structures using C, Pearson Education India, 2011

4. G. Brassard and P. Bratley, "Fundamentals of Algorithms", P. H. I., New Delhi, 1997

5. A. V. Aho, J. E. Hopcroft, J. D. Ullmann, "The Design and Analysis of Computer Algorithms", Addison Wesley, Boston, 1974

6. Thomas H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, Introduction to Algorithms, Third Edition, M. I. T. Press, 2009

7. Sanjoy Dasgupta, C. Papadimitriou and U. Vazirani, Algorithms, Tata McGraw - Hill, 2008

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B.Tech. First Year

Branch-Common to All Disciplines

ES-105	**Engineering Graphics**	**0L-0T-4P**	**2 Credits**

Course Contents:

Traditional Engineering Graphics: Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics: Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modelling; Solid Modelling; Introduction to Building Information Modelling (BIM)

Unit 1: Introduction to Engineering Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

Unit 2: Orthographic Projections covering, Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes. Projections of Regular Solids covering, those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Unit 3: Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

Unit 4: Isometric Projections covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids;

Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Unit 5: Overview of Computer Graphics covering, listing the computer technologies that impact on graphicalcommunication,Demonstratingknowledgeofthetheoryof CADsoftware[suchas:The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids

Course Outcomes:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

Text/Reference Books:

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

(Corresponding set of) CAD Software Theory and User Manuals

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Branch-Common to All Disciplines

HSS-106	**Professional communication -I Vocabulary, Grammar and Writer**	**2L-0T-2P**	**3 Credits**

COURSE CONTENT:

Unit 1: Vocabulary Building – Synonyms & Antonyms; Contextual Vocabulary; Word Roots & Affixes; Commonly Confused Words; One Word Substitution; Different Ways to Build Vocabulary.

Unit 2: Grammar & Sentence Construction – Subject–Verb Agreement; Tenses & Articles; Prepositions & Conjunctions; Parts of Speech; Error Identification; Sentence Improvement; Logical Sentence Construction; Voice (Active/Passive); Direct/Indirect Speech.

Unit 3: Communication and Reading Comprehension – Communication: types, importance, verbal & non-verbal, communication process, communication barriers, 7 C's; Reading Comprehension: meaning and strategies, skimming, scanning, extensive and intensive reading; Passages on sports, travel & adventure, food & culture, science fiction & science & technology, inspirational biographies; Identifying Main Idea: democracy & participation, gender equality, technology & society, value of critical thinking; Making Inferences: social issues, education & youth, environment & sustainability, technology & society, health & lifestyle; Answering comprehension questions.

Unit 4: Professional Correspondence – Essay Writing (descriptive/argumentative): technology & AI, education & student development, career readiness & professional growth, campus life & student engagement; Cover letter & resume writing; Email writing; Practice test question–answers.

Unit 5: Applied Skills & Mock Tests – A. Assessment Areas: vocabulary MCQs, grammar & error spotting, communication theory, reading comprehension, professional writing tasks; B. Types of Mistakes: vocabulary confusion (synonyms, antonyms, context), grammar lapses (SVA, tenses, prepositions), reading comprehension errors (inference, main idea), writing errors (tone, structure, clarity); C. Strengths & Weak Areas: strongest skills (grammar, RC, essays), weak areas needing improvement (inference questions, articles, confused words); D. Improvement

Strategies: weekly vocabulary lists, grammar drills (SVA, tenses, voice/speech), daily RC practice (sports, tech, social issues), essay-writing templates, email + resume writing checklists.

Course Outcomes

C106.1	Identify and use appropriate vocabulary and improve precision in expression.
C106.2	Identify and apply the rules of grammar correctly and construct grammatically correct sentences in spoken and written communication.
C106.3	Explain the types, importance, and elements of communication and apply reading strategies to comprehend written texts efficiently.
C106.4	Demonstrate professional writing skills and review work based on the feedback.
C106.5	Analyze competitive test patterns and communication-based assessment.

HSS 106 Practical

Unit 1: Vocabulary Building – Write/Text Practice: Short exercises using new words in sentences; everyday conversation vocabulary, and role-play (greetings, requests, directions).
Unit 2: Grammar & Sentence Construction – Write/Text Practice: Sentence correction through situational dialogues, paragraph rewriting, and role-play (polite requests, instructions, and explanation).

Unit 3: Communication & Reading Comprehension – Write/Text Practice: LSWR practice, reading comprehension passages, summary and précis writing; workplace scenarios including notices, circulars, emails, memos, and responding to messages.
Unit 4: Professional Correspondence – Write/Text Practice: Essay, letter, and email writing; practical tasks like leave emails, complaint letters, formal requests, short reports, meeting minutes.

Unit 5: Applied Skills & Mock Tests – Full-length mock tests covering word meanings, sentence formation, sentence correction, paragraph writing, grammar error correction, summary, essay, letter, email writing, and time-bound office communication exercises (emails, memos, circulars, meeting notes).

Books:

1. English Grammar and Composition by S.C. Gupta
2. Meenakshi Raman & Sangeeta Sharma Title: Technical Communication: Principles and Practice, Publisher: Oxford University Press
3. R.C. Sharma & Krishna Mohan Title: Business Correspondence and Report Writing Publisher: Tata McGraw Hill

4. M. Ashraf Rizvi Title: Effective Technical Communication Publisher: McGraw Hill Education

5. Leena Sen Title: Communication Skills Publisher: PHI Learning Pvt. Ltd.

6. S.P. Dhanavel Title: English and Communication Skills for Students of Science and Engineering, Publisher: Orient BlackSwan

7. Dr. Shalini Verma Title: Business Communication: Essential Strategies for 21st Century Manager, Publisher: Pearson Education

8. R. C. Sharma & Krishna Mohan Title: Functional English for Technical Students, Publisher: Tata McGraw Hill

9. Dr. C. Muralikrishna & Sunita Mishra Title: Communication Skills for Engineers Publisher: Pearson Education

10. 1. T. Balasubramanian, Title: A Textbook of English Phonetics for Indian Students Publisher: Macmillan India

11. Bansal & Harrison Title: Spoken English for India Publisher: Orient BlackSwan

12. Leena Sen Title: Communication Skills Publisher: PHI Learning Pvt. Ltd.

13. Sanjay Kumar & Pushp Lata Title: Communication Skills, Publisher: Oxford University Press

14. R. K. Bansal & J. B. Harrison (Revised by K. K. Sharma) Title: Spoken English and Phonetics Publisher: Orient BlackSwan

15. S. P. Dhanavel Title: English and Communication Skills for Students of Science and Engineering Publisher: Orient BlackSwan

16. Shalini Verma Title: Body Language and Soft Skills Publisher: Pearson Education India

17. M. Ashraf Rizvi Title: Effective Technical Communication Publisher: McGraw Hill Education India

18. Leena Sen & Sangeeta Sharma (combined reference) Title: Oral Communication: Speaking Across Contexts Publisher: PHI Learning

19. Dr. Kiranmai Dutt, P. Geetha Rajeevan & C. L. N. Prakash Title: A Course in Listening and Speaking – I & II

i. Publisher: Cambridge University Press India

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B.Tech. First Year

Branch-Common to All Disciplines

HSS-107	**Design Thinking**	**0L-0T-2P**	**1Credits**

Syllabus

Course objectives

- To expose the student with state of the art perspectives, ideas, concepts, and solutions related to the design and execution of projects using design thinking principles
- To prepare the mindset and discipline of systemic inspiration driven by a desire to identify new sources of ideas, and new models especially outside their regular working atmosphere
- To propose a concrete, feasible, viable and relevant innovation project/challenge

Unit 1

What is Different about Design thinking? Design Thinking Skills Principles of Design Thinking, The Basis for Design Thinking, The Design Thinking Team, Design Thinking Workshops and Meetings – Exercises and case based discussions

Unit 2

Listening and Empathizing Techniques – observation – structured open ended approach, Design Thinking Frameworks, Ideation tools – brainstorming, innovation heuristics, behavior models, overcoming cognitive fixedness – Exercises and case based discussions

Unit 3

Use of Diagrams and Maps in Design Thinking – Empathy map. Affinity diagram, mind map, journey map, combining ideas into complex innovation concepts. Story telling – improvisation, scenario planning, and development of scenarios, evaluation tools, frog design and prototyping - – Exercises and case-based discussions Assess developer and user perspectives for bias – apply frameworks to strengthen communication – sustain a

culture of innovation.

Unit 4

Idea generation Basic design directions

Themes of thinking, Inspiration and references, Brainstorming, Value, Inclusion, Sketching, Presenting ideas

Refinement

Thinking in images, Thinking in signs, Appropriation, Humour, Personification, Visual metaphors, Modification, Thinking in words, Words and language, Type 'faces', Thinking in shapes, Thinking in proportions, Thinking in colour

Unit 5

Prototyping Developing designs, 'Types' of prototype, Vocabulary

Implementation

Format, Materials, Finishing, Media, Scale, Series/Continuity

CO107.1 Demonstrate the frameworks of Design Thinking skills.

CO107.2 Apply the listening and empathizing techniques.

CO107.3 Utilize design frameworks to strengthen communication and sustainable innovation.

CO107.4 Summarize design thinking in appropriate aspects for better implementation.

CO107.5 Summarize format, materials, finishing, media, scale, and series / continuity.

References:

Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.

Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve– Apply", Springer, 2011

Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013

Jeanne Liedtka , Andrew King, Kevin Bennett , "Book - Solving Problems with Design Thinking - Ten Stories of What Works" (Columbia Business School Publishing), 2013

Maurício Vianna, Ysmar Vianna, Isabel K. Adler, Brenda Lucena, Beatriz Russo, "Design thinking: Business Innovation" MJV Press, 2011

Burgelman, Christensen, and Wheelwright, “Strategic Management of Technology and Innovation”5th Edition, McGraw Hill Publications, 2017

Gavin Ambrose, Paul Harris, “Basics Design - 8: Design Thinking”, illustrated, reprint, AVA Publishing, 2010 2. Christian Müller-Roterberg, “Handbook of Design Thinking”, Kindle Direct Publishing ISBN: 978-1790435371, November 2018

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B.Tech. First Year

Branch-Common to All Disciplines

MAND-108	**Indian Knowledge Heritage**	**0L-0T-2P**	**1Credits**

Unit -1 Foundations & Philosophy of IK

Introduction to the Indian Knowledge System; Vedas, Upanishads and classical texts as sources of knowledge; principles of sustainability, ethics and holistic thinking.

Unit-2 Scientific Heritage & Mathematics

Contributions to mathematics, geometry, algebra, calculus, logic, astronomy

Unit-3 Engineering Sciences & Technologies

Traditional technologies, metallurgy, materials, civil and mechanical engineering practices in ancient India

Unit-4 Health, Environment & Sustainable Practice

Ayurveda, traditional agriculture, architecture (Vastu), environmental knowledge.

Unit-5 Modern Relevance & Applications of IKS

Integration of IKS with modern science and engineering; innovation and entrepreneurship based on indigenous knowledge

Course Outcomes

CO108.1 Students will be able to explain the fundamental principles of the Indian Knowledge System, including the philosophical insights from Vedas, Upanishads, and classical texts, with emphasis on sustainability, ethics, and holistic thinking.

CO108.2 Students will be able to analyze India's historical contributions to mathematics, astronomy, and logical sciences, demonstrating how these developments influenced global knowledge systems.

CO108.3 Students will be able to identify and evaluate traditional Indian technologies in metallurgy, materials, civil and mechanical engineering, understanding their scientific basis and historical significance.

CO108.4 Students will be able to understand and relate traditional Indian knowledge in Ayurveda, agriculture, Vastu, and environmental management to modern sustainable practices.

CO108.5 Students will be able to integrate concepts of IKS with modern science and technology, and apply them for innovation, entrepreneurship, and societal development.

Reference:

1.Introduction to Indian Knowledge System: Concepts and Applications by B. Mahadevan, Vinayak Raja Bhat, and Nagendra Pavana (PHI Learning, 2022)

2.History of Hindu Mathematics: A Source Book — Bibhuti bhusha nDatta & Awadhesh Narayan Singh

3.Engineering and Technology in Ancient India by Ravi Prakash Arya

4.This Fissured Land: An Ecological History of India — MadhavGadgil&RamachandraGuha

5.Indian Knowledge System: Integrating Heritage with Engineering

Author: Gagan Bansal (2025, Deep Science Publishing)

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B.Tech. First Year

Branch-Common to All Disciplines

HSS-109	**Universal Human Values-II**	**0L-0T-2P**	**1Credits**

Unit 1 – Introduction to Value Education (6 lectures and 3 tutorials for practice session) Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Lecture 2: Understanding Value Education Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: Self-exploration as the Process for Value Education Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations Tutorial 2: Practice Session PS2 Exploring Human Consciousness Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

Unit 2 – Harmony in the Human Being (6 lectures and 3 tutorials for practice session) Lecture 7: Understanding Human being as the Co-existence of the Self and the Body Lecture 8: Distinguishing between the Needs of the Self and the Body Tutorial 4: Practice Session PS4 Exploring the difference of Needs of Self and Body Lecture 9: The Body as an Instrument of the Self Lecture 10: Understanding Harmony in the Self Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the Self Lecture 11: Harmony of the Self with the Body Lecture 12: Programme to ensure self-regulation and Health Tutorial 6: Practice Session PS6 Exploring Harmony of Self with the Body

Unit 3 – Harmony in the Family and Society (6 lectures and 3 tutorials for practice session) Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction Lecture 14: 'Trust' – the Foundational Value in Relationship Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust Lecture 15: 'Respect' – as the Right Evaluation Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 16: Other Feelings, Justice in Human-to-Human Relationship Lecture 17: Understanding Harmony in

the Society Lecture 18: Vision for the Universal Human Order Tutorial 9: Practice Session PS9 Exploring Systems to fulfill Human Goal

Unit 4 – Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session) Lecture 19: Understanding Harmony in the Nature Lecture 20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature Lecture 21: Realizing Existence as Co-existence at All Levels Lecture 22: The Holistic Perception of Harmony in Existence Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence

Unit 5 – Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session) Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order AICTE revised Model Curriculum for UG Degree Course in Mechanical Engineering 71 Lecture 26: Competence in Professional Ethics Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies Lecture 28: Strategies for Transition towards Value-based Life and Profession Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order.

Course Outcomes :

CO109.1 Explain the need for right understanding, relationships, and physical facilities, and apply self-exploration to understand happiness, prosperity, and natural acceptance.*

CO109.2 Describe the co-existence of self and body, distinguish their needs, and apply the principles of self-regulation to ensure harmony and health.

CO109.3 Demonstrate understanding of trust, respect, and other foundational values to ensure harmony in family relationships and contribute to a just and humanistic society.*

CO109.4 Interpret the interconnectedness and mutual fulfillment in nature and develop a holistic perception of existence as co-existence.

CO109.5 Apply human values and ethical principles to professional conduct, decision-making, and sustainable, humanistic development in personal and professional life.*

Text Book and Teachers Manual a. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034- 47-1

b. The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, RR Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-

c. Professional Ethics and Human Values, Premvir Kapoor, ISBN: 978-93-86173-652, Khanna Book Publishing Company, New Delhi, 2022. 3-2-

Reference Books 1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.

2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English) 13. Gandhi - Romain Rolland (English)

Semester-II

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B.Tech. First Year

Branch-Common to All Disciplines

BS-201	**Engineering Physics**	**2L-1T-2P**	**4Credits**

Course Contents:

Unit 1: Wave nature of particles and the Schrodinger equation (8 lectures)

Introduction to Quantum mechanics, Wave nature of Particles, De Broglie equation, operators, Time-dependent and time-independent Schrodinger equation for wave function, Application: Particle in a One dimensional Box, Free-particle wave function and wave-packets, vg and vp relation, Uncertainty principle, scattering.

Unit 2: Wave optics (8 lectures)

Huygens ' Principle, superposition of waves and interference of light by wave front splitting and amplitude splitting, interference in thin film, Young's double slit experiment, Newton's rings, Michelson interferometer, Diffraction of light wave, Fraunhoffer diffraction due to single slit and plane diffraction grating, polarization of light waves, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Unit 3: Introduction to solids (8 lectures)

Free electron theory of metals, Fermi level of Intrinsic and extrinsic, Bloch's theorem for particles in a periodic potential, Kronig-Penney model (no derivation) and origin of energy bands. V-I characteristics of PN junction, Rectifiers, Zener diode and its application, Solar Cell, Hall Effect.

Unit 4: Lasers (8 lectures)

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state lasers (ruby, Neodymium), Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications

of lasers in science, engineering and medicine. Introduction to Optical fiber, acceptance angle and cone, Numerical aperture, V number, attenuation.

Unit 5: Electrostatics in vacuum (8 lectures)

Basic properties of electric charge; continuous charge distribution, Electric dipole, Basic Introduction to Dielectrics, Gradient, Divergence and curl, Stokes' theorem, Gauss Theorem, electric field due to line charge, Continuity equation for current densities; Maxwell's equation in vacuum and non-conducting medium.

Course outcome

C201.1 Analyze Quantum Mechanics and its applications.

C201.2 Identify wave optics by Young's double slit and Newton's rings experiments.

C201.3 Classify qualitative discussion of Kronig Penny model and diodes for specific application.

C201.4 Analyze lasers and Optical fibre parameters for given Applications.

C201.5 Solve numerical problems by applying Stokes, Gauss theorem, Maxwell's equation.

List of Experiments

1. To determine the dispersive power of prism.
2. To determine the ʎ of sodium light with the help of Newton's Ring.
3. Resolving Power of Telescope.
4. YDSE (Young's double slit Experiment).
5. To determine the frequency of AC mains supply.
6. V-I Characteristics of P-N junction diode.
7. To determine the ʎ of diode losses by single slit diffraction.
8. To determine the Planck's constant with the help of photocell.
9. Hall's effect experiment.
10. Calibration of ammeter by using reference zener diode.
11. To study the effect of temperature on reverse saturation current in P-N junction diode and to determine the energy band gap.
12. To determine the ʎ of sodium by using plane diffraction grating.

13. To determine the prominent lines of mercury source by plane diffraction grating.
14. To determine the numerical aperture of an optical fiber.
15. To determine λ of given laser by plane diffraction grating.

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Branch-Common to All Disciplines

BS-202	**MATHEMATICS-II**	**3L-1T-0P**	**4Credits**

Course Contents:

Unit 1:Ordinary Differential Equations I :(6 hours) : Differential Equations of First Order and First Degree (Leibnitz linear, Bernoulli's, Exact), Differential Equations of First Order and Higher Degree, Higher order differential equations with constants coefficients, Homogeneous Linear Differential equations, Simultaneous Differential Equations.

Unit 2:Ordinary differential Equations II:(8 hours) : Second order linear differential equations with variable coefficients, Method of variation of parameters, Power series solutions ; Legendre polynomials, Bessel functions of the first kind and their properties.

Unit3:Partial Differential Equations : (8 hours): Formulation of Partial Differential equations, Linear and Non-Linear Partial Differential Equations, Homogeneous Linear Partial Differential Equations with Constants Coefficients.

Unit 4: Functions of Complex Variable :(8 hours) : Functions of Complex Variables: Analytic Functions, Harmonic Conjugate, Cauchy-Riemann Equations (without proof), Line Integral, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for Evaluation of Real Integral (Unit Circle).

Unit 5: Vector Calculus : (10 hours) : Differentiation of Vectors, Scalar and vector point function, Gradient, Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, Line Integral, Surface Integral and Volume Integral, Gauss Divergence, Stokes and Green theorems.

Course Outcome

C202.1	Simplify Differential Equations of First and Higher order.
C202.2	Apply Second Order Linear Differential Equations for solving Power Series.
C202.3	Simplify Linear and Non-Linear Partial Differential Equations.
C202.4	Elaborate Complex Variables Functions , Residue Theorem and Real Integrals
C202.5	Solve the Gradient , Divergence and Curl by appropriate methods.

Textbooks/ References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Erwinkreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. W.E.BoyceandR.C.DiPrima,Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.

4. S.L.Ross, Differential Equations, 3rd Ed., WileyIndia, 1984.

5. E.A.Coddington,AnIntroduction to Ordinary Differential Equations, Prentice Hall India,1995.

6. E.L.Ince, Ordinary Differential Equations, Dover Publications,1958.

7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.

8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

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

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B.Tech. First Year

Branch-Common to All Disciplines

ES-203	**Basic Mechanical Engineering**	**2L-0T-2P**	**3Credits**

Course Contents:

Unit I:

Materials: Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness, ductility, brittleness, malleability etc. of materials, Tensile test-Stress- strain diagram of ductile and brittle materials, Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

Unit II:

Measurement: Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain ,Force and torque measurement,Vernier caliper, Micrometer, Dialgauge, Slip gauge, Sine-bar and Combination set.

Production Engineering: Introduction to Lathe and Drilling machines and their various operations.

Unit III:

Fluids: Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal'slaw , Bernoulli's equation for incompressible fluids, Only working principle of Hydraulic machines, pumps.

Unit IV:

Thermodynamics: Thermo dynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy &entropy.

Steam Engineering: Classification and working of boilers, mountings and accessories of boilers.

Unit V:

Reciprocating Machines:

Working principle of Otto, and Diesel cycle with P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines.

Course Outcome

The students will be able to: -

C203.1	Apply knowledge in material selection and Design.
C203.2	Apply acquired knowledge of measurement techniques, production processes, and machine operations to solve practical manufacturing problems.
C203.3	Apply knowledge of fluid properties, laws, and equations to analyze and solve practical engineering problems related to fluid flow, pressure, and energy conversion.
C203.4	Apply thermodynamics laws to analyze energy transfer, heat exchange, and work interactions within thermodynamic systems
C203.5	Analyze the performance characteristics of reciprocating engines and compressors, including power output and efficiency

Reference Books:

1- Kothanda raman & Rudramoorthy, Fluid Mechanics & Machinery, New Age.
2- Nakra & Chaudhary, Instrumentation and Measurements,TMH.
3- NagP.K,EngineeringThermodynamics, TMH.
4- Ganesan, Internal Combustion Engines,TMH.
5- AgrawalCMBasicMechanicalEngineering,WileyPublication.

6- Achuthan M,, EngineeringThermodynamics,PHI.

List of Suggestive Core Experiments:

TheoryrelatedEighttoTenexperimentsincludingcoreexperimentsasfollows:

1- StudyofUniversalTestingmachines.
2- LinearandAngularmeasurementusing,Micrometer,SlipGauges,DialGaugeandSine-bar.
3- StudyofLatheMachine.

IES College of Technology, Bhopal

New Scheme Based on AICTE Flexible Curricula

Branch- Common to All Discipline

ES-204	**PROGRAMMING & DATA STRUCTURE-II**	**2L-0T-2P**	**3 Credits**

Syllabus

Unit 1: INTRODUCTION TO DATA STRUCTURES:

Data Structures: Definition- Time & Space Complexity - Arrays: Representation of arrays, Applications of arrays, sparse matrix and its representation- Linear list: Singly linked list implementation, insertion, deletion and searching operations on linear list - Circular linked list: implementation, Double linked list implementation, insertion, deletion and searching operations.

Unit 2 : STACK Sand QUEUES:

Operations, array and linked representations of stack, stack applications, infix to postfix conversion, postfix expression evaluation - Queues: operations on queues, array and linked representations - Circular Queue: operations, applications of queues.

Unit 3: TREES & GRAPHS:

Trees: Definitions and Concepts-Representation of binary tree, Binary tree traversals (In order, Post order, preorder), Binary search trees in arrays– Heaps - AVL Trees – B Trees

Graphs: Representation of Graphs- Types of graphs.

Unit 4: INTRODUCTIONS TO ALGORITHMS:

Definition of Algorithms-Overview and importance of algorithms-pseudocode conventions, asymptotic notations, practical complexities.

Graph Applications : Breadth first traversal–Depth first traversal—Single source shortest path – Minimal spanning trees – prim's and kruskal's algorithms

Unit 5: Approach of Design Algorithm

Linear Programming, Dynamic Programming, Divide and conquer, Back tracking and Parallel algorithm design.

Course outcomes

CO204.1: Explain the fundamentals of **data structures**, analyze **time and space complexity**, and implement arrays, sparse matrices, and linked list variations (singly, doubly, circular) with insertion, deletion, and searching operations.

CO204.2: Implement and apply **stacks and queues** using arrays and linked lists, and utilize their applications such as **expression conversion, evaluation**, and queue-based problem solving.

CO204.3: Demonstrate understanding of **tree and graph data structures**, implement traversals, and apply concepts of **binary trees, BSTs, heaps, AVL trees, and B-trees** along with graph types and representations.

CO204.4: Analyze and apply fundamental **algorithmic techniques** including asymptotic notations, pseudo code conventions, and implement **graph algorithms** such as BFS, DFS, shortest path, and minimum spanning trees using Prim's and Kruskal's algorithms.

CO204.5: Apply different **algorithm design paradigms** such as linear programming, divide and conquer, dynamic programming, backtracking, and parallel algorithms to solve computational problems effectively.

Recommended Texts

1. Ellis Horowitz, Sartaj Sahni,Susan Anderson Freed, Second Edition, "Fundamentals of Data in C", Universities Press
2. E. Horowitz,S. Sahniand S.Rajasekaran,Second Edition,"Fundamentals of Computer Algorithms "Universities Press

Reference Books

3. Seymour Lipschutz, Data Structures with C", First Edition, Schaum'soutline series in computers, Tata McGraw Hill.
4. R. Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, Tata McGraw Hill – 2008.
5. A.K. Sharma, Data Structures using C, Pearson Education India, 2011.
6. G.Brassard and P. Bratley, "Fundamentals of Algorithms",PHI, New Delhi, 1997.
7. A.V.Aho,J.E.Hopcroft,J.D.Ullmann,,"The design and analysis of ComputerAlgorithms", Addison Wesley, Boston, 1974
8. Thomas H.Cormen,C.E.Leiserson,RL.Rivest and C.Stein,Introductionto Algorithms, Third edition, MIT Press, 2009
9. Sanjoy Dasgupta,C. Papadimitriou and U.Vazirani, Algorithms,Tata McGraw-Hill, 2008.

IES COLLEGE OF TECHNOLOGY SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech. First Year

Branch-Common to All Disciplines

ES-205	**Basic Civil Engineering & Mechanics**	**2L-0T-2P**	**3 Credits**

Unit 1: Introduction to Building Materials & Construction Techniques

Materials: Stones, bricks, cement, lime, timber – types, properties, simple tests, and uses in daily life. Concrete & Mortar: Workability, strength properties, proportioning, mixing, curing; quality checks. Construction Elements: Foundations, masonry, plastering, floors, roofs, doors, windows, lintels, staircases – functional role and relevance.

Unit 2: Construction Practices & Basics of Building Planning

Overview of site selection, layout, foundations, fundamentals of masonry with brick and stone masonry types, basic components of concreting, curing methods and importance. Introduction to simple architectural and structural drawings, basic building symbols, and notations.

Unit 3: Fundamentals of Surveying, Mapping & Remote Sensing

Principles of surveying, errors, and accuracy. Chain/tape measurements, offsets, and area calculation. Levelling concepts, reduced levels, profile levelling, introduction to contours, and applications. Mapping: Contours, profiles, cross-sections, computation of areas & volumes. Introduction of remote sensing and its applications.

Unit 4: Applied Mechanics – Force Systems & Equilibrium

Force systems, resultants, and resolution of forces.Lami's theorem, equilibrium of particles and rigid bodies.Support reactions of beams (point load and UDL cases).Friction: laws and simple engineering applications (ladders, wedges).

Unit 5: Properties of Sections & Stresses

Centroid and center of gravity of simple and composite areas.Moment of inertia for standard sections.Simple stress–strain relations, Hooke's law, factor of safety.Thin cylinder stresses (introductory level).

Course Outcomes (COs)

On successful completion, the learner will be able to: -

CO205.1: Recognize commonly used construction materials and their applications in infrastructure and laboratories.

CO205.2: Interpret simple building components and basic drawings and understand site practices.

CO205.3: Apply surveying methods to measure, map contours and profiles, and explain basic remote sensing applications.

CO205.4: Analyze simple force systems and equilibrium conditions applicable to machines, devices, and structures.

CO205.5: Compute centroid, moment of inertia, and bending effects in simple sections, linking structural behavior to multidisciplinary engineering designs.

Reference Books

1. S.C. Rangwala – Engineering Materials (Charotar Publishing House)
2. B.C. Punmia, Ashok Kumar Jain, Arun Jain – Building Construction (Laxmi Publications)
3. S.K. Duggal – Building Materials (New Age International Publishers)
4. B.C. Punmia – Surveying Vol. I & II (Laxmi Publications)
5. R. Agor – Surveying and Levelling (Khanna Publishers)
6. J. Ghosh – Remote Sensing and GIS (Narosa Publishing House)
7. A.K. Tayal – Engineering Mechanics (Umesh Publications)
8. R.S. Khurmi, J.K. Gupta – A Textbook of Engineering Mechanics (S. Chand & Co.)
9. F.L. Singer – Engineering Mechanics: Statics and Dynamics (Harper & Row / CBS Publishers)

IES COLLEGE OF TECHNOLOGY SYLLABUS

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B.Tech.First Year

Branch-Common to All Disciplines

HSS-206	**Professional Communication II (SVAR)**	**2L-0T-2P**	**3Credits**

Unit 1: Pronunciation & Fluency (Reading)

Target: Develop clear speech, correct sounds, and natural reading pace.

Activities

1. **Phonetics Drills**
   - Difficult sounds: *th, s, sh, v, w*
   - **Includes:**
     - Meaning of *Phonetics*
     - Meaning of *Phonetic Transcription*
2. **Timed Reading Aloud (1-minute passages)**
   - Themes:
     a. College Life & Adjustment
     b. Technology & Digital Habits
     c. Personal Growth & Motivation
     d. Time Management & Productivity
3. **Tongue Twisters for Articulation**
   - **Includes:** Benefits of tongue twisters
4. **Record & Review**
   - Self-correction through playback analysis

Unit 2: Listening & Recitation

Target: Improve listening accuracy and repetition fluency.

Activities

1. **Sentence Repetition Drills**
   - Importance in second language teaching
   - Drills supporting fluency and accuracy
2. **Short News/Audio Dictation**
3. **Dialogue Listening & Role-Play**
   - Role of dialogue listening in improving comprehension & response accuracy
   - **Situations:**
     a. Passenger asking for train tickets & timings
     b. Doctor and patient discussing symptoms
     c. Student seeking guidance from teacher
     d. Customer correcting a wrong food order
     e. Colleagues discussing a work issue

4. **Fill-in-the-Blanks Listening Tasks**

Unit 3: Grammar & Error Identification

Target: Strengthen grammar through listening tasks and error correction.

Activities

1. **Quick Grammar Quizzes**
   - Topics: Tenses, Subject–Verb Agreement, Prepositions
   - Includes: Common grammatical errors
2. **Instructor Read-Aloud → Error Identification**
   - Includes: Limitations of timed reading aloud
3. **"Spot the Error" Listening Games**
4. **Peer Exchange of Error Sentences**

Unit 4: Conversational Comprehension

Target: Listen, infer, and respond logically.

Activities

1. **Audio Clip-Based Listening Tasks**
2. **Role-Play Everyday Situations**

   a. Asking for Directions on Campus

   b. Introducing Yourself to a New Classmate

   c. Ordering Food in the College Canteen

   d. Asking for Help with Notes

3. **Inference Drills**

   Inferring **relationships**, **moods**, and **settings**

   Types of relationships & common emotions (Examples included)

4. **Importance of Question/Answer Sessions**

   Role in improving listening & speaking skills

5. **Summarizing Short Conversations**

   Themes: a. Lost Item b. Library Rules c. Asking for Directions d. Group Project Planning

Unit 5: Extempore and Book Review

Target: Organize thoughts and speak confidently & fluently.

Activities

1. **Short Topic Drills (45–60 sec)**

2. **Timed Preparation + Delivery**
   30 seconds prep + response
3. **Extempore Meaning & Applications**
   Fields where extempore speaking is essential
4. **Mock Interviews**
   Meaning, purpose, use, and types
5. **Peer/Teacher Feedback**
   Focus on clarity, fluency, and coherence
6. Review of a Self-Selected Book

C206.1	Apply correct pronunciation, sound production, and articulation techniques through phonetic and fluency drills.
C206.2	Demonstrate active listening skills to accurately comprehend, repeat, and respond to spoken input.
C206.3	Apply grammatical knowledge to identify and correct errors through listening-based grammar activities.
C206.4	Analyze and interpret spoken conversations to infer relationships, emotions,ideas, and respond appropriately.
C206.5	Present ideas confidently and fluently by organizing thoughts quickly in extempore speaking, mock interviews, and book review presentation. | extempore speaking, mock interviews, and book review presentations.

IES COLLEGE OF TECHNOLOGY SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech.First Year

Branch-CSE, AL, DS, AD, CY

ES-207	**Computer Hardware Workshop**	**0L-0T-4P**	**2Credits**

Syllabus:

This workshop is structured into 4 key Units, blending theory and extensive practical content.

Unit	Topics	Practical Activities (Workshop Focus)	Learning Hours (Approx.)
Unit 1	**Computer Fundamentals & System Components**		**25 hours**
	Introduction to computer architecture, safety procedures, and basic electrical/electronic components.	Safe handling of tools and components; identifying different components like CPU, RAM, Motherboard form factors (ATX, micro-ATX), storage drives (HDD, SSD), power supplies (SMPS), etc..	(5 Theory, 20 Practical)
Unit 2	**PC Assembly & Operating Systems**		**35 hours**
	Step-by-step PC assembly process, BIOS/CMOS configuration, boot sequence, and OS fundamentals.	Complete assembly and disassembly of a PC; configuring BIOS/UEFI settings; installing Windows and Linux OS; installing device drivers and application software.	(5 Theory, 30 Practical)
Unit 3	**Maintenance & Troubleshooting**		**30 hours**
	Common hardware faults, diagnostic utilities, preventive maintenance, and data management techniques.	Performing diagnostic tests (POST); fault finding and repair at card level; data backup and recovery; implementing basic security (firewall, antivirus); general	(10 Theory, 20 Practical)

		maintenance procedures.	
Unit 4	**Networking Fundamentals**		**30 hours**
	Network concepts, topologies, devices (routers, switches), IP addressing, and security basics.	Crimping network cables; setting up a small wired/wireless LAN; configuring IP addresses; sharing resources over a network; basic network troubleshooting.	(10 Theory, 20 Practical)
Total			**120 hours**

Course Outcomes

Upon successful completion of this workshop, students will be able to:

- Identify and describe the function of major computer components.
- Safely assemble a new desktop PC from individual components.
- Install, configure, and manage different operating systems (Windows and Linux) and application software.
- Perform diagnostic tests and troubleshoot hardware and software problems at the component/card level.
- Set up and configure a basic wired and wireless network.
- Implement basic security measures and perform data backup/recovery techniques.

Practical Examinations/Lab Work (60%): Assesses hands-on skills in assembly, installation, maintenance, and networking tasks.

Written Examination (30%): Evaluates theoretical knowledge of components, troubleshooting theory, and networking concepts.

Workshop Project/Logbook (10%): Documentation of all lab activities and a small project (e.g., building a specialized PC or a small functional network).

IES COLLEGE OF TECHNOLOGY SYLLABUS

Autonomous College

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B.Tech.First Year

Branch-Common to All Disciplines

ES-207	**Idea Lab Workshop**	…….	…….

OBJECTIVE

- To gain hands-on experience in designing, simulating, and fabricating printed circuit boards using industry-standard tools and techniques.
- To introduce school students to fundamental mechanical tools, measurement principles, and digital fabrication, promoting technical curiosity and hands-on learning.

LEARNING OUTCOMES

CONTENTS

Topic	Activities
PCB design fundamentals	Gained understanding of PCB design fundamentals including layer stack-up, component placement, and routing.
Component identification	Identify different components and colour coding
EDA Tool hands-on circuit designing	Worked with EDA tools
EDA Tool hands-on circuit designing	Worked with EDA tools
EDA Tool hands-on layout designing	Worked with EDA tools
PCB Designing	Design pcb layout, understanding about etching, soldering, drilling and trouble shouting process

PCB Designing	Design pcb layout, understanding about etching, soldering, drilling and trouble shouting process
Mini project designing	Design project in a group
Orientation & Basics of Measurement	Introduction to the lab, safety guidelines, demo of vernier caliper and micrometer
Hands-On with Measurement Tools	Practice sessions using caliper, micrometer, and height gauge on sample parts
Introduction to 3D Printing	Basics of 3D modeling, slicing software, live 3D printing demonstration
High-Speed Drill Machine & Fabrication Safety	Safety briefing, supervised drilling practice, fabrication of a simple part
Mini Project	Students measure, design, and fabricate a simple model
Project Competition and certification distribution	Valedictory

Student will able to

CO.1. Demonstrate the PCB manufacturing process, DRC (Design Rule Check), and Gerber file generation.

CO.2. Design PCBs from schematic to final board layout.

CO.3. Utilize EDA tools for relevant application

CO.4. Utilize precision instruments, measurement equipment and fabrication tools for relevant applications.

CO.5. Build early technical confidence and safety awareness.

KEY PROJECTS

1. **Design of a Power Supply Module**
2. **Design a Mini Project**

IES COLLEGE OF TECHNOLOGY SYLLABUS

Autonomous College

New Scheme Based On AICTE Flexible Curricula

B.Tech.First Year

Branch-ME, CE, EX, EC

ES-207	**Workshop**	**0L-0T-4P**	**2Credits**

Lectures & amp; videos: (10hours)

1. Manufacturing Methods- casting, forming, machining, joining, advanced

Manufacturing methods (3 lectures)

2. Fitting operations & power tools (1lecture)

3. Electrical & Electronics (1lecture)

4. Carpentry (1lecture)

5. Metal casting (1lecture)

6. Welding (arc welding & gas welding), brazing (1lecture)

Workshop Practice: (60hours)

1. Machine shop (10hours)

2. Fitting shop (8hours)

3. Carpentry (6hours)

4. Electrical & Electronics (8hours)

5. Welding shop (8hours (Arcwelding4hrs+ gaswelding4hrs)

6. Casting (8hours)

7. Smithy (6hours)

Course Outcomes

CO1: Students will be able to **identify and explain various manufacturing methods** such as casting, forming, machining, joining, and advanced manufacturing processes.

CO2: Students will be able to **perform basic fitting operations** and use common **hand tools and power tools** safely and effectively.

CO3: Students will be able to **understand fundamental concepts of electrical and electronics systems** and apply them in basic workshop applications.

CO4: Students will be able to **demonstrate carpentry skills** including measuring, cutting, planning, and joining wooden components.

CO5: Students will be able to **carry out basic metal casting and welding operations** (arc welding, gas welding, brazing) with an understanding of materials, tools, and safety practices.