

SCHEME OF EXAMINATION

&

SYLLABI

for

**B.Tech Ist Year (Common to All B.Tech Courses)
(Effective from the session: 2009-2010)**



Uttarakhand Technical University, Dehradun

UTTRAKHANDTECHNICAL UNIVERSITY, DEHRADUN
STUDY AND EVALUATION SCHEME
B.Tech Ist Year (Common to All B.Tech Courses)
(Effective from the session: 2009-2010)

Year: I, Semester-1

S.No	Course Code	Subject	Periods			EVALUATION SCHEME					CRE DIT
						SESSIONAL EXAM			Exter nal Exam.	Subje ct Total	
			L	T	P	CT	TA	Total			
1	TMA 101	Mathematics - I	3	1	0	30	20	50	100	150	4
2	TPH 101 / TCY 101	Engg,Physics / Engg.Chemistry	3	1	0	30	20	50	100	150	4
3	THM 101	Basic Technical Communication – I	3	1	0	30	20	50	100	150	3
4	TEE 101 / TME 101	Basic Electrical Engineering / Mechanical Engineering	3	1	0	30	20	50	100	150	4
5	TCS 101 / TEC 101	Fundamentals of Computer & Programming / Fundamentals of Electronic Engineering	3	1	0	30	20	50	100	150	4
*	TES 101	Environmental Studies	2	0	0	-	-	-	-	-	-
Practicals											
1	PPH 101 / PCY 101	Physics / Chemistry	0	0	2	-	-	25	25	50	2
2	PEE 101 / PME 101	Basic Electrical Engineering / Mechanical Engineering	0	0	2	-	-	25	25	50	2
3	PCS 101 / PEC 101	Fundamentals of Computer & Programming / Fundamentals of Electronic Engineering	0	0	2	-	-	25	25	50	2
4	PWS 101/PED 101	Workshop Practice / Engineering Drawing	0	0	2	-	-	25	25	50	2
TOTAL			-	-	-					950	27

UTTRAKHANDTECHNICAL UNIVERSITY, DEHRADUN
STUDY AND EVALUATION SCHEME
B.Tech Ist Year (Common to All B.Tech Courses)
(Effective from the session : 2009-2010)
Year: I, Semester-II
UTTRAKHANDTECHNICAL UNIVERSITY, DEHRADUN

S.No	Course Code	Subject	Periods			EVALUATION SCHEME					CRE DIT
						SESSIONAL EXAM			Exter nal Exa m.	Subj ect Tota l	
			L	T	P	CT	TA	Total			
1	TMA 201	Mathematics - II	3	1	0	30	20	50	100	150	4
2	TCY 201 / TPH 201	Chemistry / Physics	3	1	0	30	20	50	100	150	4
3	THM 201	Professional Communication – II (Technical Writing)	3	1	0	30	20	50	100	150	3
4	TME 201 / TEE 201	Basic Mechanical Engineering / Electrical Engineering	3	1	0	30	20	50	100	150	4
5	TEC 201 / TCS 201	Fundamentals of Electronic Engineering / Fundamentals Computer & Programming	3	1	0	30	20	50	100	150	4
*	TES 201	Environmental Studies	2	0	0	30	20	50	-	50	-
Practicals											
1	PCY 201 / PPH 201	Chemistry / Physics	0	0	2	-	-	25	25	50	2
2	PME 201 / PEE 201	Basic Mechanical Engineering / Electrical Engineering	0	0	2	-	-	25	25	50	2
3	PEC 201 / PCS 201	Fundamentals of Electronic Engineering / Fundamentals Computer & Programming	0	0	2	-	-	25	25	50	2
4	PED201/PWS 201	Engineering Drawing / Workshop Practice	0	0	2	-	-	25	25	50	2
		TOTAL	-	-	-	-	-			1000	27

MATHEMATICS –I (TMA101)

L T P
3 1 0

UNIT-1

Matrices

10L

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

9L

Leibnitz theorem, Partial Differentiation, Euler's theorem, Change of variables, Expansion of functions of several variables.

UNIT-3

Differential Calculus -II

9L

Jacobian, Approximations and errors, Extrema of functions of several variables, Lagrange method of multipliers

UNIT-4

Multiple Integrals

6L

Double and triple integrals, Change of order, Change of variables, beta and gamma functions, Application to area, volume, Dirichlet integral and applications.

Vector Calculus

6L

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:

- A Text book of Engineering Mathematics (Vol.1) by Peter V. O' Neil, Cengage Learning.
- Shanti Narayan: A Text Book of Matrices, *S. Chand & Company*.
- C. Prasad: Mathematics for Engineers, *Prasad Mudralaya*.
- E. Kreyszig: Advanced Engineering Mathematics, *Wiley Eastern Publications*.
- B. S. Grewal: higher Engineering Mathematics, *Khanna Publications*.
- N. Piskunov: Differential & Integral Calculus, *Moscow Peace Publications*.

ENGINEERING PHYSICS (TPH-101/201)

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3 1 0

UNIT-I

(8L)

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

(8L)

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 nSlit Diffraction, Diffraction Grating, Raleigh's Criterion of Resolution, Resolving Power of Grating.

UNIT-III

(7L)

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

(8L)

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.

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

(9L)

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:

- Concepts of Modern Physics, Beiser (Mc-Graw Hill)
- Introduction to Special theory of Relativity Robert Resnick - Wiely
- Optics, Ajoy Ghatak (TMH)
- Physics of Atoms, Wehr Richards & Adiaiv
- Lasers, O, Svetto
- Introduction to Electrodynamics, David J. Griffith (PH I)
- Engineering Electromagnetics. William Havt. 7th Ed.(TMH)

- Solid State Physics ,C. Kittel, 7th edition (Wiley Eastern)
- Solid State Physics,A.J. Dekker

ENGINEERING CHEMISTRY (TCY -101/201)

L T P
3 1 0

UNIT – I GENERAL & ORGANIC CHEMISTRY

8 L

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, hyperconjugation, 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 L

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, Poly propylene, 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 L

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 L

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

REFERENCE BOOKS

- Engineering chemistry by Sivasankar, TMH, New Delhi.
- Engineering Chemistry by H.K. Chopra & A. Parmar, Narosha Publishing House, New Delhi.
- Engineering chemistry by Gurtu & Singhal, Pragati Prakashan, Meerut.
- Engineering Chemistry by R.P. Mani & K.N. Mishra, Cengage learning India Pvt. Ltd. Delhi
- Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co., New Delhi.
- Physical Chemistry by Atkin's, Oxford University Press.
- Organic Chemistry by Morrisson & Boyd, Pearson Publication.
- Organic Chemistry by Loudon, Oxford University Press.
- Concise Inorganic Chemistry by J.D. Lee, Wiley – India.

- Chemistry concepts and applications by Steven S.Zumdahl from Cengage Learning India Pvt. Ltd., New Delhi.

BASIC ELECTRICAL ENGINEERING (TEE101/201)

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MECHANICAL ENGINEERING

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FUNDAMENTALS OF COMPUTER & PROGRAMMING (TCS 101/201)

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UNIT-I

8L

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

8L

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

10L

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

6L

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

8L

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

- Computer Basics and C Programming, V.Rajaraman,[PHI]
- Let Us C : Yashwant Kanetkar [BPB]
- Pradeep K.Sinha and Priti Sinha, “Computer Fundamentals: Concepts, Systems and Applications”, BPB Publications
- Mastering C ,K.R.Venugopal,S.R.Prasad[TMH]
- Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard E. Gilberg, Thomson, (India Edition)

FUNDAMENTALS OF ELECTRONIC ENGINEERING (TEC 101/201)

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UNIT-1

Semiconductor materials and properties

4L

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

4L

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

6L

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

4L

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

UNIT-4

Bipolar Junction Transistor

5L

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

4L

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

6L

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

4L

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

Operational Amplifiers

4L

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

Reference Books:

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.
4. R.K. Singh & Ashish, Basic Electronics Engg. Laxmi Publication, 2007.
5. Milman & Halkias, Integrated electronics Electronics, PHI, 2005.

BASIC TECHNICAL COMMUNICATION (THM 101)

L T P
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.

SUGGESTED REFERENCES BOOKS:

- Rizvi: Effective Technical Communication, TMH, New Delhi
- Arora & Chandra Improve your Writing, OUP, New Delhi.
- Hornby A.S: Guide to Patterns & Usage in English; OUP, New Delhi.
- Suresh Kumar & Sreehari A Handbook for English Language, Cambridge
- Norman Lewis: Word Power Made Easy, W.R Goyal Pub. & Distributors.
- Ruther Ford A: Basic Communication Skills; Person Education, N. Delhi
- Michael Swan: Practical English Usage; OUP, New Delhi.
- Joans Daniel: English Pronouncing Dictionary, Cambridge
- John Seely: The Oxford Guide to Writing and Speaking. OUP, Delhi
- Mohammad Aslam: Introduction of English Phonetics and Phonology Cambridge

ENVIRONMENTAL STUDIES (TES 101/201)

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2 0 0

UNIT-1 NATURAL RESOURCES :

8 L

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 L

- 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 L

- 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.

- 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 BOOK

- Environmental Studies by Erach Bharucha, University Press.
- Environmental studies by R. Rajagoplan, Oxford University Press.
- Environment Science & Ethics Singhal, Singhal & Aggarwal, Pragati Prakshan, Meerut.
- Environmental Studies by Anubha Kaushik & C.P. Kaushik, New age International Publisher.
- Environmental Science by Santra, N.C.B.A, Calcutta.
- Environment and Ecology by Deeksha Dave and S.S. Katewa, Cengage Learning, New Delhi.
- Environmental Studies by Daniel's, Wiley India.
- Fundamental of Ecology, E.P.Odum, Cengage Learning.
- Environmental Science and Engineering by Wright, Pearson Publication.
- Environmental Engineering by Vasilind, Cengage Learning, New Delhi.
- First Ecology by Beeby and Brennan, Oxford University Press.
- Environment Science by Miller, Cengage Learning, New Delhi.
- Introduction to Environmental Engineering and Science by G.M. Masters, Prentice Hall India Pvt. Ltd.
- Hand book of Environmental laws, Rules, Guidelines, Compliances and Standards Vol. 1 & Vol. 2, Bharat Publication, New Delhi.

ENGINEERING DRAWING (PED 101/201)

L T P
0 0 2

1. Introduction

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.

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

WORKSHOP PRACTICE (PWS 101/201)

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.

Reference:

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\PCS201)

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 (CPY 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 λ_{max} 480nm.

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. 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.

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

Laplace Transform

10

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

Infinite Series

8

Introduction, Sequences, Series: Convergence, Series of positive terms, Comparison tests, Integral tests, Comparison of ratio's, 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

Fourier Series and Partial Differential Equations

8

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.