PHYSICS

TAS-101/ TAS-201

(Revised w.e.f. 2004-05)

L	T	P
3	1	0

Unit – I : 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**

Unit – II : 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**

Unit – III : 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**

Unit – IV : 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 Hysterisis and Its Applications **4**

Unit – V : 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**

References:

1. Robert Resmick : Introduction to Special Theory of Relativity
2. Aurthur Beiser : Perspectives of Modern Physics
3. A.K. Ghatak : Optics
4. Wehr Richords & Adiav : Physics of Atoms
5. O.Svelto : Lasers
6. D.J. Griffith : Electrodynamics

CHEMISTRY

TAS-102/TAS-202

[Revised w.e.f. 2004-2005]

L	T	P
3	1	0

Unit – I

1. **Molecular theory of diatomic heteromolecules, Bond 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 & Two Dimensional solids, graphite as two dimensional solid and its conducting properties. Fullerene & its applications.

Unit-II

1. Basic principles of spectroscopic methods. The use of UV, Visible, IR, ^{1}H NMR, for the determination of structure of simple organic compounds.
2. Characteristics and classification of polymers.
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 & polytiphene) & their applications.

Unit-III

1. Stability of reaction intermediates, e.g. Carbanion, Carbocation and free radicals. Types of organic reactions, & Mechanism of nucleophilic substitution reaction.
2. Mechanism of the following reactions.

   (i) Aldol condensation. (ii) Cannizzaro reaction (iii) Beckmann rearrangement (iv) Hofmann rearrangement, and

   (v) Diels-Alder reaction
3. E-Z Nomenclature. Optical Isomerism of organic Compounds containing one chiral center. Examples of optically active compounds without chirality. Conformations of butane.

Unit-IV

1. Order & Molecularity of reactions. First & Second order reactions. Energy of activation.
2. Phase Rule: Its application to one component system (Water).
3. Equilibrium Potential, electrochemical cells (galvanic & concentration cells), Electrochemical theory of corrosion & protection of corrosion.

Unit-V

1. 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.
2. Classification of fuels, Coal, Biomass & Biogas. Determination of gross and net calorific values using Bomb Calorimeter.
3. Environmental pollution : Types of pollution & pollutants, Air Pollution. Formation and depletion of ozone, smog and Acid rain.

References :

1. Organic Chemistry (Morrison & Boy)
2. Inorganic Chemistry (I.D. Lee)
3. Physical Chemistry (Barrow)
4. Environmental chemistry (Manahan)

PROFESSIONAL COMMUNICATION

TAS-103

[Effective from the session : 2004-05]

Unit – I : Technical Communication 8

Nature; Origin and Scope; Feature and General Writing; Significance; Style: Objective Style as Contrary to Literary Composition.

Forms of Technical Communication:

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, Uses.

Unit-II : Pre-Requisites of Technical Written Communication **9**

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.

Unit : III : Business Correspondence: Principles; Features; Sales and Credit Letters: Letters of Enquiry, Quotation, Order, Claim, Complaint and Adjustment letters, Bio-Data Making, Resumes/Job Application Processing. **7**

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

A Study of following Value-Oriented Essays:

A.L.Basham	:	The Heritage of India
S. Radhakrishnan	:	*The Gandhian Outlook*
Francis Bacon	:	*Of Studies*
J.B. Priestley	:	Making Writing Simple
Virginia Wooef	:	How should one Read a Book
R.K. Narayan	:	*A Bookish Topic*
C.E.M. Joad	:	The Civilization of Today

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

O.H. Henry	:	The Gift of the Magi
R.N. Tagore	:	The Renunciation
Katherine Mansfield	:	*The Fly*
A.P. Chekhor	:	*The Lament*
M.R. Anand	:	The Barber's Trade Union
Ruskin Bond	:	The Eyes Are Not Here
D.H. Lawrence	:	The Rocking Horse Winner
Ernest Hemingway	:	The Capital of the World

Unit-V : Dimensions of Spoken English: Using English Language Laboratory : **6**

Stress, Intonation, Rhythm, Phonemes, Allophones, Phonetic Transcription, Listening, Reading & Comprehension of Speech and Reproduction of Response.

Texts Books/ References

Singh R.P. (ed)	:	An Anthology of English Essay; OUP, New Delhi
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
Ruther Ford 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
Seely John	:	Writing Report; OUP, New Delhi

Suggested Readings :

Arora V.N. etal	:	Improve Your Writing; OUP Delhi
Mohan K. & Sharma R.C.	:	Business Correspondence of Report Writing; TMH, New Delhi.
Clive Upton etal	:	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 Alveyblrideh	:	American English Pronouncing Dictionary; OUP New Delhi.
Jons Daniel	:	English Pronouncing Dictionary; Cambridge University Press.

MATHEMATICS-I

TAS-104

Unit - I : Matrices **9**

Elementary row and column transformation, Rank of matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Caley-Hamition Theorom, Eigen values and eigen vectors, Diagonalisation, Complex and unitary materices .

Unit - II : Differential Catculus-I **8**

Leibnitz theorem, Partial differentiation, Eulers theorem, Curve tracing, Change of variables, Expansion of function of several variables

Unit - III : Differntial Caluculus-II **7**

Jacobian, , Approximation of errors, Exterma of functions of several variables, Lagranges method of multipliers (Simple applications).

Unit - IV : 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.

Unit - V : Vector Calculus **7**

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

ELECTRICAL ENGINEERING

TEE-101/TEE-201

(Revised : with effect from session 2002-2003)

L	T	P
3	1	0

Unit-I

1. Steady State Analysis of A.C. Circuits :

Sinusoidal and phasor representation of voltage and current: single phase a.c. circuit-behaviour of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor : magnetic circuit. 8

Unit-II

2. D.C. Network Theory :

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.

3. Measuring Instruments:

Construction and principle of operation of voltage and current measuring instruments; introduction to power and energy meters. 8

Unit-III

4. Three Phase A.C. Circuits :

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

5. Transformer :

Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single phase transformer, O.C. and S.C. tests. 9

Unit-IV

6. D.C. Machines

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

7. Three phase Synchronous Machines :

Principle of operation and application of synchronous motor. 8

Unit-V

8. Three phase induction Motor

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

9. Single phase Induction Motor :

Principle of operation, methods of starting. 7

References :

1. V. Del Toro. " Principles of electrical Engineering, "Prentice hall International.
2. W.H. Hayt & J.E. Kennedy," Engineering circuit Analysis, "Mc Graw Hill.
3. I.J. Nagrath, "Basic Electrical Engineering," Tata Mc. Graw Hill.
4. A.e. Fitgerald, D.E., Higginbotham and A Grabel, "Basic Electrical Engineering " Mc Graw Hill.
5. H. Cotton, "Advanced Electrical Technology" Wheeler Publishing.

MECHANICAL ENGINEERING

TME-101/201

[Effective from the session : 2004-05]

A. THERMODYNAMICS

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. 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

Unit – II : 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 stoke S.I. and C.I. engines. Otto cycle, Diesel cycle. 3

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 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

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. **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. **2**

Torsion: Introduction, Torsion of Shafts of circular section, Torque and Twist, Shear stress due to Torque. **2**

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 (Sl 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".

ELECTRONICS ENGINEERING

TEC-101/ TEC-201

[Effective from the session : 2004-05]

Unit – I

Semiconductor materials and properties

Group-IV materials, Covalent bond, electron-hole concepts	1
Basic concepts of energy bands in materials, concept of forbidden gap	2
Intrinsic and extrinsic semiconductors, donors and acceptors impurities	1

Junction diode

p-n junction	1
depletion layer	1
v-i characteristics, diode resistance, capacitance	1
diode ratings (average current, repetitive peak current, non-repetitive current, peak-inverse voltage).	1

Unit-II

Diode Applications

rectifiers (half wave and full wave)	1
calculation of transformer utilisation factor and diode ratings,	1
filter (C-filter), calculation of ripple factor and load regulation	2
clipping circuits, clamping circuits, voltage multipliers	2

Breakdown diodes

breakdown mechanisms (zener and avalanche)	1
breakdown characteristics, zener resistance, zener diode ratings	1
zener diode application as shunt regulator	2

Unit-III

Bipolar Junction Transistor

Basic construction, transistor action	1
CB, CE and CC configurations, input/output characteristics	2
Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits	2

Transistor Amplifier

Graphical analysis of CE amplifier, concept of voltage gain, current gain	2
h-parameter model (low frequency), computation of A_i, A_v, R_i, R_o of single transistor CE and CC amplifier configurations.	2

Unit-IV

Field Effect Transistor

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 3

MOSFET: depletion and enhancement type MOSFET-construction, operation and characteristics.	2
Computation of A_v, R_i, R_o, of single FET amplifiers using all the three configurations	1

Unit-V

Switching theory and logic design

Number systems, conversion of bases	5
Boolean algebra, logic gates, concept of universal gate, canonical forms.	2
Minimisation using K-map	1

Operational Amplifiers

Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators 2

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.

INFORMATION TECHNOLOGY

TIT-101/TIT-201

[Effective from the Session : 2004-05] **L T P**

Unit – I : Fundamental Concept of Information **3 1 0**

Information Concept and Processing:

Definition of information, Data Vs Information, Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Need, Value and Quality of information, Concept of Information Entropy, Shannon's Principles, Entropy of Information, use of Entropy in Coding, Static & Dynamic codes, Category and Level of Information in Business Organization.

Information Representation:

Information Content, Entropy, Data Compression, Shannon Fano, Huffman Coding, Extended Huffman Codes, Arithmetic Coding, LZ78, LZW coding, Introduction to JPEG, MPEG, MHEG and other IT Industry Standards.

Unit-II : Concepts in Computer & Programming

Computer Appreciation:

Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, RAM/ROM, Computer Hardware, CPU, Various I/O devices, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Humanwer.

Programming Language Classification & Program Methodology:

Computer Languages, Generation of Languages, Translators-Interpreters, Compiler/Interpreters, Compilers, Flow, Charts, Dataflow Diagram, Assemblers, Introduction to 4GLs, Software Development Methodology, Life Cycles, Software Coding, Testing, maintenance, ISO, CMM standards for IT industry.

UNIT : III : Digital Devices and Basic Network Concepts

Digital Fundamentals:

Various codes, decimal, binary, hexa decimal conversion, floating numbers gates, flip flops, adder, multiplexes, need for Data Transmission over distances, Types of Data Transmission, Media for Data Transmission, Modulation, AM, FM, Digital Modulation, Multiplexing of Signals

Data Communication & Networks:

Computer Networks, Networking of computers- Introduction of LAN and WAN. Network Topologies, Basic Concepts in Computer Networks, Client-server Architecture, ISDN, ATM, Token based protocol, CSMA/CD, Mobile Communication.

UNIT-IV : Internet and Web Technologies

Internet & World Wide Web:

Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email, ISP, EDI, E-Commerce, Public Key Private Key, Safety of Business Transaction on web.

Web Technologies:

Elementary Concepts of E-Commerce, Basic Infrastructures for E-Commerce, Electronic Token, Security Threats, Electronic Payment Systems, Digital Signatures, Network, Security, Firewall, Introduction to Web Technologies.

UNIT-V : Concepts in Operating System, Office Tools and Data Management

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, Tools for Data Management, Basics of Database management system, Introduction to basic Commands of Dbase, Foxpro, SQL Etc.

IT Industry Trends, Careers and Applications in India:

Scientific, Business, Educational and Entertainment Application, Industry Automation, Weather Forecasting, Awareness of Ongoing IT projects in India NICNET, BRNET etc. Application of IT to other Areas E Commerce, electronic governance, Multimedia, Entertainment.

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.

ENVIRONMENTAL STUDIES

TES - 201

L	T	P
3	1	0

Unit-I :

The Multidisciplinary nature of environmental studies **2**

Definition, scope and importance, Need for public awareness

Natural Resources **6**

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 mineral resources, case studies.

(d) Food resources: World food problem, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources: Land as 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 lifestyles.

Unit-2 : Ecosystems **6**

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:

  (a) Forest ecosystem (b) Grassland Ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit-3 : Biodiversity and its conservation **7**

Introduction- Definition : genetic, species and ecosystem diversity, Biogeographical classification of India,Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ Ex-situ conservation of biodiversity.

Unit-4 : Environmental Pollution **8**

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.
- Diaster management: floods, earthquake, cyclone and landslides.

Unit-5: Social Issues and the Environment **5**

From Unsustainable 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, 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.

Human Population and the Environment **4**

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 environmental assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural /Industrial / Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes etc

References

1. Agrawal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad- 380 013, India Email : mapin@icenet.net (R)
3. Brunner R.C., 1989, hazardous Waste Incineration, McGraw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P, Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encycolopedia, Jaico Publ. House, Mubmbi, 1196p.
6. De. A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993 Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p.
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 1140p.
11. Jadhav, H. & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
12. Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
13. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TM)
14. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
16. Rai N,B, & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
17. Sharma B.K., 2001. Environmental Chemistry. Goel Publ. House Meerut.
18. Survey of the Environment, The Hindu (M)
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media (R)
21. Trivedi R.K. and P.k. Goel, Introduction to air pollution, Techno-Science Publication (TB)
22. Wagner K.D., 1998. Environment Management. W.B. Saunders Co. Philadelphia, USA 499p.

(M) Magazine (R) Reference (TB) Textbook

MATHEMATICS II

TAS-204

Unit - I : 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).

Unit - II : 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.

Unit - III : 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.

Unit - IV : Fourier Series and Partial Differential Equations **8**

Periodic functions, Trignometric series, Fourier series of period 2π , 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 2^{nd} order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples.

Unit - V : 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.

PHYSICS PRACTICALS

TAS-151/TAS-251

(Revised w.e.f. 2004-05)

L	T	P
2	1	0

List of Experiments (Any Ten)

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.
3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.
4. To determine the specific rotation of cane sugar solution using half shade polarimeter.
5. To determine the wavelength of spectral lines using plane transmission grating.
6. To determine the specific resistance of the material of given wire using Carey Foster's bridge.
7. To determine the variation of magnetic field along the axis of a current carrying coil and then to estimate the radius of the coil.
8. To verify Stefan's Law by electrical method.
9. To calibrate the given ammeter and voltmeter.
10. To study the Hall effect and determine Hall coefficient, carnier density and mobility of a given semiconductor material using Hall-effect set up.
11. To determine energy bank gap of a given semiconductor material.
12. To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.
13. To draw hysteresis curve of a given sample of ferromagnetic material and from this to determine magnetic susceptibility and permeability of the given specimen.
14. To determine the balistic constant of a ballistic galvanometer.
15. To determine the viscosity of a liquid.

Note : Additional experiments may be added based on contents of syllabus.

CHEMISTRY PRACTICALS

TAS-152/TAS-252

LIST OF EXPERIMENTS

[Revised w.e.f. 2004-2005]

L	T	P
0	0	2

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.
3. Determination of available chlorine in bleaching powder.
4. Determination of chloride content in the given water sample by Mohr's method.
5. Determination of iron content in the given ore by using external indictor
6. pH-metric titration.
7. Determination of Equivalent weight of Iron by the chemical displacement method. The equivalent weight of copper is 63.5

   (Note : the procedure to be followed in carrying the above experiment is given as annexure)
8. Viscosity of an addition polymer like polyster by Viscometer.
9. Determination of iron concentration in sample of water by colorimetric method. The method involves the use of KCNS as colour developing agent and the measurements are carried out at λ_{max} 480 nm.

   Note : The general procedure of estimation is given on pp653-8 of the textbook of Quantitative Chemical Analysis by A.I. Vogel 6th Edition, Publisher : Pearson education Ltd. 2000)
10. Element detection & functional group identification in organic compounds

Annexure

In this experiment we will determine the equivalent weight of Iron, which displaces one equivalent of copper (63.5 g) from a solution containing copper ions.

Procedure: Clean a sample of iron (strip measuring 3.5cm×1.5cm) with a sand paper and weigh it accurately. Place it in a clean beaker (250ml) and pour into it 100ml of $CuSo_4$ solution of known strength (~ N/10) Allow the strip to stand in the beacker for about 30 minutes. Carefully withdraw the strip of iron (from the beaker) with a forceps and place it on a porcelain plate contained in a desiccafor (using $cacl_2$ as a desiccant). The quantity of copper sulphate remaining in solution – after the chemical displacement, is estimated by lodometric titration method. The dried strip of iron (containing the deposited copper) is then carefully weighed.

Observations:

Weight of iron strip = …….g

Wt. Of iron strip + copper = ……g

(after drying)

wt. of copper deposited on iron strip ⇒

Initial conc. of cu- final conc. of cu. (determined by titration)

The weight of iron, which goes into solution(as $Fe\ So_4$)

⇒ (Initial weight of iron strip + weight of deposited copper) - weight of iron strip along with copper (after drying)

$$\frac{\text{Eq.wt. of copper}}{\text{Eq. Wt. of Iron}}\ (63.5) = \frac{\text{Wt. of Copper Deposited}}{\text{Wt. of } Fe_{(s)} \text{ (going into solution)}}$$

The Eq. Wt. of Fe = ?

The % error involved in the experiment =…….

ELECTRICAL ENGINEERING LAB

TEE-151 / TEE 251

L T P
0 0 2

List of Practicals

A minimum of 10 experiments from the following :

1. Verification of Network Theorems.
2. Study of diode characteristcs.
3. To study a half wave and full wave rectifier circuit with and without capacitor filter and determine the ripple factor.
4. Determination of Common base and common emitter characteristics of a transistor.
5. Study of phenomenon of resonance in RLC series circuit.
6. Measurement of power in a three phase circuit by two wattmeter method.
7. Measurement of efficiency of a single phase transformer by load test.
8. Determination of parameters and losses in a single phase transformer by OC and SC test.
9. DC generator characteriestics.
10. Speed control of dc shunt motor.
11. Study running and reversing of a three phase induction motor.
12. Study of a single phase energy meter.
13. To study the various logic gate (TTL).

    Additional experiments may be added based on contents of syllabi.

MECHANICAL ENGINEERING LAB

TME-151 / TME 251

L T P
0 0 2

List of Practicals

1. Study of boiler models - Babcock Wilcox, Lancashire and Locomotive.
2. Study of Steam engine and steam turbine models.
3. Study of 2-stroke and 4-stroke I.C.E. models.
4. Study of Fiat engine and/ or Diesel engine prototype.
5. Study of a vapour compression Refrigeration unit tutor/refrigerator.
6. Study of a window type air conditioner.
7. To conduct the tensile test on a UTM and determine ultimate Tensile strength, percentage elongation for a steel specimen.
8. To conduct the compression test and determine the ultimate compressive strength for a specimen.
9. To conduct the Impact test (Izod / charpy) on the Impact testing machine and to find the impact strength.
11. To determine the hardness of the given specimen using Brinell / Rockwell / Vicker testing machine.

COMPUTER PROGRAMMING LAB

TCS 151 / TCS 251

L T P
0 0 2

List of Practicals

1. Practice of all internal and External DOS Commands
2. Write simple batch program
3. Giving exposure to Windows environment
4. File and program management in windows
5. Practice of all UNIX commands
6. Write simple shell script
7. Introduction to text editing and word processing
8. Exposure to advance feature supported by some editors
9. Net Surfing
10. Creation and usage of E-mail account
11. Write small program using C language
12. Handling of data structure in C
13. Familarizing mail account using PINE, deleting, creating folder/ mail-messages, adding signature, creating directory of addresses.

Note : *List may be modified according to new software available.*

WORKSHOP PRACTICE

TWS-151/251

L T P
0 0 2

1. **Carpentry Shop:** 1. Study of tools and operation and carpentry joints. 2. Simple exercise using jack plain. 3. To prepare half-lap corner joint, mortise and tennon joints. 4. Simple exercise on woodworking lathe.

2. **fitting Bench Working Shop :** 1. Study of tools and operations 2. Simple exercises involving filling work. 3. Making perfect male-female joint 4. Simple exercise involving drilling/tapping/dieing.

3. **Black Smithy Shop :** 1. Study of tools and operations 2. Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

4. **Welding Shop :** 1. Study of tools and operations . 2. Simple butt joint. 3. Lap joint. 4. oxy acetylene welding.

5. **Sheet metal shop :** 1.Study of tools and operations. 2. Making funnel complete with soldering. 3. Fabrication of tool box, tray, electrical panel box etc.

6. **Machine Shop :** 1. Study of tools and operations. 2. Plane turning. 3. Step turning. 4. Taper turning 5. Threading. 6. Single point cutting tool grinding.

ENGINEERING GRAPHICS L T P
TCE 151 0 0 2

1. Introduction

Graphics as a tool to communicate ideas, Lettering and' dimensioning, Construction of geometrical figures like pentagon and hexagon. 2

2. Orthographic Projection

Principles of orthographic projections, Principal and auxiliary planes, First and Third angle projections. 1

Projection of points. Pictorial view. 1

Projection of lines parallel to both the planes. Parallel to one and inclined to other, Inclined to both the planes. Application to practical problems. 3

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. 2

Sectioning of solids lying in various positions, True shape of the section. 2

Development of lateral surfaces, sheet metal drawing. 1

3. Isometric Projection

Principles of isometric projection, Isometric projection using box and offset methods. 2

References:

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

COMMUNICATION LAB (ENGLISH)

TAS-253

[Effective from the session : 2004-05]

(i) Orientation to Speech Sounds through International Phonetic Alphabets (I.P.S.) : British Received Pronunciation.

(ii) Speech Drills with Emphasis on Articulatory Phonetics, Place and Manner.

LIST OF PRACTICALS

Stress in Speech: Based on Accentual Patterns.

Intonation-Pattern-Practice: Rising, Falling and Level-Tones.

Rhythm in Speech-Practices On Strong and Weak-form Words.

Individual Conferencing / Speaking along with Quizzes.

Conversational Skills for Interview/ Seminars / Workshops with Emphasis on Kinesis along with Promotion of Phonetic-Script-Skills.

Group-Discussion: Practices based on Accurate & Current Grammatical Patterns.

Official / Public Speaking : Practices based on Mechanics of Articulation.

Theme Presentation-Practices Based on Linguistic Patterns.

Developing Argumentative Skills/ Role-Play Presentations with Proper Rhythmic Stress.

Testing comprehension : Reading and Listening Exercises with the use of Audio-Visual Aids.

Audience-based, Effective Speech Production (Elocution)

U.P. TECHNICAL UNIVERSITY
LUCKNOW

Syllabus
of

B.Tech. I Year (I & II Semester)
[Common to all Branches]

Effective from the Session : 2004-05