Scheme and Syllabus

of

B. TECH. (COMPUTER SCIENCE AND ENGINEERING WITH ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

By

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	Semester-I				
Code	**Course Name**	**L**	**T**	**P**	**Credits**
ETPH101	Applied Physics/ Engineering Physics	2	0	0	2
ETCS103	Programming with C	2	0	0	2
ETEE105	Basic Electrical & Electronics Engineering	2	1	0	3
ETHS107	Professional Communication	2	0	0	2
ETMT109	Engineering Mathematics	3	1	0	4
ETHS111	Green Technology and Sustainability	2	0	0	2
ETPH151	Applied Physics/ Engineering Physics Lab	0	0	4	2
ETCS153	Programming with C Lab	0	0	4	2
ETEE155	Basic Electrical & Electronics Engineering Lab	0	0	4	2
ETHS157	Professional Communication Lab	0	0	4	2
ETME159	Engineering Skills Practices-I	0	0	6	3
	Total	13	2	22	26

Syllabus First Year First Semester

Course Title	Applied Physics/ Engineering Physics	Course No:	ETPH101
Specialization	Engineering	Structure (L-T-P-C)	(2-0-0-2)

Course Objective:

The objective of the course is to strengthen the fundamentals of physics and then build an interface of theoretical concepts with their industrial/engineering applications

Course Outcome:

By the end of this course, the student will be able to:

- **CO1.** Recall various phenomenon of physics including Laplace and Poisson's equations for electrostatic potential, Faraday's Law and its applications
- **CO2.** Understanding the basics of electrostatics and magnetostatics
- **CO3.** Identify and classify various phenomenon in real life into electro- or magneto statics.
- **CO4.** Explain the basics of electrostatics, magneto statics and electromagnetic laws.
- **CO5.** Apply the acquired knowledge in designing and understanding the physical phenomenon of Electrostatic and Magneto static.

Course Content:

Unit 1: Electrostatics in vacuum: Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution and connection with steady state diffusion and thermal conduction; Practical examples like Farady's cage and coffee-ring effect; Boundary conditions of electric field and electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.

Unit 2: Electrostatics in a linear dielectric medium: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics – Point charge at the center of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field

Unit 3: Magnetostatics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Magnetostatics in a linear magnetic medium: Magnetization and associated bound currents; auxiliary magnetic field: Boundary conditions on and. Solving for magnetic field due to simple magnets like a bar magnet; magnetic susceptibility and ferromagnetic, paramagnetic and diamagnetic materials; Qualitative discussion of magnetic field in presence of magnetic materials.

Unit 4: Faraday's law: Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; Electromagnetic breaking and its applications; Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and calculating electric field due to changing magnetic fields in quasi-static approximation; energy stored in a magnetic field.

Displacement current, Magnetic field due to time-dependent electric field and Maxwell's equations: Continuity equation for current densities; Modifying equation for the curl of magnetic field to satisfy continuity equation; displace current and magnetic field arising from time dependent electric field; calculating magnetic field due to changing electric fields in quasistatic approximation. Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field; Flow of energy and Poynting vector with examples. Qualitative discussion of momentum in electromagnetic fields.

Unit 5: Electromagnetic waves: The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; relation between electric and magnetic fields of an electromagnetic wave; energy carried by electromagnetic waves and examples. Momentum carried by electromagnetic waves and resultant pressure. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.

Textbook:

1. David Griffiths, Introduction to Electrodynamics

References:

1. Halliday and Resnick, Physics
2. W. Saslow, Electricity, magnetism and light

Course Title	Applied Physics/ Engineering Physics Lab	Course No:	ETPH151
Specialization	Engineering	Structure (L-T-P-C)	(0-0-4-2)

Course Objective:

Hands-on understanding the phenomenon taught in theory.

Course Outcome:

At the end of this course, the student will be able to:

- **CO1.** Recall the theorical concept and will be able to corelate with the practical.
- **CO2.** Understanding of magnetic field, and resonance phenomenon
- **CO3.** Explain the resonance phenomenon in LCR circuits
- **CO4.** Explain fundamentals of Lorentz force in a vacuum tube
- **CO5.** Apply the knowledge learnt in measurement of Lorentz force in a vacuum tube.

Course Content:

1. Experiments on electromagnetic induction and electromagnetic breaking;
2. LC circuit and LCR circuit;
3. Resonance phenomena in LCR circuits;
4. Magnetic field from Helmholtz coil;
5. Measurement of Lorentz force in a vacuum tube.

Textbook:

1. David Griffiths, Introduction to Electrodynamics

References:

1. Halliday and Resnick, Physics
2. W. Saslow, Electricity, magnetism and light

Course Title	**Programming with C**	Course No:	ETCS103
Specialization	Engineering	Structure (L-T-P-C)	**(2-0-0-2)**

Course Objectives:

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

Course Outcomes:

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

CO1. Recall and understand the basics constructs of a programming language.
CO2. Demonstrate the problem solving and critical thinking skills.
CO3. Applying the knowledge of programming skills in problem solving using C language.
CO4. Analyzing the Different programs in terms of their complexity and efficiency
CO5. Test the program for its correctness from all possible inputs.
CO6. Design the program in C language to solve any problem.

Course Content:

Unit 1: Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. Number Systems: Binary, Octal, Decimal, Hexadecimal

Introduction to C Language: Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements

Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.

Unit-2: Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If-Else, Switch-Statement and Examples. Loop Control Statements: For, While, Do- While and Examples. Continue, Break and Go to statements

Functions: Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. Recursion- Recursive Functions.

Storage Classes: Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.

Unit 3: Preprocessors: Preprocessor Commands

Arrays: Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

Unit 4: Pointers: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers,

Compatibility, L value and R value, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command- line Arguments.
Strings - Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

Unit 5: Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self-Referential Structures, Unions, Type Definition (typedef), Enumerated Types.
Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/output Functions, Character Input/output Functions.

Textbook:

1. B.A. Forouzan and R.F. Gilberg, "*A Structured Programming Approach in C",* Cengage Learning, 2007

Reference:

1.Kernighan BW and Ritchie DM, "*The C Programming Language"*, 2nd Edition, Prentice Hall of India, 2006.
2. Rajaraman V, "*The Fundamentals of Computer"*, 4th Edition, Prentice-Hall of India, 2006.

Course Title	Programming with C Lab	Course No:	ETCS153
Specialization	Engineering	Structure (L-T-P-C)	0-0-4-2

Course Objectives:

The objective of the course is to give exposure to the student about the implementation of different algorithm in C language.

Course Outcome:

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

- **CO1.** Understand the fundamentals of programming in C Language
- **CO2.** Write, compile and debug programs in C
- **CO3.** Formulate given problems and give solutions by programming it in C.
- **CO4.** To be able to effectively choose programming components to solve computing problems in real-world.

Course Content:

1. Finding the maximum and minimum of given set of numbers
2. Finding Roots of a Quadratic Equation
3. Sin x and Cos x values using series expansion
4. Conversion of Binary to Decimal, Octal, Hexa and Vice versa
5. Generating a Pascal triangle and Pyramid of numbers
6. Recursion: Factorial, Fibonacci, GCD
7. Matrix addition and multiplication using arrays
8. Bubble Sort, Selection Sort
9. Programs on Linear Search and Binary Search using recursive and non-recursive procedures.
10. Functions for string manipulations
11. Finding the No. of characters, words and lines of given text file
12. File Handling programs.

Textbook:

1. B.A. Forouzan and R.F. Gilberg, "*A Structured Programming Approach in C",* Cengage Learning, 2007

Reference:

1. Kernighan BW and Ritchie DM, "*The C Programming Language"*, 2nd Edition, Prentice Hall of India, 2006.

2. Rajaraman V, "*The Fundamentals of Computer"*, 4th Edition, Prentice-Hall of India, 2006.

Course Title	Basic Electrical & Electronics Engineering	Course No:	ETEE105
Specialization	Engineering	Structure (L-T-P-C)	(2-1-0-3)

Course Objectives:
To introduce the fundamentals of Electrical and electronics Engineering including circuit analysis, transformers, machines, analog and digital electronics

Course Outcome:
After completion of the course, the student will be able to:

CO1. Acquire knowledge about the electric circuit and electronics
CO2. Develop skills in analyzing electrical circuits, and transformers
CO3. Understand the DC machines and its working principle
CO4. Explain the theory, construction, and operation of electronic devices

Course Content:

Unit I: Electrical Circuit Analysis: Voltage & Current sources: dependent & independent source, source conversion. Analysis of D.C. circuits: Mesh & Loop analysis, Nodal analysis. Network Theorems: Thevenin's, Norton's, superposition theorem etc. Star- Delta circuits. 1-Φ AC Circuits: Review of 1-Φ phase AC circuits under sinusoidal steady state conditions, Resonance, Active, Reactive and Apparent power, Power factor. 3-Φ AC circuits: Balanced and Unbalanced supply, Star and Delta connections, power measurement.

Unit II: Transformers: Magnetic Circuits: Review of laws of electromagnetism, Flux, MMF and their relation, analysis of magnetic and electric circuit. Single-phase transformer: Basic concepts, constructional features, EMF equation, voltage, current and impedance transformation, Equivalent circuits.

Unit III: Electrical Machine: DC Machines: Constructional features, working principle, emf equation, types of DC machines and their characteristics.
Induction Machines: Constructional features, working principle, emf equation, concept of slip and torque–slip characteristics. Synchronous Machines: Constructional features, working principle and emf equation.

Unit IV: Digital Electronics: Number systems: decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers. Demorgan's theorem, Logic Gates: Basic and Universal Gates, their representation, truth table and realization, Half and Full adder circuits, Flip-Flops etc.

Unit V: Electronic Devices and Circuits: Introduction to semiconductors, Diodes: types of diodes and their characteristic. Bipolar Junction Transistors: working, configurations (CC, CB & CE) and

mode of operation.

Textbook:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
2. S. Ghosh, “Fundamentals of Electrical and Electronics Engineering”, PHI Publications.
3. J.B. Gupta, “Text book of Basic Electrical and Electronics Engineering”, S. K. Kataria Publications
4. D.C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.

References:

1. V.D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India.
2. D.P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
3. Hughes Edward, Electrical & Electronic Technology, Pearson Education, 2007.
4. Alexander.C. K. & Mathew. N. O. Sadiku, Fundamentals of Electrical circuits, Tata McGraw Hill, 2008.
5. P.S. Bhimbhara, “Electrical Machinery” Khanna Publishers
6. Milmann & Halkias, “Integrated Electronics” TMH
7. M.Morris Mano, “Digital Logic and Computer Design” Pearson

Course Title	Basic Electrical & Electronics Engineering Lab	Course No:	ETEE155
Specialization	Engineering	Structure (L-T-P-C)	(0-0-4-2)

Course Objectives:
The students will be able to have hands-on experience on the topics related to curriculum of Basic Electrical and Engineering.

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

CO1. Recall the theoretical concept and corelate to practical
CO2. Understand the application of theory concepts
CO3. Implement and verify theories and concepts covered in theory like Kirchhoff‟s laws, Norton Theorem and Superposition Theorem
CO4. Calculate different parameters of transformer

Course Content:

List of practicals:

1. Study of the Cathode Ray Oscilloscope (CRO).
2. Verification of Kirchhoff‟s laws
3. Verification of Norton Theorem
4. Verification of Superposition Theorem
5. Verification of Thevenin Theorem.
6. Determination of parameters and losses using open-circuit and short-circuit tests on a single-phase transformer.
7. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single-phase transformer
8. Determination of open circuit characteristics of a separately excited DC generator.
9. Characteristics of separately excited and self-excited dc generators
10. Demonstration of cut-out sections of machines: dc machine, three phase induction machine, singlephase induction machine and synchronous machine.
11. Study of electronic components and equipment’s.
    a. Resistor Colour coding using digital multi-meter.
    b. Assembling electronic components on bread board.
12. Measurement of ac signal parameters using cathode ray oscilloscope and function generator.
13. Soldering and desoldering practice.
14. Verification of logic gates (OR, AND, OR, NOT, NAND, EX-OR).

15. Implementation of half adder circuit using logic gates.

Textbook:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
2. S. Ghosh, “Fundamentals of Electrical and Electronics Engineering”, PHI Publications.
3. J.B. Gupta, “Text book of Basic Electrical and Electronics Engineering”, S.K.Kataria Publications
4. D.C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.

References:

1. V.D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India.
2. D.P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
3. Hughes Edward, Electrical & Electronic Technology, Pearson Education, 2007.
4. Alexander.C. K. & Mathew. N. O. Sadiku, Fundamentals of Electrical circuits, Tata McGraw Hill, 2008.
5. P.S. Bhimbhara, “Electrical Machinery” Khanna Publishers
6. Milmann & Halkias, “Integrated Electronics” TMH
7. M.Morris Mano, “Digital Logic and Computer Design” Pearson

Course Title	Professional Communication	Course No:	ETHS107
Specialization	Engineering	Structure (L-T-P-C)	(2-0-0-2)

Course Objectives:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

Course Outcome:

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

CO1. Recall the basic concept for effective presentations and communication
CO2. Understand use of different modes of written communication for effective use in a professional environment
CO3. Illustrate communication skills by Participating confidently in Group Discussions
CO4. Confident Presentation and communication at job interviews
CO5. Develop adequate Soft Skills required for the workplace

Course Content:

Unit 1: Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

Unit 2: Basic Writing Skills: Sentence Structures, use of phrases and clauses in sentences, Importance of proper punctuation, creating coherence, organizing principles of paragraphs in documents, Techniques for writing precisely

Unit 3: Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

Unit 4: Nature and Style of sensible Writing: Describing, Defining, Classifying, Providing examples or evidence, Writing, introduction and conclusion

Unit 5: Writing Practices: Comprehension, Précis Writing and Essay Writing

Textbook:

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

References:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

Course Title	Professional Communication Lab	Course No:	ETHS157
Specialization	Basic Sciences	Structure (L-T-P-C)	0-0-4-2

Course Objectives:
The objective is that the student will acquire basic proficiency in English speaking, writing, listening and reading skills.

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

CO1. Recite the concept taught in theory and able to corelate with practical
CO2. Understand the role of effective speaking and communication
CO3. Demonstrate good communication skills including speaking, writing, listening and reading
CO4. Present confidently at interviews, presentations and group discussion

Course Contents:

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

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

Textbook:

1. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course Title	Engineering Mathematics	Course No:	ETMT109
Specialization	Engineering	Structure (L-T-P-C)	(3-1-0-4)

Course Objectives:
The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student. To impart basic knowledge on complex numbers, series, basics of calculus, linear algebra, ordinary differential equation.

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

- **CO1.** Acquire basic knowledge in
  - Complex number systems and infinite series
  - Calculus of one variable
  - Linear Algebra
  - Ordinary differential equations
- **CO2.** Develop skills in analyzing:
  - Different methods for differential equation for obtaining appropriate solutions
  - Different methods and theorems for Convergence and Divergence of Infinite series
  - Methods to handle problem related to calculus
- **CO3.** Develop skills in designing mathematical model Formulate and represent any problem mathematically
- **CO4.** Apply the Skill to solve the processes using ODE.

Course Content:

Unit-1: Complex Numbers and Infinite Series: De Moivre's theorem and roots of complex numbers. Euler's theorem, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Unit II: Convergence and Divergence of Series: Convergence and Divergence of Infinite series, Comparison test D'Alembert's ratio test. Higher ratio test, Cauchy's root test. Alternating series, Lebnitz test, Absolute and conditional convergence.

Unit III: Calculus of One Variable: Successive differentiation. Leibnitz theorem (without proof) McLaurin's and Taylor's expansion of functions, errors and approximation. Asymptotes of Cartesian curves. Curveture of curves in Cartesian, parametric and polar coordinates, Tracing of curves in Cartesian, parametric and polar coordinates (like conics, astroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardiode, Lemniscate of Bernoulli, equiangular spiral). Reduction Formulae for evaluating Finding area under the curves, Length of the curves, volume and surface of solids of revolution.

Unit IV: Linear Algebra – Matrices: Rank of matrix, Linear transformations, Hermitian and skeew – Hermitian forms, Inverse of matrix by elementary operations. Consistency of linear simultaneous

equations, Diagonalisation of a matrix, Eigen values and eigen vectors. Caley – Hamilton theorem (without proof).

Unit V: Ordinary Differential Equations: First order differential equations – exact and reducible to exact form. Linear differential equations of higher order with constant coefficients. Solution of simultaneous differential equations. Variation of parameters, Solution of homogeneous differential equations – Canchy and Legendre forms.

Text books:

1. Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003 (2^{nd} Ed.).
3. "Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)

References:

1. Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2. Wylie, R., "Advanced Engineering Mathematics", McGraw-Hill, 1995.

Course Title	Green Technology and Sustainability	Course No:	ETHS111
Specialization	Engineering	Structure (L-T-P-C)	(2-0-0-2)

Course Objectives:

- To the design, manufacture and use of chemical products so as to reduce or eliminate chemical hazards intentionally.
- To create better, safer, chemicals while choosing the safest, most efficient ways to synthesis them.
- The main goal of Green Technology is to eliminate hazards right at the design stage.
- To demonstrate how chemical production could be achieved without posing hazard to human health and environment.

Course Outcome:

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

CO1. Recall and demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns
CO2. Understand the need of green technology and its sustainability
CO3. Demonstrate critical thinking skills in relation to environmental affairs
CO4. Demonstrate an integrative approach to environmental issues with a focus on sustainability
CO5. Analyze the purpose and basic difference among various waste management techniques
CO6. Develop awareness on maintaining healthy environment

Course Content:

Unit 1: Introduction of Green protocol: Need, Goal and Limitation of Green Technology, Principles of Green Technology with their explanations and examples. Sustainable development, atom economy, reduction of toxicity.

Unit 2: Waste: Production, Prevention, Problems and Source of waste, cost of Waste, Waste minimization technique, waste treatment and recycling.

Unit 3: Environmental chemicals: Chemical speciation – speciation of lead, mercury, arsenic and chromium. Structure and property-activity relationship, fate of organics in the environment – transformation reactions (hydrolysis, elimination, oxidation-reduction etc). Risk evaluation of environmental chemicals, Biochemical effects of arsenic, lead, mercury and pesticides.

Unit 4: Water and Biodegradation: Analysis of water and water quality parameters – concept of pH, measurement of acidity, alkalinity, hardness, residual chlorine, chlorides, DO, BOD, COD, fluoride and nitrogen. Biodegradation – biodegradation of carbohydrates, proteins, fats and oils and detergents.

Unit 5: Atmosphere: Structure of atmosphere, chemical and photochemical reactions in the atmosphere. Ozone Chemistry: formation and depletion of ozone layer, oxides of nitrogen and sulphur. Acid rain mechanism of formation and effects. Photochemical smog, and sulfurous

smog. Greenhouse effect, global warming, greenhouse gases.

Textbook:

1. C.N Sawyer, P.L McCarty and G.F Parkin, Chemistry for Environmental Engineering and Science, 5th ed. Tata McGraw-Hill, 2003.
2. Das, A. K. Environmental Chemistry with Green Chemistry, Books and allied (P) Ltd. Ahluwalia, V.K. Green Chemistry: Environmentally Benign Reactions, Ane Books India, New Delhi, 2006.

References:

1. Sanghi, R. and Srivastava, M.M. Green chemistry: Environment Friendly Alternatives, Narosa Publishing House.
2. Paul Anastas, John C. Warner, John Warner Joint; Green Chemistry: Theory and Practice New Ed Edition; Oxford University press, USA, 2000

Course Title	Engineering Skills Practices-I	Course No:	ETME159
Specialization	Engineering	Structure (L-T-P-C)	(0-0-6-3)

Course Objectives:

- The objective of this course is to give an exposure on the basic practices followed in the domain of mechanical, electrical, electronics and communication engineering.
- The exercises will train the students to acquire skills which are very essential for the engineers through hands-on sessions.

Course Outcome:

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

CO1. Acquire basic knowledge about
- Welding and its type
- Fitting, drilling, tapping
- Types of Domestic wiring practice
- PCB Making

CO2. Develop skills in analyzing:
- Difference among various welding techniques and choose a suitable welding technique
- Differentiate various types of Domestic wiring and their usage
- Designing PCB for a given problem
- Fitting – Drilling & tapping concepts

CO3. Understanding the purpose of welding and its applications

CO4. Identification of different defects

Course Content:

Experiments will be framed to train the students in following common engineering practices:

Unit 1: Welding: Introduction and classification of welding processes, welding terms (terminology), welding positions, joints and filler metals. Gas welding and Gas cutting: Principle, Oxyacetylene welding equipment, Flame cutting. Specimen preparation and making of lap joint, butt joint. T-joint with Oxyacetylene gas welding.

Unit 2: Electric arc welding: Principle, equipments, types-MIG, TIG, submerged arc and others, Welding electrodes, classification and selection of electrodes, welding arc and its characteristics, arc stability, arc blow.

Resistance welding- principle and their types i.e. spot, seam, projection, upset and flash. Welding Defects, their causes and remedies. Brazing and soldering.

Making of lap, Butt, T-joints etc. with electric arc welding, Study of MIG and TIG welding equipment and making a weld joint by this process, study of resistance welding processes and prepare a spot-welded joint.

Unit 3: Basic manufacturing processes: Fitting – Drilling & tapping – Material joining processes Specimen preparation and Fitting: Square joint, V joint, half round joint, dovetail joint

Unit 4: PCB making: Assembling and testing – Electrical wiring. Familiarization of electronic components by Nomenclature, meters, power supplies, function generators and Oscilloscope – Bread board assembling of simple circuits: IR transmitter and receiver
LED emergency lamp – Communication study: amplitude modulation and demodulation PCB**:** designing and making of simple circuits – Soldering and testing of electronic components and circuits

Unit 5: Various types of Domestic wiring practice: Fluorescent lamp connection, Staircase wiring – Estimation and costing of domestic and industrial wiring – power consumption by Incandescent, CFL and LED lamps.

House-wiring: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter

Textbook:

1. Welding Technology by R.S. Parmar, (khanna Publishers).
2. Workshop Technology Vol.1 by B.S Raghuwanshi (Dhanpat Rai & Co.)
3. Uppal S. L., "Electrical Wiring & Estimating", 5Edn, Khanna Publishers, 2003.
4. Chapman. W. A. J., Workshop Technology, Part 1 & 2, Taylor & Francis.

Reference:

1. Clyde F. Coombs, "Printed circuits hand book", 6Edn, McGraw Hill, 2007.
2. John H. Watt, Terrell Croft, "American Electricians' Handbook: A Reference Book for the Practical Electrical Man", Tata McGraw Hill, 2002.