

Uttarakhand Technical University, Dehradun

Study and Evaluation Scheme

B. Tech Programme (Effective from Session: 2006-2007)

B. Tech

I Year (I & II Semester)

THEORY SUBJECT

S. N	Course Code	Subject	Period			Evaluation Scheme			ESE	Sub Total
			L	T	P	Sessional Exam.				
						CT	TA	Total		
1	THM-101	Professional Comm	2	1	0	15	10	25	50	75
2	TMA-101/202	Mathematics	3	1	0	30	20	50	100	150
3	TPH-101/201	Physics	3	1	0	30	20	50	100	150
4	TME-101/201	Mechanical Engg.	3	1	0	30	20	50	100	150
5	TCS-101/201	Computer System Programming	3	1	0	30	20	50	100	150
6	TES-101/201	Environmental Studies	2	1	0	15	10	25	50	75

PRACTICAL SUBJECT

S. N	Course Code	Subject	Period			Evaluation Scheme			ESE	Sub Total
			L	T	P	Sessional Exam.				
						CT	TA	Total		
1	PPH-151/251	Physics Lab	0	0	2	15	10	25	25	50
2	TME-151/251	Mechanical Lab	0	0	2	15	10	25	25	50
3	PCS-151/251	Computer Lab	0	0	2	15	10	25	25	50
Semester Total			16	6	6					900

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I Year (I & II Semester)

THEORY SUBJECT

S.N	Course Code	Subject	Period			Evaluation Scheme			ESE	Sub Total
			L	T	P	Sessional Exam.				
						CT	TA	Total		
1	THM-101	Professional Communication	2	1	0	15	10	25	50	75
2	TMA-101/202	Mathematics	3	1	0	30	20	50	100	150
3	TCY-10/201	Chemistry	3	1	0	30	20	50	100	150
4	TEE-101/201	Basic Electrical	3	1	0	30	20	50	100	150
5	TEC-101/201	Basic Electronics	3	1	0	30	20	50	100	150

PRACTICAL SUBJECT

S.N	Course Code	Subject	Period			Evaluation Scheme			ESE	Sub Total
			L	T	P	Sessional Exam.				
						CT	TA	Total		
1	PCY-151/251	Chemistry Lab	0	0	2	15	10	25	25	50
2	TEE-151/251	Electrical Lab	0	0	2	15	10	25	25	50
3	PWS151/251	Workshop Practice	0	0	2	15	10	25	25	50
4	PCG-151/251	Engg. Graphics	1	0	2	15	10	25	50	75
		General Proficiency	0	0	0	-	-	100	-	100
		Discipline	0	0	0	-	-	100	-	100
Semester Total										2000

Uttarakhand Technical University, Dehradun

B. Tech-I Year (I & II Sem) Syllabus

PHYSICS (TPH-101/TPH-201)

Relativistic Mechanics:

Inertial and Non-inertial Frames, Michelson-Morley Experiment, Postulates of Special Theory of Relativity, Galilean and Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass

Energy Equivalence and Variation of Mass with Velocity. **6**

Interference

Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Displacement of Fringes,

Interference in Thin Films – Wedge Shaped Film, Newton's Rings. **4**

Diffraction : Single and n-Slit Diffraction, Diffraction Grating, Raleigh's Criterion of Resolution,

Resolving Power of Telescope, Microscope and Grating. **5**

Polarization

Phenomenon of Double Refraction, Ordinary and Extra-ordinary Rays, Nicol Prism, Production and

Analysis of Plane, Circularly and Elliptically Polarized Light, Fresnel Theory, Optical Activity, Specific

Rotation, Polarimeter. **5**

Laser : Principle of Laser Action, Einstein's Coefficients, Construction and Working of He-Ne and Ruby

Laser. **3**

Electromagnetics

Ampere's Law and Displacement Current, Maxwell's Equations in Integral and Differential Forms,

Electromagnetic Wave Propagation in Free Space and Conducting Media, Poynting Theorem. **5**

Magnetic Properties of Materials

Basic Concept of Para-, Dia and Ferro-Magnetism, Langevin's Theory of Diamagnetism, Phenomenon of

Hysteresis and Its Applications **4**

X-Rays

Diffraction of X-Rays, Bragg's Law, Practical Applications of X-Rays, Compton Effect. **3**

Wave Mechanics : Wave Particle Duality, de Broglie Concept of Matter Waves, Heisenberg Uncertainty

Principle, Schrödinger Wave Equation and Its Applications: Particle in a Box and One Dimensional

Harmonic Oscillator. **5**

Prerequisite : None Equivalent Course : None

References:

1. Robert Resnick : Introduction to Special Theory of Relativity, Wiley
2. Arthur Beiser : Perspectives of Modern Physics
3. A.K. Ghatak : Optics
4. Wehr Richards & Adair : Physics of Atoms
5. O.Svelto : Lasers
6. D.J. Griffith : Electrodynamics

CHEMISTRY

(TCY-101/TCY-201)

1. Molecular theory of diatomic heteromolecules, Bond theory of bonding in metals, Hydrogen bonding. 3

2. Solid state Chemistry: 5

Radius Ratio Rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of Density of unit cell.

One & Two Dimensional solids, graphite as two dimensional solid and its conducting properties.

Fullerene & its applications.

3. Structures of the following polymers, viz, Natural and synthetic rubbers, Polyamide and Polyester

fibres, polymethylmethacrylate, poly acrylonitrile and polystyrene. A brief account of conducting polymers (polypyrrole & polythiophene) & their applications. 4

4. Order & Molecularity of reactions. First & Second order reactions. Energy of activation. 3

5. Phase Rule: Its application to one component system (Water). 2

6. Equilibrium Potential, electrochemical cells (galvanic & concentration cells), Electrochemical theory

of corrosion & protection of corrosion. 3

7. **Water Chemistry:** Hardness of water, softening of water by Lenny-S process & Reverse osmosis.

Treatment of boiler feed water by Calgon process, Zeolites and ion-exchange resins. 4

8. Classification of fuels, Coal, Biomass & Biogas. Determination of gross and net calorific values

using Bomb Calorimeter. 5

9. **Environmental pollution** : Types of pollution & pollutants, Air Pollution. Formation and depletion

of ozone, smog and Acid rain., 4

10. **Toxic chemicals in Environment:** Basic concepts, Brief idea about the environmental impact of

toxic chemicals specially, CO, NxOx, Sox, O3, Pesticides, environmental management 3

Lubricants

11. Introduction to lubricants, Mechanism of lubrication, Classification of lubricants, Flash and fire

points, Selection of lubricants

Prerequisite: None

Equivalent Course: None

References :

1. Organic Chemistry (Morrison & Boyd)

2. Inorganic Chemistry (I.D. Lee)

3. Physical Chemistry (Barrow)

4. Environmental chemistry (Manahan)

MATHEMATICS-I

(TMA-101)

Matrices 9

Elementary row and column transformation, Rank of matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Cayley-Hamilton Theorem, Eigen values and eigen vectors, Diagonalisation, Complex and unitary matrices.

Differential Calculus -I 8

Leibnitz theorem, Partial differentiation, Euler's theorem, Curve tracing, Change of variables, Expansion of function of several variables

Differential Calculus -II 7

Jacobian, , Approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications).

Multiple Integrals 7

Double and triple integral, Change of order, Change of variables, Beta and Gamma functions, Application to area, volume, Dirichlet integral and applications.

Vector Calculus 7

Point functions, Gradient, divergence and curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Green's, Stokes and Gauss divergence theorem.

Prerequisites: None, Equivalent Course: None

References:

1. Shanti Narayan: A Text book of Matrices, S.Chand
2. C. Prasad: Mathematics for Engineers, Prasad Mudralaya
3. E. Kreyszig: Advanced Engineering Mathematics, Wiley Eastern
4. B.S. Grewal: Higher Engineering Mathematics, Khanna Publ.
5. Piskunov N: Differential & Integral Calculus, Moscow Peace Publ.

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MECHANICAL ENGINEERING (TME-101/ TME-201)

A. THERMODYNAMICS

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. 2

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. 3

Properties of steam and thermodynamics cycles:

Properties of steam, use of property diagram, Steam-Tables, processes involving steam in closed and

open systems. Rankine cycle. 4

Introduction to I.C. Engines-two & four stroke S.I. and C.I. engines. Otto cycle, Diesel cycle. 3

B. MECHANICS AND STRENGTH OF MATERIALS

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 friction-Belt

Friction. 2

Structure Analysis

Beams: Introduction, Shear force and Bending Moment, shear force 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. 3

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.

3

Compound stress and strains: Introduction, state of plane stress, Principal stress and strain, Mohr's stress

circle. 2

Pure Bending of Beams: Introduction, Simple Bending theory, Stress in Beams of different cross sections.

Torsion: Introduction, Torsion of Shafts of circular section, Torque and Twist, Shear stress due to Torque.

2

Prerequisites: None, Equivalent Course: None

5

Reference:

1. Van Wylen G.J. & Sonnlog R.E. : Fundamentals of classical thermodynamics, John Wiley & Sons, Inc.

NY.

2. Wark Wenneth : Thermodynamics (2nd edition), Mc Graw Hill book Co. NY.

3. Holman, J.P. : Thermodynamics, MC Graw Hill book Co. NY.

4. Yadav R. : Thermodynamics and Heat Engines, Vol I & II (SI Edition) Central Publishing House

Allahabad.

5. Yadav R. : Steam & Gas Turbines.

6. Kshitish Chandra Pal : Heat Power, Orient Longman Limited, 17, Chittranjan Avenue, Calcutta.

7. S. Rao, B.B. Parulekar, 'Energy Technology', Khanna Pub., New Delhi.

8. G. H. Ryder : "Strength of Materials".

9. F. L. Singer : "Strength of Materials".

10. Timoshenko : "Strength of Materials".

BASIC ELECTRICAL ENGINEERING (TEE-101/TEE-201)

1. D.C. Network Theory : 4

Circuit theory concepts-Mesh and node analysis.

Network Theorems- Super-position theorem. Thevenin's theorem, Norton's theorem, Maximum

Power Transfer theorem, Star Delta transformation.

2. Steady State Analysis of A.C. Circuits : 5

Sinusoidal and phasor representation of voltage and current: single phase a.c. circuitbehaviour

of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor : magnetic circuit.

3. Measuring Instruments: 4

Construction and principle of operation of voltage and current measuring instruments; introduction to

power and energy meters.

4. Three Phase A.C. Circuits : 4

Star-Delta connections, line and phase voltage/current relations, three phase power and its measurement.

5. Transformer : 5

Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and

voltage regulation of single phase transformer, O.C. and S.C. tests.

6. D.C. Machines 6

Principle of electromechanical energy conversion, types of d.c. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, Starter and speed control of d.c.

motors, their applications.

7. Three phase induction Motor 4

Principle of operation, types and methods of starting, slip-torque characteristics, applications.

8. Synchronous Machines: Principle of Operation of Alternator and synchronous motor **2**

9. Single phase Motors : Principle of operation and methods of starting of induction motor, Stepper

motor and Universal motor **3**

Prerequisite: None, Equivalent: None

References :

1. V. Del Toro. " Principles of electrical Engineering, "Prentice hall International.

2. W.H. Hayt & J.E. Kemmerly, " Engineering circuit Analysis, "Mc Graw Hill.

3. I.J. Nagrath, "Basic Electrical Engineering," Tata Mc. Graw Hill.

4. A.e. Fitzgerald, D.E., Higginbotham and A Gabel, "Basic Electrical Engineering " Mc Graw Hill.

5. H. Cotton, "Advanced Electrical Technology" Wheeler Publishing.

PROFESSIONAL COMMUNICATION (THU-101)

Pre-Requisites of Technical Written Communication

Vocabulary Building: Homophones (Words Similar in sound but different in Meanings); Word-formation;

One-Word substitute; New & Select Vocabulary Building (about 500 words)

Functional Grammar: Patterns and Correct usage (Parts of speech); Syntax Concord; Prepositions; Articles.

Requisites of Good Sentence and Paragraph Writing : Requisites of Good Sentence Writing; Paragraph

Writing; Unity, Coherence and Emphasis; Development of Paragraph: Inductive Order, Deductive Order,

Spatial, Linear, Chronological Orders etc. with Emphasis on Argumentative & Expository Writing.

Language Learning Through Thematic and Value based Critical Reading (Non-Detailed Text Study)

Study of following Short Stories for making the Students acquaint with the styles of great Writers of World:

O.H. Henry : The Last Leaf

R.N. Tagore: The Renunciation

M.R. Anand: The Barber's Trade Union

Dimensions of Spoken English:

Stress, Intonation, Rhythm, Phone mes, Allophones, Phonetic Transcription, Listening, Reading &

Comprehension of Speech and Reproduction of Response.

Prerequisite: None, Equivalent Course: None

Texts Books/ References

Singh R.P. (ed) :An Anthology of English Short Stories; OUP, New Delhi.

Hornby A.S :Guide to Patterns & Usage in English; OUP, New Delhi

Clark S. & Pointon: Word for Word; OUP, New Delhi

Rutherford A.:Basic Communication Skills; Person Education, New Delhi.

Singh R.P. : Functional Skills in Language & Literature; OUP, New Delhi

Bansal R.K. & Harrison: Phonetics in English; Orient Longman, New Delhi

Sethi & Dhamija: A Course in Phonetics & Spoken English; Prentice Hall, New Delhi.

Blum Rosen : Word Power; Cambridge University Press, New Delhi

Suggested Readings :

Clive Upton et al: Oxford Dictionary of Pronunciation for Current English; OUP New Delhi.

A Dictionary of Modern English Usages; OUP, New Delhi

Michael Swan: Practical English Usages; OUP, New Delhi

John Alveybrideh: American English Pronouncing Dictionary; OUP New Delhi.

Jons Daniel: English Pronouncing Dictionary; Cambridge University Press.

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COMPUTER SYSTEMS, PROGRAMMING (TCS-101/TCS-201)

Concepts in Computer & Programming

Computer Appreciation: 7

Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers,

Classification of Computers, Computer Hardware, CPU, RAM/ROM, Various I/O devices, Peripherals,

Storage Media, Software Definition, Role and Categories, Firmware and Human ware.

Programming Language Classification & Program Methodology: 8

Computer Languages: Generation of Languages, Translators, Interpreters, Compilers, Compilers, Flow

Charts, Dataflow Diagram, Assemblers, Introduction to 4GLs, Software Development Methodology, Life

Cycles, Software Coding, Testing, maintenance.

Digital Devices and Basic Network Concepts

Digital Fundamentals: 4

Various codes, decimal, binary, hexadecimal conversion, floating point numbers, Need for Data

Transmission over distances, Types of Data Transmission, Media for Data Transmission (UTP, Optical,

Wireless) ,

Data Communication & Networks: 5

Computer Networks, Networking of computers- Introduction of LAN and WAN. Network Topologies,

Basic Concepts in Computer Networks, Client-server Architecture, Mobile Communication.

Internet and Web Technologies

Internet & World Wide Web: 3

Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search

Engines, Email,

Concepts in Operating System, Office Tools and Data Management 4

Introductory concepts in operating system & Data Management:

Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows,

MS office Tools, MS WORD, MS EXCEL, MS Power Point,

IT Industry Trends, Careers and Applications in India: 3

Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic

governance, Multimedia, and Entertainment.

Information Representation: 4

Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio,

Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI

Prerequisite: None, Equivalent Course: None

References:

1.D S Yadav, "Foundations of IT", New Age, Delhi

2.Curtin, "Information Technology : Breaking News", TMH

3.Rajaraman, "Introduction to Computers", PHI

4.Nelson, "Data Compression", BPB.

5.Peter Nortans "Introduction to Computers", TMH.

6. Leon & Leon "Fundamental of information Technology", Vikas
7. Kanter, "Managing Information System"
8. Lehngart, "Internet 101", Addison Wesley
9. CIS tems "Internet, An Introduction", Tata McGraw Hill.

BASIC ELECTRONICS

(TEC-101/TEC-201)

Semiconductor materials and properties 3

Group-IV materials, Covalent bond, electron-hole concepts

Basic concepts of energy bands in materials, concept of forbidden gap

Intrinsic and extrinsic semiconductors, donors and acceptors impurities

Junction diode 4

p-n junction, depletion layer, v- i characteristics, diode resistance, capacitance
diode ratings (average current, repetitive peak current, non-repetitive current,
peak-inverse voltage).

Diode Applications 6

rectifiers (half wave and full wave), calculation of transformer utilisation factor and
diode ratings, filter (C-filter), calculation of ripple factor and load regulation
clipping circuits, clamping circuits, voltage multipliers

Breakdown diodes 4

breakdown mechanisms (zener and avalanche), breakdown characteristics,
zener resistance, zener diode ratings, zener diode application as shunt regulator

Bipolar Junction Transistor 5

Basic construction, transistor action, CB, CE and CC configurations, input/output

Characteristics, Biasing of transistors- fixed bias, emitter bias, potential divider
bias, comparison of biasing circuits

Transistor Amplifier 4

Graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model
(low

frequency), computation of A_i , A_v , R_i , R_o of single transistor CE and CC amplifier
configurations.

Field Effect Transistor 6

JFET: Basic construction, transistor action, concept of pinch off, maximum drain saturation
current,

input and transfer characteristics, characteristic equation CG, CS and CD configurations,
fixed-, self-biasing

MOSFET: depletion and enhancement type MOSFET-construction, operation and
characteristics.

Computation of A_v , R_i , R_o , of single FET amplifiers using all the three configurations

Switching theory and logic design 6

Number systems, conversion of bases, Boolean algebra, logic gates,
concept of universal gate, canonical forms. Minimisation using K-map

Operational Amplifiers 2

Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non- inverting
and unity gain

amplifiers, adders, difference amplifiers, integrators

Prerequisite: None, Equivalent: None

Books and reference:

1. Boylestad and Nashelsky, 'Electronic Devices and circuits' PHI, 6e, 2001.
2. A Mottershead, 'Electronic devices and circuits', PHI, 2000.
3. Morris Mano, 'Digital Computer Design', PHI, 2003.

MATHEMATICS II (TMA-202)

Differential Equations 8

Ordinary differential equations of first order, Exact differential equations, Linear differential equations of

first order, Linear differential equations of nth order with constant coefficients,

Complementary functions

and particular integrals, Simultaneous linear differential equations, Solutions of second order differential

equations by changing dependent and independent variables, Method of variation of parameters,

Applications to engineering problems (without derivation).

Series Solutions and Special Functions 8

Series solutions of ODE of 2nd order with variable coefficients with special emphasis to differential

equations of Legendre, and Bessel . Legendre polynomials, Bessels functions and their properties.

Laplace Transform 7

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, Application to solve simple linear and simultaneous differential equations.

Fourier Series and Partial Differential Equations 8

Periodic functions, Trigonometric series, Fourier series of period $2p$, Eulers 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 2nd order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples.

Applications of Partial Differential Equations 7

Method of separation of variables for solving partial differential equations, Wave equation up to twodimensions,

Laplace equation in two-dimensions, Heat conduction equations up to two-dimensions,

Equations of transmission Lines.

Prerequisite: None

Equivalent Course: None

References:

1. E. Kreyszig: Advanced Engineering Mathematics, Wiley Eastern
2. B.S. Grewal: Higher Engineering Mathematics, Khanna Publ.
3. C. Prasad: Advanced Mathematics for Engineers, Prasad Mudralaya
4. J.N. Kapoor: A Textbook of Differential Equations, Pitamber Publ.

TECHNICAL WRITING (THM -201)

Technical Communication 10

Nature; Origin and Scope; Feature and General Writing; Significance; Style: Objective Style as

Contrary to Literary Composition. Forms of Technical Communication, Distinction between formal and informal writing. Essay Writing.

Reports: Types, Significance, Structure & Style of Report;

Writing of Reports: Project, Thesis, Dissertation Writing;

Technical Paper & Scientific Article Writing: Elements, Methods & Technical Objectives;

Technical Proposal: Nature, Divisions, Kinds, and Uses.

Business Correspondence: 9

Principles; Features; Sales and Credit Letters: Letters of Enquiry, Quotation, Order, Claim, Complaint and

Adjustment letters, Bio-Data Making, Resumes/Job Application Processing.

Language Learning Through Thematic and Value based Critical Reading (Non-Detailed Text Study):

A Study of following Value -Oriented Essays: 10

S. Radhakrishnan : *The Gandhian Outlook*

J.B. Priestley : *Making Writing Simple*

C.E.M. Joad : *The Civilization of Today*

Prerequisite : None Equivalent Course: None

Texts Books/ References

Singh R.P. (ed) : *An Anthology of English Essay*; OUP, New Delhi

Hornby A.S. : *Guide to Patterns & Usage in English*; OUP, New Delhi

Rutherford A. : *Basic Communication Skills*; Person Education, New Delhi.

Singh R.P. : *Functional Skills in Language & Literature*; OUP, New Delhi

Seely John : *Writing Report*; OUP, New Delhi

Suggested Readings :

Arora V.N. et al : *Improve Your Writing*; OUP Delhi

Mohan K. & Sharma R.C.: *Business Correspondence of Report Writing*; TMH, New Delhi.

Michael Swan : *Practical English Usages*; OUP, New Delhi

John Alveybrideh : *American English Pronouncing Dictionary*; OUP New Delhi.

ENVIRONMENTAL STUDIES (TES-101/TES-201)

GENERAL: 3

Definition, Scope, Segments of Environment and its Multidisciplinary Nature

Some Major Environmental Problems

ECOLOGY AND ENVIRONMENT: 5

Concept of an Ecosystem- its components and functions

Trophic Levels- Producer, Consumer and Decomposer

Energy and Nutrient Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and

Ecological Pyramid

AIR POLLUTION: 3

Various segments of Atmosphere and their Significance

Classification of Pollutants in Air – their sources, toxic effects, sampling and analysis, Stationary and Mobile Sources

and their Control

Photochemical and Sulphurous Smog, Acid Rain

Indoor Air Quality

Greenhouse Effect and Global Warming

Ozone Layer - Its Depletion and Control Measures

WATER POLLUTION: 5

Water Resources of the Earth and Indian Scenario

Point and non-Point sources of Pollution

Various Pollutants and their Toxic Effects

Water Quality- DO and its significance, BOD and COD and their measurement

Water Quality in Rivers and Lakes- DO sag, Eutrophication, Thermal Stratification, Mixing in Lakes and its

Consequences, Designated Best Use (CPCB Criteria)

Potability of Water- Municipal Water Supply

Wastewater – Characteristics, Primary and Secondary Treatment

Rainwater Harvesting

NATURAL RESOURCES AND BIO-DIVERSITY 6

Renewable and non-Renewable Resources, Sustainable Development

Forest Resources, Deforestation- causes and effects

Bio-Diversity- Its Importance, Threats and Conservation

Dams and Reservoirs- Their Benefits and Problems

A BRIEF INTRODUCTION TO NOISE POLLUTION, SOIL POLLUTION AND SOLID WASTE MANAGEMENT 3

MEASURES FOR PROTECTION OF ENVIRONMENT 3

Development with protection of environment- social issues. Legal frame work for environmental protection in India.

Brief introduction to Acts for environmental protection.

PROJECT PREPARATION

Prerequisite: None, Equivalent: None

REFERENCES:

1. De,A.K., "Environmental Chemistry", New Age Publishers Pvt. Ltd.
2. Masters,G.M., "Introduction to Environmental Engineering and Science", Prentice Hall India Pvt.Ltd.
3. Odem,E.P., "Fundamentals of Ecology", W.B.Sannders Co.
4. Bryant,P.J., "Biodiversity and Conservation", Hypertext Book (www.darwin.bio.uci.edu)
5. Tewari, Khulbe & Tewari: Textbook of Environment Studies; I.K. Publication
6. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards,
Vol I and II,Environment Media