



Bipin Tripathi
Kumaon Institute of Technology

Course structure & Curriculum Ist year



MATHEMATICS –I (TMA-101)

	L	T	P
UNIT-1	3	1	0
Matrices		(10)	
Elementary row and column transformations Rank of matrix, linear dependence, Consistency of linear system of equations, Characteristic equation, Cayley-Hamilton theorem, Eigen values and Eigen vectors, Diagonalization, Complex and unitary matrices.			
UNIT-2			
Differential Calculus-I			(9)
Leibnitz theorem, Partial Differentiation, Euler's theorem, Change of variables, Expansion of functions of several variables.			
UNIT-3			
Differential Calculus-II			(9)
Jacobian, Approximations and errors, Extrema of functions of several variables, Lagrange method of multipliers			
UNIT-4			
Multiple Integrals			(6)
Double and triple integrals, Change of order, Change of variables, beta and gamma functions, Application to area, volume, Drichlet integral and applications.			
Vector Calculus			(6)
Point functions, Gradient, divergence and curl of a vector and their physical interpretation, Line, surface and volume integrals, Green, Stokes and Gauss divergence theorem.			
References:			
<ul style="list-style-type: none">• Advanced Engineering Mathematics, Kreyszig, Wiley India• A Text book of Engineering Mathematics (Vol.1) by Peter V. O' Neil, Cengage Learning• B. S. Grewal: higher Engineering Mathematics, <i>Khanna Publications</i>.• N. Piskunov: Differential & Integral Calculus, <i>Moscow Peace Publications</i>.• G Shankar Rao, Text book of engineering mathematics, BS Publication, Hyderabad			

	L	T	P
ENGINEERING PHYSICS (TPH-101/201)	3	1	0

UNIT-I			(8)
Relativistic Mechanics:			
Inertial and Non-inertial Frames, 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. Radiation: Kirchoff's Law, Stefan's law (only statement), Energy spectrum of Blackbody Radiation, Compton Effect.			
UNIT-II			(8)
Interference:			
Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Displacement of Fringes, Interference in Thin Films – Wedge Shaped Film, Newton's Rings.			
Diffraction:			
Single and n-Slit Diffraction, Diffraction Grating, Raleigh's Criterion of Resolution, Resolving Power of Grating.			
			(7)

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

UNIT-IV

(8)

Electromagnetic: Ampere's Law and Displacement Current, Maxwell's Equations in Integral and Differential Forms, Electromagnetic Wave Propagation in Free Space and Conducting Media, Poincaré Theorem.

Magnetic Properties of Materials: Basic Concept of Para-, Dia and Ferro-Magnetism, Langevin's Theory of Diamagnetism, Phenomenon of Hysteresis and Its Applications

UNIT-V

(9)

Superconductivity:-

Essential properties of superconductors (zero resistivity), London equations, penetration depth and coherence length, Meissner effect, critical field, critical current Isotope effect, heat capacity, Type I and Type II superconductors, Characteristics of superconductors in superconducting state, applications of superconductors.

Wave Mechanics : Wave Particle Duality, de Broglie Concept of Matter Waves, Heisenberg Uncertainty Principle, Schrödinger Wave Equation and Its Applications: Particle in a Box.

Reference Books:

- Introduction to Special theory of Relativity Robert Resnick – Wiley India
- Physics of Atoms, Wehr Richards & Adia
- Fundamentals of Physics, Halliday, Wiley India
- Engineering Electromagnetics, William Hayt, 7th Ed. (TMH)
- Ashutosh Asthana, Engg. Physics, BS Publication, Hyderabad

ENGINEERING CHEMISTRY (TCY -101/201)

L	T	P
3	1	0

UNIT – I GENERAL & ORGANIC CHEMISTRY

(8)

Molecular orbital diagram of diatomic molecules, valence bond theory & molecular orbital Theory linear combination of atomic orbitals, hybridization, hydrogen bonding, band theory of solids, liquid crystals with their classification applications, Bragg's Law, Fullerenes & their application, Nature of organic molecules, attacking reagents, inductive effect, electromeric, mesomeric (resonance) effect, hyper conjugation, reaction intermediates types of organic reaction (substitution, addition, elimination reaction & organic rearrangements), Saytzeff's rule, organic name reactions (cannizzaro's reaction, aldol condensation, Pinnacol-pinnacol rearrangement, Beckmann's rearrangement, Hoffmann's rearrangement), Optical isomerism & confirmations, E-Z nomenclature, R-S configuration.

UNIT – II PHYSICAL & WATER CHEMISTRY

(10)

Rate of reaction, order & molecularity of reaction, Zero order, First Order, Second order reaction, steady state approximation, concept of activation energy, energy barrier, cell potential, liquid junction potential, conductance & its variation with dilution, Transport no. Kohlraush's Law and its application, pH, buffer solution, calculation of pH of buffer mixture solubility & solubility Product, Nernst distribution law & its application, corrosion, its type, Mechanism & control,

Theory of Electrochemical corrosion. Hardness of water, boiler feed water, Softening of water (Calgon Process, Zeolite process, Lime Soda process & Ion exchange process), Reverse osmosis, treatment of boiler feed water.

UNIT – III CHEMISTRY OF ENGINEERING MATERIALS (7)

L Introduction & classification of polymers, Types of Polymerization, bulk solution, suspension & emulsion, copolymers, vulcanization, PVC, Polyamides, Polyurethane, Polyethylene, Polypropylene, PET, Resins (Phenol Formaldehyde), PMMA, PAN, Rubber, Conducting and Biodegradable polymers, Pyroceramics, Toughened glass, Strengthening of glass, Refractories, Nano Composites, Protective Coatings, Fe, Al, Cu, Pb & Zn alloys, Organometallics & their applications.

UNIT – IV FUELS & COMBUSTION (8)

Classification of Fuels, calorific value of fuel, gross & net calorific value, determination of calorific value using Bomb calorimeter, Coal, Biomass and Biogas, Bio Fuel, Esterification & Transesterification, Introduction of Lubricants, Mechanism of Lubrication, Classification of Lubricant, Bio Lubricant, Flash and Fire Point, Pour Point, Cloud Point, Aniline point, Viscosity index.

UNIT – V ANALYTICAL METHODS AND APPLICATIONS (7)

Titrimetric analysis with reference to acid-base, redox, precipitation and complexometric titrations. Elementary ideas and simple applications of UV, visible, mass and NMR spectral techniques. ¹H NMR spectral techniques.

REFERENCE BOOKS

- Engineering Chemistry – Wiley India
- Engineering chemistry by Sivasankar, TMH, New Delhi.
- Organic Chemistry by Morrison & Boyd, Pearson Publication.
- Organic Chemistry by Loudon, Oxford University Press.
- C Parameswara Murthy, C V Agrawal and et.al., Engineering Chemistry, BS Publication, Hyderabad

BASIC ELECTRICAL ENGINEERING (TEE-101/201)

	L	T	P
UNIT-1	3	1	0

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.

Steady State Analysis of A.C. Circuits : (5)

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

UNIT-2

Three Phase A.C. Circuits : (4)

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

(4)

3. Measuring Instruments:

(4)

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

UNIT-3

(6)

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.

Rotating Machine

Unit-4

(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, Starter and speed control of d.c. motors, their applications.

Synchronous Machines: Principle of Operation of Alternator and synchronous motor.

UNIT-5

(4)

Three phase induction Motor : Principle of operation, types and methods of starting, slip-torque characteristics, applications.

Single Phase Motors : Principle of operation and methods of starting of induction motor, Stepper motor and Universal motor

References :

1. Dr. R. K. Singh and Dr. P.S. Subramanyam, Basic Electrical Engineering, BS Publication, Hyderabad.
2. Gaikwad, Basic Electrical Engineering, Wiley India
3. A.e. Fitzgerald, D.E., Higginbotham and A Grabel, —Basic Electrical Engineering Mc- GrawHill .
4. H. Cotton, —Advanced Electrical Technology|| Wheeler Publishing.

MECHANICAL ENGINEERING (TME-101/201)

L	T	P
3	1	0

UNIT-1

Fundamental Concepts and Definitions

(8)

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 and non cyclic processes, Reversible and irreversible processes, Quasi static process, Energy and its forms, Enthalpy.

UNIT-2

(8)

Zeroth law:

Zeroth law, Different temperature scales and temperature measurement **First law:** First law of thermodynamics. Processes - flow and non-flow, Control volume, Flow work and non-flow work, Steady flow energy equation, Unsteady flow systems and their analysis. **Second law:** Limitations of first law of thermodynamics, Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator. Statements of second law and their equivalence, Carnot cycle, Carnot theorem, Thermodynamic temperature scale, Clausius inequality. Concept of entropy.

UNIT-3

(8)

Properties of steam:

Properties of steam, Phase transformation process and its graphical representation on P-V, T-V & T-s diagram, Mollier diagram and Steam Tables, Processes involving steam in closed and open systems.

Introduction to I.C. Engines: Two & four stroke S.I. and C.I. engines. Otto cycle, Diesel cycle, Dual cycle.

UNIT-4

(9)

Force system and Analysis

Basic concept: Review of laws of motion, transfer of force to parallel position, resultant of planer force system, Free Body Diagrams, Equilibrium. **Friction:** Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry friction.

Structure Analysis

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

Trusses: Introduction, Simple Trusses, Determination of forces in simple truss members, Method of joints and Method of section.

UNIT-5

(9)

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 section, Strain energy, Thermal stresses.

Compound stress and strains: Introduction, State of plane stress, Principal stress and strain, Mohr's circle for stress and strain.

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.

Reference:

1. Agarwal, Basic Mechanical Engineering, Wiley India
2. Holman, J.P. : Thermodynamics, Mc Graw Hill book Co. NY.
3. Singh Onkar, Bhavikatti S.S., Chandra Suresh : Introduction to Mechanical Engineering: Thermodynamics, Mechanics and Strength of Materials, New Age International Publishers
4. Yadav R. : Thermodynamics and Heat Engines, Vol I & II (SI Edition) Central Publishing House Allahabad.

FUNDAMENTALS OF COMPUTER & PROGRAMMING (TCS -101/201)

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3	1	0

(8)

UNIT-I

Introduction to Computer Systems; Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions. Binary arithmetic, Floating point arithmetic, signed and unsigned numbers IEEE standards, CPU organization, ALU, registers, memory, the idea of program execution at micro level. Concept of computing, contemporary Operating Systems such as DOS, Windows, UNIX etc. (only brief user level description). Introduction to organization and architecture of mainframe, mini and micro systems.

UNIT-II**(8)**

Concept of flow chart and algorithm; Algorithms to programs: specification, top-down development and stepwise refinement ,Introduction to the design and implementation of correct, efficient and maintainable programs, structured Programming,Use of high level programming language for the systematic development of programs, programmability and programming languages, Object codes, compilers. Introduction to the Editing tools such as vi or MS-VC editors.

UNIT-III**(10)**

C: Data types, Identifiers, Storage class, Constant, Operators, expression, Statements, console I/O statements, Selection statements: if-else, switch, Iteration Statements: for, while, do-while, Jump statements: return, go to, break, continue, comments. Function, Call by value, Call by reference, arguments to main(), return statements, recursion, function prototypes, , preprocessor directives.

UNIT-IV**(6)**

Arrays: Single dimensional arrays, two dimensional arrays, multidimensional arrays, variable length arrays. Strings, array of strings. Structures: array of structures, passing structure to function, structure pointers, structure within structures. Unions, bit fields, enumerations.

UNIT-V**(8)**

Pointers: pointer variables, pointer operator, pointer expression, array of pointers, multiple indirection, pointers to functions, dynamic allocation functions.

File I/O : Streams and files, file system basics, fread, fwrite, fseek, random access I/O, fprintf(), fscanf(), standard streams.

Reference Book

- Gupta: Computer Concepts & C Programming, Comdex
- Jones, C Programming with problem solving, Wiley India
- Let Us C : Yashwant Kanetkar [BPB]
- Mastering C ,K.R.Venugopal,S.R.Prasad[TMH]
- Computer Science- A Structured Programming Approach Using C, by Behrouz
- A. Forouzan, Richard F. Gilberg, Thomson, [India Edition]

FUNDAMENTALS OF ELECTRONIC ENGINEERING (TEC-101/201)

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3	1	0

UNIT-1**Semiconductor materials and properties****(4)**

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

Basic concepts of energy bands in materials, concepts of forbidden gap Intrinsic and extrinsic semiconductors, donors and acceptors impurities

UNIT-2**Junction diode and diode applications****(5)**

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**(4)**

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

UNIT-3

Breakdown diodes

(4)

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

UNIT-4

Bipolar Junction Transistor

(5)

Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, concept of Biasing of transistors-fixed bias, emitter bias, potential divider bias

Transistor Amplifier

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, characteristics equation CG, CS and CD configurations, Introduction to self and fixed 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

(4)

Number systems, conversions of bases, Boolean algebra, logic gates, concept of universal gate, concept of K- Map

Operational Amplifiers

(4)

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

Reference Books:

1. R. K. Singh & Lal Kishor, Basic Electronics Engineering, B S Publication, Hyderabad.
2. Gaikwad, Basic Electronics, Wiley India
3. A Mottershead, 'Electronic devices and circuits'. PHI, 2000.
4. Morris Mano, 'Digital Computer Design', PHI, 2003.

BASIC TECHNICAL COMMUNICATION (THM -101)

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3	0	0

RELEVANCE OF TECHNICAL COMMUNICATION FOR TECHNOCRATS:

English Communication is an integral part of today's life. The advent of new technologies has led to the rapid development of a global village. A budding technocrat must be equipped with English language proficiency so that he / she can make a mark in this global village. Engineering students come from different backgrounds with different mother tongues. It is imperative for them to overcome their native accentual patterns and gain proficiency in speaking standard English. They also need to acquire optimum writing skills. Hence proper training in English speaking and writing is necessary. This goes hand in hand with the development of reading and listening skills. The course of Basic Technical Communication will help in the development and improvement of the communication skills and linguistic competence of engineering students.

OBJECTIVES:-

1. To help students perform better in all academic subjects through greater command over the English language.

2. To promote efficiency in English language with the development of the four skills of communication i.e., LSRW (Listening, Speaking, Reading and Writing).
3. To prepare students face the challenges of their professional lives in an increasingly globalised world.

UNIT – I: COMMUNICATION

- 1) Communication – Definition. Process of communication,
- 2) Types of communication—Verbal and Non-Verbal communication; Formal and Informal communication (grapevine) and their significance.
- 3) Barriers to Communication—Semantic barriers, Physical barriers, Psychological barriers, Interpersonal barriers and Organizational barriers. Language as a tool of communication.
- 4) Importance of communication with reference to students, professionals business etc.
- 5) Technical communication: Definition, Oral and Written technical communication. Difference between general writing and technical writing.
- 6) Computer-aided Technical Communication.
- 7) Style in Technical Communication. Features of technical writing.
- 8) Importance of Technical Communication

UNIT-2: READING SKILLS

- 1) Importance of Reading Skills, Types of Reading Skills, Methods of Improving Reading Skills, Objectives of Improving Reading Skills
- 2) Vocabulary Building: Antonyms, Synonyms, Homophones, Word formation (Prefixes and Suffixes). One Word substitution,
- 3) Jargon/Technical Terminology – Use of Jargon and examples of Jargon.
- 4) Paragraph: Definition. Requirements of a paragraph -- Understanding, Unity, Coherence and Emphasis in a paragraph. Identifying the Topic Sentence. Development of a Paragraph using Deductive order, Inductive order, Chronological Order (Time Order), Spatial Order (Space Order), Expository Order, Question and Answer Order, Comparison and Contrast Order. Devices used to impart Coherence and Emphasis in a Paragraph. Analysis of a given Paragraph in terms of Unity, Coherence and Emphasis.
- 5) Developing Reading Skills and Reading Comprehension through the study of thematic and value based critical reading of the following essays –
 1. Of Discourse by Francis Bacon
 2. Unity of Minds by Dr. A.P.J. Abdul Kalam

UNIT-3:- WRITING SKILLS.

- 1) Importance of Writing Skills, Types of Writing Skills, Methods for Improving Writing Skills, Objectives of Improving Writing Skills
- 2) Functional Grammar- Parts of Speech.
- 3) Common Grammatical Errors: Errors of Syntax, Concord etc.
- 4) Sentence and Paragraph construction. Writing Expository, Argumentative, Deductive etc. Paragraphs.
- 5) Précis Writing
- 6) Letter writing: Formal and Informal Letters.
- 7) Developing Writing Skills through the study of thematic and value based critical reading of the following short stories–
 1. After Twenty Years by O. Henry
 2. The Open Window by Saki (H.H. Munro)

UNIT 4:- LISTENING SKILLS

- 1) Importance of Listening Skills, Process of listening, listening and hearing, Active and Passive Listening. Types of Listening: Academic listening, Appreciative listening, Attentive Listening, Critical Listening, and Discriminative listening etc.
- 2) Methods for Improving Listening Skills, Objectives of Improving Listening Skills.
- 3) Barriers to listening: Semantic barriers, Physical barriers, and Psychological barriers.
- 4) Listening Comprehension: Identifying general content, Identifying specific information.
- 5) Listening for Note taking and drawing inferences.
- 6) Developing listening skills and listening comprehension through the study of thematic and value based critical reading of the following one-act play.

1. The Refund by Fritz Karinthy

7) Practice of Listening Skills through Language Laboratory

1. Listening to a recording of a telephone conversation for identifying specific information as well as details.
2. Listening to a recording of a railway / airport announcement for selective listening and identifying specific information.
3. Listening to a recording of a radio / television news bulletin for identifying specific as well as over-all information
4. Listening to a recording of the description of a place, event or incident for note-taking, identifying details, descriptions and overall idea.
5. Listening to a recording of a lecture / talk on for note taking and identifying facts and drawing conclusions.
6. Listening to a recording of a television panel discussion on any topic for identifying facts, analyzing those drawing inferences and explaining the conclusion of the discussion in a logical manner.
7. Listening to passages that are read out for practicing note taking and identifying general and detailed content.
8. Listening to dialogues that are read out for identifying specific, general and detailed content.

UNIT-5:- SPEAKING SKILLS.

- 1) Importance of Speaking Skills, Types of Speaking, Methods for Improving Speaking Skills, Objectives of Improving Speaking Skills
- 2) Organs of Speech, Mechanism of Speech.
- 3) Phonetics: Classification of English Sounds, Vowel (short vowels and long vowels), Consonants, Diphthongs, Phonemes, Allophones, Phonetic transcription.
- 4) Syllable: Definition, Types of Syllable. Monosyllabic, Polysyllabic words etc.
- 5) Stress, Rhythm, Intonation: Rising Tone, Falling Tone and Rising-Falling Tone.
- 6) Everyday Conversation: Tips and characteristics of a good conversation. Common manners and etiquette.
- 7) Debate, Making a speech, Role play,
- 8) Extempore, JAM Session (just a minute session).
- 9) **Practice of Speaking Skills through Language Laboratory**
 1. Practicing the following modules through self-learning software:
 - a. Grammar with special emphasis on Tenses
 - b. Pronunciation: of consonants, vowels, syllables and individual words
 - c. Word Stress: based on accentual patterns
 - d. Rhythm in speech based on content words and strong words
 - e. Intonation: rising, falling and rising-falling tone

- f. Pause groups
- g. Speech making / public speaking
2. Introducing self and others keeping in mind kinesics.
3. Common conversation practice (making small talk etc.).
4. Asking for permission.
5. Making requests.
6. Describing events / people / places
7. Extempore.
8. JAM Session (Just a Minute Session).
9. Role play
10. Holding informal discussions.
11. Logical presentation of one's views on a given topic.
12. Delivering a speech using Stress, Rhythm and Intonation.

Note: The two class tests for theory will be of 10 marks each and two class tests of Basic Technical Communication will be of 10 marks each so that the total marks for class test will be of 40 marks and 10 marks will be for tutorial/attendance/home assignments. The subject faculty is requested to send the class test marks indicating both for theory and lab separately.

(b) Kindly make following changes in the structure of B.Tech. Ist year syllabus. In the subject of THM 101 Basic Technical Communication indicate

SUGGESTED REFERENCES BOOKS:

- Kavita Tyagi & Padma Misra Basic Technical Communication, PHI, New Delhi
- Norman Lewis: Word Power Made Easy, W.R Goyal Pub. & Distributors.
- Rutherford A: Basic Communication Skills; Person Education, N. Delhi
- Joans Daniel: John Seely: English Pronouncing Dictionary, Cambridge The Oxford Guide to Writing and Speaking. OUP, Delhi
- Mohammad Aslam: Introduction of English Phonetics and Phonology Cambridge, Hyderabad
- Y Kameswari, Successful Career Soft Skills and Business English, BS Publications,

ENVIRONMENTAL STUDIES (TES -101/201)

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2	0	0

(8)

UNIT-1 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 forest 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 problems, changes caused by agriculture and over-grazing, 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 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 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 ecosystems :
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT- 3 BIODIVERSITY AND ITS CONSERVATION

(4)

- 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 and Ex-situ conservation of biodiversity.

UNIT- 4 ENVIRONMENTAL POLLUTION & SOCIAL ISSUES

(7)

- Definition
- Cause, 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
- Disaster management : floods, earthquake, cyclone and landslides.
- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.

REFERENCE BOOKS

- M Ajni Reddy, Text book of environmental Science, BS Publication, Hyderabad
- Environmental Studies by Daniel, Wiley India
- Environmental Studies by Erach Bharucha, University Press.
- Fundamental of Ecology, E.P.Odum, Cengage Learning.
- Environmental Science and Engineering by Wright, Pearson Publication.
- First Ecology by Beeby and Brennan, Oxford University Press.
- Environment Science by Miller, Cengage Learning, New Delhi.
- Hand book of Environmental laws, Rules, Guidelines, Compliances and Standards Vol. 1 & Vol. 2, Bharat Publication, New Delhi.

ENGINEERING DRAWING (PED 101/201)

1. Introduction

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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, Charoathar Publishing.
2. D A Hindoliya, Text book of Egg. Graphics, BS Publication, Hyderabad

WORKSHOP PRACTICE (PWS 101/201)

L	T	P
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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 tenon 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.

References:

1. Hajra, Bose, Roy: Workshop Technology Vol 1 & 2, Media Promotors
2. Raghuvanshi B.S.: Workshop Technology, Vol 1 & 2, Dhanpatrai

C PROGRAMMING LAB (PCS-101/201)

L	T	P
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List of Experiments

1. Practice of all internal and External DOS Commands
2. Practice of all UNIX commands and write simple shell script.
3. WAP to perform simple arithmetic operations using different data types.
4. WAP to swap two numbers without using third variable.
5. WAP to find out whether the given number is prime or not.
6. WAP using conditional operator to determine whether a year is leap year or not.
7. WAP to print the ASCII code and their equivalent characters.
8. WAP to print corresponding days of a week using switch case.
9. WAP to print factorial of a number using recursion.
10. WAP to print Fibonacci series using function.
11. WAP to print an array and find greatest element of the array.
12. WAP to arrange elements of a given array in ascending order.
13. WAP for Matrix multiplication and find the inverse of resultant matrix.
14. WAP to print name, price & no. of pages of 3 books using structures.
15. WAP to remove the trailing blanks in a string input by the user, and print the resulting string using pointer.

CHEMISTRY PRACTICALS (PCY 101/201)

L	T	P
0	0	2

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary & 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 indicator.
6. Determination of Acid & Base no. in lubricating oil by potentiometric method.
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. Determination of viscosity index of lubricating oil.
9. Determination of iron concentration in sample of water by colorimetric method. The method involves the use of KCNS as colour developing agent & the measurements are carried out at max 480nm.
10. Determination of heat of neutralization of Hydrochloric acid & Sodium hydroxide
11. Determination of flash & fire point of lubricating oil
12. Determination of Carbon residue of lubricating oil.
13. Determination of Sulphated ash of motor oil.
14. Determination of saponification value of lubricating oil & vegetable oil.
15. Separation of metal ions by paper chromatography.

Note :The general procedure of estimation is given on pp653-8 of the text book of Quantitative

MATHEMATICS-II (TMA-201)

L	T	P
3	1	0

Unit-1

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 the dependent and independent variables, Method of variation of parameters.

Unit-2

(10)

Laplace Transform

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

Unit-3

(8)

Infinite Series

Introduction, Sequences, Series: Convergence, Series of positive terms, Comparison tests, Integral tests, Comparison of ratios, D'Alembert ratio test, Raabe's test, Cauchy root test, Alternating series: Leibnitz rule, Power series, Uniform convergence, Weierstrass's M-test, Properties of uniformly convergent series.

Unit-4

(8)

Fourier Series and Partial Differential Equations

Periodic functions, Trigonometric series, Fourier series of periodic function, Euler's formula, Functions having arbitrary period, Change of intervals, Even and odd functions, Half range sine and cosine series.

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

Unit-5

Applications of Partial Differential equations

(8)

Method of separation of variables for solving partial differential equations, One dimensional wave equation, Laplace equation in two dimensions, Heat conduction equations of one dimension and two dimension.

References:

1. A Text book of Engineering Mathematics (Vol.2) by Peter V. O'Neil, Cengage Learning.
2. B. S. Grewal: Higher Engineering Mathematics, *Khanna Publications*.
3. C. Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya.
4. E. Kreyszig: Advanced Engineering Mathematics, Wiley Eastern.
5. M.D. Raisinghania: Ordinary & Partial Differential Equations, S. Chand Publication.

ADVANCED TECHNICAL COMMUNICATION (THM-201)

L	T	P
3	0	2

UNIT 1 : TECHNICAL COMMUNICATION

1. Introduction to technical communication, types of technical communication, history of the development of technical communication.
2. Difference between general and technical communication, importance of technical communication.
3. Characteristic features of technical communication. Elements of style in technical communication.
4. Process of preparing a technical document.
5. Elements, features and objectives of scientific articles, research papers, dissertation and thesis.

UNIT 2:-BUSINESS COMMUNICATION

1. Importance and Features of Business Communication
2. Business Correspondence – Principles, Features, Types, Format and layout of Business letter.
3. Types of Business Correspondence – letters of Enquiry, Quotation, Order, Instructions, Sales, Credit, Complaint, Collection etc.
4. Some more types of Business Correspondence -- Notice, Agenda, Minutes, Memorandum.
5. Job Application letters -- Covering letter, Resume, Bio-data and C.V.

UNIT 3:- TECHNICAL PROPOSAL and TECHNICAL REPORT

1. Technical Proposal – Introduction, purpose, features, types, format, importance, process of preparation. Writing technical proposals.
2. Technical Report -- Features, Types, Style, Format, Relevance. Writing Technical Reports.

UNIT 4:-LITERATURE

1. Critical reading and thematic, value-based study of the Novella, '**Animal Farm**' by George Orwell.
2. Critical review, study of theme, plot, symbolism, characterization, style of writing etc.

UNIT 5:- SOFT SKILLS

This unit should be covered in classroom teaching as well as judicious use of language lab, (There should be optimum use of software's related to accent, presentation skills etc.)

1. Kinesics, Para language, Proxemics.
2. Presentation skills - Features, Types, Structure, Aids and Importance.
3. Interpersonal communication skills – Role of Personality and its various attributes like EQ, attitude, motivation, stress management and accepting criticism in determining efficacy of interpersonal communication.
4. Corporate communication skills – Role of business etiquette, conducting meetings, managing conflict, negotiation, team spirit, decision-making, time management and problem solving skills.
5. Group Discussion skills - Features and Importance

6. Facing Interviews - Interview Tips.

❖ **Practice of Soft Skills using Language Laboratory**

1. Practicing the following modules through self-learning software:

- a. Pronunciation: of consonants, vowels, syllables and individual words
 - b. Word Stress: based on accentual patterns
 - c. Rhythm in speech based on content words and strong words
 - d. Intonation: rising, falling and rising-falling tone
 - e. Pause groups
 - f. Presentation skills
2. Participating in Mock Interviews
 3. Participating in Group Discussions
 4. Giving Presentations keeping in mind Kinesics, Para language, and Proxemics
 5. Participating in Role Play for enhancing interpersonal and corporate communication skills

REFERENCE BOOKS

- Kavita Tyagi & Padma Misra, Advance Tech. Communication, PHI, New Delhi
- Gupta Advanced Technical Communication, Cambridge University Press, N. Delhi
- George Orwell Animal Farm, Penguin Publishing Company, N. Delhi
- Sharma & Mohan Business Correspondence and Report Writing, TMH, N. Delhi.
- Rubens Science & Technical Writing, Foundation books, Cambridge, N. Delhi
- Raman & Sharma Technical Communication, Cengage Learning, N. Delhi
- Wallace, Masters Personality Development, Cengage Learning, N. Delhi
- Robert Barrass Students Must Write, Foundationbooks, Cambridge, N. Delhi
- Bhaskar Rao, Successful Career Soft Skills and Business English, BS Publications, Hyderabad
- Chakrawarthy: Soft Skills for Professionals, Wiley India

