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

YEAR I, Semester-II

S. No.	Subject Code	Category	Subject	Periods				Evaluation Scheme				Subject Total
								Sessional			Exam.	
				L	T	P	C	CT	TA	Total	ESE	
Theory Subjects												
10.	CH 101	BS	Chemistry	3	1	0	4	25	15	40	60	100
11.	ES 101	ESA	Environmental Studies	2	1	0	3	25	15	40	60	100
12.	MT 112	BS	Mathematics II	3	1	0	4	25	15	40	60	100
13.	ME 101	ESA	Basic Mechanical Engg.	3	1	0	4	25	15	40	60	100
14.	CS 101	ESA	Computer Programming	3	1	0	4	25	15	40	60	100
15.	CH 102	BS	Chemistry Lab	0	0	2	1	30	30	60	40	100
16.	ME 102	ESA	Mechanical Engg. Lab	0	0	2	1	30	30	60	40	100
17.	CS 102	ESA	Computer Programming Lab	0	0	2	1	30	30	60	40	100
18.	LN 151	HM	Professional Communication Lab	0	1	2	2	30	30	60	40	100
			Total	**14**	**6**	**8**	**24**	**245**	**195**	**440**	**460**	**900**

L-Lecture **T-T**utorial **P-**Practical **C**-Credits **CT-**Class Test **TA-**Teacher Assessment

Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

BS- Basic Science **DC-** Departmental Core

HM- Humanities **OE-** Open Elective

DE- Departmental Elective **ESA-** Engineering Sciences & Arts (Foundation Course & Engineering Courses

CHEMISTRY (CH-101)

(w.e.f. Session: 2015-16)

L	**T**	**P**
3	1	0

UNIT I: Molecular theory of heterodiatomic molecules, Band theory of bonding in metals, Hydrogen bonding. 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.

UNIT II: Basic principles of spectroscopic methods. The use of UV, Visible, IR, ^{1}HNMR, for the determination of structure of simple organic compounds.Characteristics and classification of polymers. 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**.**

UNIT III: Stability of reaction intermediates, *e.g.* Carbanions, Carbocations and free radicals. Types of organic reactions, and mechanism of nucleophilic substitution reactions.Mechanism of following reactions:Aldol condensation,Cannizzaro reaction, Beckmann rearrangement,Hofmann rearrangement and 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.

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

UNIT V: Classification of fuels, Coal, Biomass and Biogas. Determination of gross and net calorific values using Bomb Calorimeter. First law of thermodynamics and its mathematical statement, heat, energy and work; Heat content or Enthalpy of a system; Thermochemistry: Hess's law of constant heat summation, Heat of reaction, Heat of combustion,Heatofneutralization,Heatofformation,Heatoffusion,Heatofvaporization, Heatofsublimation,Heatof solutionandHeatofdilution,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,.

Reference Books:

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

CHEMISTRY LAB (CH102)

(w.e.f. Session: 2015-16)

L	**T**	**P**
0	0	2

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.

ENVIORNMENTAL STUDIES (ES 101)

(w.e.f. Session: 2015-16)

L	**T**	**P**
2	1	0

Unit-I

Multidisciplinary nature of Environmental Science and Natural Resources

Multidisciplinary nature of Environmental studies, Scope and Importance of Environmental Science and Need of public awareness, Introduction to Natural resources, Renewable and non-renewable resources, Natural resources and associated problems.

Forest Resources

Types of forest, Use of forests, Exploitation of forests, Deforestation, Timber extraction, Mining, Dams and their effects on forests and tribal people.

Water Resources:

Use and over utilization of surface and ground water, Floods, Drought, Conflicts over water, Dams benefits and problems.

Mineral Resources:

Use and exploitation, Environmental effects of using and extracting minerals Resources.

Food Resources:

World food problems, Changes caused by agriculture and over Grazing, Effects of modern agriculture, Fertilizer problem, Pesticide problem, Water logging, Salinity.

Energy Resources:

Growing energy needs, Renewable energy sources, Use of alternative energy sources.

Land Resources

Land as resource, Land degradation, Man induced land slides, Soil erosion and desertification Role of individual in conservation of resources, Equitable use of resources for sustainable life style

Unit-II

Ecosystem

Concept of Ecosystem, Structure of Ecosystem, Function of Ecosystem, Role of Producer Consumer and Decomposer, Energy flow in an Ecosystem, Ecological Succession, Food chain, Food web, Trophic Level, Ecological Pyramid

Different types of Ecosystem terrestrial Ecosystem

Structure and Functions of Forest Ecosystem, Structure and Functions of grassland Ecosystem, Structure and Functions of Desert Ecosystem,

Aquatic Ecosystem:

Structure and Functions of Lake Ecosystem, Structure and Functions of Pond Ecosystem, Structure and Functions of River Ecosystem.

Unit-III

Biodiversity

Introduction of Biodiversity, Genetic Diversity, Species Diversity, Ecosystem diversity, Measurement of Bio-diversity, Bio-Geographical classification of India, Value of Bio-diversity, Consumptive & productive use values, Social, ethical, aesthetic, 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 species of India IUCN Red data book, Endemic species of India, Conservation of Biodiversity.

Unit-IV
Environmental Pollution

Introduction of Environmental Pollution
Air Pollution:
Classification of air pollutants, Causes of Air Pollution, Effects of Air Pollution, Control Measures of Air Pollution, Electrostatic precipitators, Cyclone separator, Fabric Filters
Soil Pollution:
Causes of Soil Pollution, Effects of Soil Pollution, Control Measures of Soil Pollution
Marine Pollution:
Introduction to Marine Pollution, Sources of Marine Pollution, Effects of marine Pollution, Control Measures of Marine Pollution.
Noise Pollution:
Sources of Noise Pollution, Effects of Noise Pollution, Control measures of Noise Pollution
Thermal Pollution:
Sources of Thermal Pollution, Effects of Thermal Pollution, Control measures of Thermal Pollution
Nuclear Pollution:
Introduction to Nuclear Hazards, Sources of Nuclear Hazards, Effects of nuclear Hazards, Control Measures of Nuclear Hazards
Solid Waste Management:
Sources of Urban Solid Wastes, Effects of Urban Solid Wastes Control measures of Urban Solid Wastes Causes, Effects and control measures of Industrial Wastes, Role of an Individual in prevention of pollution.
Disaster Management:
Concept of Disaster Management, Floods, Earthquake, Cyclones, Landslides

Unit-V

Social Issues and Environment

From unsustainable development to sustainable development, Urban problems related to Energy, Water conservation, Rain water Harvesting, Water shed management, Resettlement and Rehabilitation of people, Environmental ethics, Wasteland reclamation , Consumerism and waste product.

Environmental Acts, Issues involved in Enforcement of legislation and Public Awareness:
The Environment protection Act, The Air prevention and control of Pollution Act, The Water prevention and control of Pollution Act, wildlife protection Act, Forest conservation act, Issues involved in Enforcement of Environmental Legislation, Public Awareness
Human Population and the Environment

Population growth variation among nation, Population Explosion, Environment and Human Health, Human Rights, Value Education, HIV/AIDS, Women and Child welfare, Role of Information Technology in Environment and Human Health.

BASIC MECHANICAL ENGINEERING (ME101)
(w.e.f. Session: 2015-16)

	L	T	P
A. FUNDAMENTALS OF THERMODYNAMICS	3	1	0

Unit –I

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. 4

Unit –II

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-III

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 –IV

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-V

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 andtriangular 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:

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

COMPUTER PROGRAMMING (CS101)

(w.e.f. Session: 2015-16)

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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

Starting 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.

COMPUTER PROGRAMMING LAB (CS102)

(w.e.f. Session: 2015-16)

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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.

ENGINEERING GRAPHICS (ME103)

(w.e.f. Session: 2015-16)

L	T	P
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1. Introduction

Engineering graphics as a tool to communicate ideas, Lettering and dimensioning. Construction of geometrical figures like pentagon and hexagon.

2. Orthographic Projection

Principles of orthographic projections Principal and auxiliary planes, First and Third angle projections.
Projection of points. Pictorial view.
Projection of lines parallel to both the planes. Parallel to one and inclined to other,
Inclined to both the planes.
Application to practical problems.
Projection of solid in simple position, Axis or slant edge inclined to one and parallel to other plane, solids lying on a face or generator on a plane.
Sectioning of solids lying in various positions, True shape of the section.
Development of lateral surfaces, sheet metal drawing.

3. Isometric Projection

Principles of isometric projection, Isometric projection using box and offset methods.

References:

1. Bhatt. N.D. : Elementary Engineering Drawing Charothar Publishing.
2. Laxmi Narayan V and Vaish W: A Text Book of Practical Geometry and Geometrical drawing.

Integral University, Lucknow

Department of Mathematics

B. Tech. 1st year **IInd Sem**

Subject: Engineering Mathematics-II (common to all branches except BT & FT)
Subject Code: MT112

(Revised w.e.f. session 2015-2016)

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Unit-I Differential Equations **[**8]

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 **[**8]

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

Unit-III : Fourier Series and Partial Differential Equations **[**9]

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 **[**8]

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 **[**7]

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.