Integral University Lucknow
Study & Evaluation Scheme
B. Tech. (Electrical Engg.)

1st YEAR			**SEMESTER-II**							
S. No.	**Course Code**	**Subject**	**Periods**			**Evaluation**				**Subject total**
						Sessional			**End Sem. Exam.**	
			L	**T**	**P**	**CT**	**TA**	**Total**		
THEORY SUBJECTS										
1.	IES-201	Environmental Studies	3	1	0	30	20	50	100	150
2.	ICH-201	Chemistry	3	1	0	30	20	50	100	150
3.	ICS-201	Computer Programming	3	1	0	30	20	50	100	150
4.	IMA-201	Mathematics-II	3	1	0	30	20	50	100	150
5.	IME-201	Basic Mechanical Engineering	3	1	0	30	20	50	100	150
6.	IME-202	Manufacturing Process	2	1	0	15	10	25	75	100
Practical/Training/Project										
7.	ICS-251	Computer programming Lab	-	-	03	10	10	20	30	50
8.	ICH-251	Chemistry Lab	-	-	03	10	10	20	30	50
9.	IME-251	Mechanical Engineering Lab	-	-	03	10	10	20	30	50
10.	IPC-251	Professional Communication Lab	-	-	03	10	10	20	30	50
11.	IGP-201	General Proficiency	-	-	-	-	-	50	-	50
Total			17	06	12	180	175	405	695	1100

SYLLABUS OF ENVIRONMENTAL STUDIES
ES-101/ES-201

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Unit-I

Multidisciplinary nature of Environmental studies. Definition, Scope and Importance , Need for public awareness.

Natural resources:

Renewable and non-renewable resources :

Natural resources and associated problems.

a. Forest Resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b. Water Resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.

c. Mineral Resources: Use and exploitation, environmental effects of extracting and using minerals resources, case studies.

d. Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer -pesticide problems, Waterlogging, Salinity, case studies.

e. Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies.

f. Land Resources: Land as a resource, Land degradation, Man induced landslides, Soil erosion and desertification.

- Role of an individual in conservation of natural resources
- Equitable use of resources for sustainable life styles.

Unit-II

Ecosystems

- Concept of an Ecosystem.
- Structure and Function of an Ecosystem.
- Producer Consumer and decomposers.
- Energy flow in the Ecosystem.
- Ecological Succession.
- Food chains, Food webs and Ecological Pyramids.
- Introduction, types, characteristics features ,structure and function of the following ecosystem:
  - a- Forest Ecosystem
  - b- Grassland Ecosystem
  - c- Desert Ecosystem,
  - d- Aquatic Ecosystem: (Ponds, streams, lakes, rivers, oceans, estuaries)

Unit-III

Biodiversity and its conservation

- Introduction - Definition: Genetic, Species and Ecosystem diversity.
- Bio-Geographical classification of India,
- Value of Bio-diversity: Consumptive use, productive use, Social, ethical, aesthetic and option values

- Biodiversity at Global, National & Local levels.
- India as a Mega Diversity Nation.
- Hotspots of Biodiversity
- Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts
- Endangered and endemic species of India
- Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-IV
Environmental Pollution

Definition

- Causes, effects and control measures of

    a) Air Pollution

    b) Water Pollution

    c) Soil Pollution

    d) Marine Pollution

    e) Noise Pollution

    f) Thermal Pollution

    g) Nuclear Hazards

- Solid Waste Management: Causes, effects and control measures of urban and Industrial Wastes.
- Role of an Individual in prevention of pollution.
- Pollution case studies
- Disaster Management: floods, earthquake, cyclones and landslides.

Unit-V

Social Issues and the Environment

- From unsustainable development to sustainable development
- Urban problems related to Energy
- Water conservation, Rain water Harvesting, Watershed management
- Resettlement and Rehabilitation of people; its problems and concerns, case studies.
- Environmental ethics: issues and possible solutions

- Green house effect and global Warming, effects of acid Rain and their remedial measures and ozone Layer depletion.
- Wasteland reclamation,
- Consumerism and waste products
- Environment protection Act, Air (prevention and control of Pollution) Act, Water(prevention and control of Pollution) Act, wildlife protection Act, Forest conservation Act, Issues involved in Enforcement of Environmental Legislation, Public Awareness, case studies.

Human Population and the Environment

- Population growth variation among nations, Population Explosion, Family welfare programme,
- Environment and Human Health,
- Human Rights.
- Value education
- HIV/AIDS, Women and Child welfare
- Role of Information Technology in Environment and Human Health, Case studies.

Suggested field work

Visit to local area to document environment assets river/ forest/ grassland/ hill/ mountain, visit to local polluted site urban/ rural/ industrial/ agricultural, study of common plants, insects, birds, study of simple ecosystems pond river, hill slopes etc.

References:

1. Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd.Bikaner.
2. Bharaucha Erach, The Biodiversity of India, Mappin Pub. Pvt. Ltd.,Ahemdabad-380, India.
3. Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill.
4. Clark R.S. Marine Pollution, Clanderon Press Oxford (TB).
5. Cunningham W.P.2001.Cooper, T.H. Gorhani, E&Hepworth, Environmental encyclopedia, Jaicob Publication House, Mumbai.
6. De . A.K. Environmental chemistry Willey Eastern Limited.
7. Down to Earth, Centre for Science and Environment(R).
8. Glick,H.P..1993 water in crisis,Pacific Institute for studies in dev, Environment & security,Stockholm Env, Institute, Oxford Univ,Press 473 p.
9. Hawkins R.E.Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood,V.H.& watson ,R.T.1995.Global biodiversity Assessment .Cambridge Univ.Press 1140 p.
11. Jadhave,H.and Bhosale,V.M.1995 Environmental protection and laws,Himalaya pub, house,Delhi.284 p.
12. Mckinnery,M.L.and school ,R.M.1996 Environmental science systems and solutions, web enhanced edition 639 p.
13. Mhaskar A.K.Matter Hazardous, Techno Science Pub (TM)
14. Miller T.G.Jr,Environmentals Ecology,W.B.Saunders Co.USA,574 p.
15. Odum,E.P.1997.Fundamental chemistry, Goel Pub House Meerut.
16. Survey of the Environment, The Hindu (M).

CHEMISTRY ICH-101/201

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UNIT 1 **3 1 0**

1. Molecular theory of heterodiatomic molecules, Band theory of bonding in metals, Hydrogen bonding.
2. Solid state chemistry: Radius ratio rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of density of unit cell. One and Two Dimensional solids, Graphite as two dimensional solid and its conducting properties, Fullerene and its applications. (08)

UNIT 2

1. Basic principles of spectroscopic methods, The use of UV, Visible, IR, HNMR, for the determination of structure of simple organic compounds.
2. Characteristics and classification of polymers.
3. Structures of the polymers: Natural and synthetic rubbers, Polyamides and polyester fibers, Polymethylmethacrylate, Polyacrylonitrile and Polystyrene, A brief account of conducting polymers (polypyrrole and polythiophene) and their applications. (08)

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UNIT 3

1. Stability of reaction intermediates, e.g. Carbanions, Carbocations and free radicals, Types of organic reactions, and mechanism of nucleophilic substitution reactions.
2. Mechanism of following reactions.

(i) Aldol condensation (ii) Cannizzaro reaction (iii) Beckmann rearrangement (iv) Hofmann rearrangement and (v) Diels-Alder reaction.

E-Z Nomenclature, Optical isomerism of organic compounds containing one chiral center, Examples of Optically active compounds without chirality, Conformations of n-butane. (08)

UNIT 4

1. Order and molecularity of reactions, First and second order reaction, Energy of activation.
2. Phase Rule, its application to one component system (water).
3. Equilibrium potential, electrochemical cells (galvanic and concentration cells), Electrochemical theory of corrosion and protection of corrosion (08)

UNIT 5

1. Classification of fuels, Coal, Biomass and Bioga, Determination of gross and net calorific values using Bomb Calorimeter.
2. First law of thermodynamics and its mathematical statement, heat, energy and work; Heat content or Enthalpy of a system; Thermo-chemistry: Hess's law of constant heat summation, Heat of (reaction, Heat of combustion, Heat of neutralization, Heat of formation, Heat of fusion, Heat of vaporization, Heat of sublimation, Heat of solution and Heat of dilution (only definition and explanation).
3. Hardness of water, softening of water by Lime-Soda process, Zeolites and ion-exchange resins process and Reverse Osmosis. Treatment of boiler feed water by Calgon process. (08)

REFERENCE :

1. Engineering Chemistry by Jain and Iain.
2. Engineering Chemistry by R. K. Agrawal

CHEMISTRY LAB (CH-151/251)

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List of Experiments

1. To determine the Iron content in the given iron ore by using external indicator.
2. To determine the Alkalinity in the given water sample
3. To determine the Chloride content in the given water sample by Mohr's method. (Argentometric method)
4. To determine the Percentage of Available Chlorine in the given sample of Bleaching powder iodometrically.
5. To determine the temporary and permanent hardness in water sample by Complexometric titration using EDTA as standard solution.
6. To determine the Equivalent weight of Iron by Chemical Displacement method. (The Equivalent weight of Copper is 63.5)
7. To determine the strength of given HCl solution by titrating it against NaOH solution using pH meter.
8. To determine the iron concentration in the given water sample by Spectrophotometer using potassium thiocyanate as colour developing agent.
9. To detect the presence of functional groups in the given organic compound.
10. To detect the presence of Elements in the given organic compound.

COMPUTER PROGRAMMING
ICS 101/ ICS 201

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3 1 0

Unit 1

Introduction to Computers: Generation of computers, Characteristic and classifications of computers.

Components of Computer: CPU, Various I/O Devices, Memory & its types , (Memory Hierarchy, Storage Media), Computer Software and their types, Operating System.

Computer Networks & Communication: LAN, MAN, WAN, Network Topologies, Modes of Data Communication.

Introduction to Internet and its Safeguard: Internet Addresses, Domain Name System, URL, Web Browsers Search Engines, Firewalls , Anti-Virus, Translators.

Algorithm and flowchart: Algorithm and flow chart characteristics, Sketching Flowcharts of various problems. [09]

Unit 2

tarting C: Standard I/O in 'C', 'C' Fundamental, C Character set, Constants, Variables, Keywords and Identifiers, Data types, Declaration. Operators and Expressions, Conditional statements (If, If-else), Nesting of if- else statement, switch statement, The?: operator, goto statement.

Decision making and Looping (While, Do-While, for), Break and Continue statements, Case Control Structures (Switch), C programs based on above concepts. [08]

Unit 3

Introduction to pointers: declaration and initialization of pointers, accessing the address of the variable, accessing the variable through the pointer, chain of pointers, pointers operators, pointer arithmetic

Introduction to Functions: Need of "C" function, User Defined and Library Functions, Prototype of Function, Call by Value; Call by Reference; Nesting of Functions, Recursion. Pointers with function, C program based on above concept [09]

Unit 4

Array: Concept of One Dimensional and Multi Dimensional arrays, Declaration,

Operations: insert, delete, search, traverse, and merge, matrix operations, Sorting: Bubble sort, merge sort, insertion sort.

Character array and strings: declaring and initializing strings variable, reading and writing a character, reading and writing strings from terminal, Arithmetic operations on characters, string handling functions. Application of pointers, and function on array, C program based on above concept [10]

Unit 5

Structures: Defining Structure, Declaration of Structure Variable, Accessing Structure members, copying and comparing structure variable, operation on individual member, nesting of structures, Array of structures. Application of pointers and function on Structures.

Union Defining Union Declaration of Union, difference between structure and Union, Introduction of Static and Dynamic memory allocation- The process of Dynamic memory allocation,C program based on above concept. [08]

References:

1. Foundation of Information Technology by 'D.S. Yadav'- New age International
2. Programming in 'C' by 'E Balagurusamy'.-TMH Publication.
3. Let us 'C' by 'Yashwant Kanitkar'-BPB Publication.
4. The C Programming Essentials by Dey- Pearson Publication.
5.Pointer s in C by 'Yashwant Kanitkar'

COMPUTER PROGRAMMING LAB
ICS-251

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1. Programs based on basic concepts of C. (e.g. Addition, Subtraction, Multiplications, Swapping of numbers, Conversions, area calculation, interest calculation…etc)
2. Programs based on Conditional statement.
3. Programs based on loop Conditions (FOR, WHILE, DO- WHILE).
4. Programs based on Single & Two dimensional Array (Insertion, deletion, Multiplication, searching, etc...).
5. Programs based on Pointers.
6. Programs based on Function call (Call by value and call by reference).
7. Programs based on recursion.
8. Programs based on Strings and its operations.
9. Programs based on Structures and its operations.
10. Programs based on Miscellaneous Concepts.

MATHEMATICS-II
IMA-201

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Unit-I Differential Equations 10

Linear differential equations of first order, Linear differential equations of higher order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solution of second order differential equations by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation) .

Unit-II : Laplace Transform 9

Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function, Dirac-delta function, Laplace transform of periodic functions, Convolution theorem, Applications to solve simple linear and simultaneous differential equations.

Unit-III : Fourier Series and Partial Differential Equations 10

Periodic functions, trigonometric series , Fourier series of period 2π, Euler's formulae, functions having arbitrary period, change of interval, Even and odd functions, Half range sine and cosine series.

Introduction of partial differential equations, linear partial differential equations with constant coefficients of second order and their classifications to parabolic, elliptic and hyperbolic forms with illustrative examples.

Unit-IV: Applications of Partial Differential Equations 7

Method of separation of variables for solving partial differential equations, Wave equation up to two-dimensions, Laplace equation in two-dimensions, Heat conduction equations up to two dimensions, Equations of transmission Lines.

Unit-V: Curve fitting and Solution of Equations 6

Method of least squares , curve fitting of straight line and parabola, Solution of cubic and biquadratic equations.

Reference Books:

1. E. Kreyszig — Advanced Engineering Mathematics, Wiley Eastern Ltd.
2. Jaggi and Mathur — Advanced Engineering Mathematics, Khanna Pub.
3. B. S. Grewal — Higher Engineering Mathematics, Khanna Pub.
4. Dennis G. Zill — Advanced Engineering Mathematics, CBS Pub.

BASIC MECHANICAL ENGINEERING
IME-101/201

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A. FUNDAMENTALS OF THERMODYNAMICS

Unit –1

Fundamental Concepts and Definitions:

Definition of Thermodynamics, System, surrounding and universe, Phase, Concept of continuum, Macroscopic & microscopic point of view. Density, Specific volume, Pressure, temperature. Thermodynamic equilibrium, Property, State, Path, process, Cyclic process, Energy and its form, Work and heat, Enthalpy. 3

Laws of thermodynamics:

Zeroth law: Concepts of Temperature, Zeroth law. 1

First law: First law of thermodynamics. Concept of processes, Flow processes and control volume, Flow work, Steady flow energy equation, Mechanical work in a steady flow of process. 4

Second law : Essence of second law, Thermal reservoir, Heat engines, COP of heat pump and refrigerator. Statements of second law, Carnot cycle, Clausius inequality. Concept of Entropy.

Unit –2

Properties of steam and thermodynamic cycles :

Properties of steam, Use of property diagram, Steam tables, Processes involving steam in closed and open systems. Ranking cycle

Introduction to I.C. Engines: Two, four stoke S.I. and C.I. engines. Otto cycle, Diesel cycle. 4

B. MECHANICS AND STRENGTH OF MATERIALS

Unit-3

Force system and Analysis:

Basic Concept: Laws of motion. Transfer of force to parallel position, Resultant of planer force system. Free Body diagrams, equilibrium and its equation. 4

Friction: Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry fiction belt friction. 2

Unit –4

Structure Analysis :

Beams: Introduction, Shear force and bending moment, Shear and bending moment diagram for statically determinate beams. 4

Trusses: Introduction, Simple Trusses, Determination of forces in simple trusses members, methods of joints and method of section. 4

Unit-5

Stress and Strain Analysis :

Simple Stress and strain: Introduction, Normal shear stresses, Stress-strain diagrams for ductile and brittle materials, Elastic constants, One dimensional loading of members of varying cross sections,

Strain Energy. 4

Pure Bending of Beams

Introduction, Simple bending theory, Stress in beams of circular, rectangular and triangular cross section. 2

Torsion: Introduction, Torsion of shafts of circular section, Torque and Twist, Shear stress due to Torque. Comparison of hollow and solid circular shafts. 4

Reference:

1. Van Wylen G.J. & Sonnlog R.E. Fundamentals of Classical Thermodynamics, John Wiley & Sons, Inc. NY.
2. Wark Wenneth: Thermodynamics (2^{nd} edition) Mc Graw Hill Book Co. NY.
3. Holman, J.P.: Thermodynamics, Mc Graw Hill Book Co.NY.
4. Shames I.H., Engineering Mechanics, P.H.I.
5. D.S. Kumar, Mechanical Engineering, S.K. Katarial & Sons.
6. Bhavi Katti S.S., Engineering Mechanics, New Age Pub.
7. P.K. Bharti: Engineering Mechanics, Kataria and Sons.
8. R.K. Rajput, Mechanical Engineering, Laxmi Pub.

BASIC MECHANICAL ENGINEERING LAB
IME-151/251

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List of Experiments

1. To study and sketch the model of fire tube (Lancashire and Locomotive) boiler.
2. To study and sketch the model of water tube (Babcock & Wilcox) boiler.
3. To study and sketch the model of two stroke S.I. Engines.
4. To study and sketch the model of four stroke S.I. Engines.
5. To study and sketch the model of four stroke C.I. Engines.
6. To study and sketch the model of vapour compression refrigerator.
7. To study and sketch the model of simple steam engine.
8. To determine the Rockwell hardness no. of a given specimen using hardness tester.
9. To perform the tensile test on specimen and determine the different mechanical properties with the help of UTM.
10. To determine the impact strength of mild steel by Izod method using impact testing machine.
11. To perform the compression test on brick and determine the ultimate compressive strength with the help of UTM.

MANUFACTURING PROCESSES
IME-102/202

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Unit –1

Basic Metals & Alloys: properties and Applications

Properties of Materials

Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness, Elementary ideas of fracture, fatigue & creep. 2

Ferrous Materials

Carbon steels, their classification based on percentage carbon as low mild, medium & high carbon steels, their properties & applications. Wrought iron, cast iron alloy steels, stainless steel, tool steel. Elementary introduction to heat treatment to carbon steel: annealing, normalizing, quenching & tempering casehardening. 3

Non-Ferrous Metal & Alloys:

Common uses of various non ferrous metals & alloys & their compositions such as copper alloys: Brass, Bronze, Aluminium alloys such as Duralumin. 3

Unit-2

Introduction to Metal forming and Machining processes

Metal Forming

Hot working, verous cold working processes, Basic metal forming operations such as forging, Rolling, Wire & Tube drawing & extrusion, and their applications. Press working, Die and punch assembly, cutting & forming and their applications. 4

Machining & Their Applications:

Basic principles of lath-Machine and forming and their applications of shaper planer, drilling, Milling & grinding. 4

Unit-3

Introduction to casting and welding processes

Casting

Pattern & allowanaces, Molding sand and its desirable properties. Mould making with the use of core, Gating System, Casting defects and remdies. Cupota furnace Die Casting and its uses. 4

Welding

Importance & basic concepts of welding, classification of welding processes Gas-welding, types of flames, Electric-arc welding. Resistance welding soldering and brazing and their uses.

4

Unit-4

Misc. Topics Manufacturing

Importance of materials & manufacturing for the socio-economic development, plant location, plant layout-it types, types of production. Production verous productivity. 3

Non Metalic Materials

Common types and uses of wood, cement-concrete, ceramics, rubber, plastics and composite-materials. 2

Important Misc. Processes

Powder-metallurgy process and its applications, Plastic products manufacturing, galvanizing and electroplating operations. 3

PROFESSIONAL COMMUNICATION LAB:
PC 251/252

Day 1. Introductions (Instructors, Students and Curriculum)

Day 2. Listening exercises

Day 3. Framing Questions

Day 4. Making Small talks

Day 5. Presentation Making- tips, do's and don'ts/ group presentations

Day 6. Group presentations

Day 7. Phonetic alphabet

Day 8. Phonetic transcription

Day 9. Intonation

Day 10. Stress

Day 11. . Working on Negotiations

Day 12- 14Situational conversational section- Social language, emergency situations/ seeking help, inquiries, communicating bad news

Day 15: Exercise on cross cultural communication