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**Communication Skills (101)/(DIP-101)**

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| **CO1** | Learn to make communication effective**.** Use appropriate Determiners, Prepositions, Auxiliary verbs, and subject-verb agreement in the given situations. |
| **CO2** | Write short answers to the questions based on specified Passages and Short Stories. Form corrects sentences using new words in the specified Passages |
| **CO3** | Define communication Describe Communication Process and its types. |
| **CO4** | Writing paragraphs of 150 words on topics of general interest i.e. pollution, ragging in college, importance of computers, and importance of communication skill. |
| **CO5** | Develop paragraphs on any four topics from the specified list. |

**COURSE CONTENTS:**
**UNIT I COMMUNICATION PROCESS AND ITS NEEDS**:
How to make communication effective Barriers in communication, Removal of barriers Grammar and vocabulary for correct English usage. Determiners, Prepositions, Auxiliary verbs and subject-verb agreement Rewrite as directed (change voice, correct form of verbs/ tenses)Vocabulary One word substitution, words often misused and wrongly spelt.
**UNIT II PASSAGES OF COMPREHENSION:**
Prescribed passages six from existing syllabus: Language of Science, Desalination, Desalting Process Safety Practices: Non-conventional Sources of Energy, Our Environment Entrepreneurship
**UNIT III BUSINESS COMMUNICATION:**
Writing summary, moral and characterization of any one story from the book prescribed. Principles of effective business correspondence Its parts, mechanics, styles and forms Application for job, Biodata and C.V.Letter of Enquiry Placing order Complaint.
**UNIT IV COMPOSITION & TRANSLATION:**
Writing paragraphs of 150 words on topics of general interest i.e., pollution, ragging in college, importance of computers, importance of communication skill, importance of science and technology etc. Translation (Hindi to English and vice- versa).
**UNIT V UNSEEN PASSAGES & PRECIS WRITING**:

i Answer the questions based on the passage.
ii Give suitable title
OR
iii Writing Precis

**Reference Books: -**


1. English Conversation Practice- Grant Taylor
2. Practical English Grammar - Thomson & Martinet
3. Communication Skills for Technical Students Book – I, Book –II M/S Somaiya Publication, Bombay
4. Living English Structure S.Allen
5. English Grammar, Usage, and Composition
6. Tickoo& Subramanian, S. Chand & Co. Standard AllenLongman.

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**Physics (102)/(DIP-102)**

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Able to make physical measurements with accuracy by minimizing different types of errors. |
| **CO-2** | Analyze and Differentiate different type of Motions. Evaluate speed in circular motion. Also able to describe waves and ultrasonic waves and engineering, medical and industrial applications |
| **CO-3** | Enable to understand the properties of matter and heat related phenomenon. |
| **CO-4** | Enable to understand Heating effect of electriccurrent. Aslo able to understand electrostatics and the function of capacitors. |
| **CO-5** | Able to illustrate the conditions for light amplification in various LASER and laser based instruments and optical devices. |

**COURSE CONTENTS:**

**UNIT I UNITS & MEASUREMENT**:
Fundamental and derived units, Scalar and vector, Basic requirements to represent vector, Symbols, abbreviation and proculation, Linear measurement by vernier calipers, screw gauge and spherometer, Angular measurement by angular vernier.

**UNIT II MOTION AND WAVE MOTION:**
Motion and its type, Linear motion (laws and equation), Circular motion, Angular velocity and relation with linear velocity, Centripetal acceleration, Centripetal and Centrifugal forces, Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration, Kinetic energy of rotation.
Wave motion, transverse and longitudinal waves with examples, Sound and light waves and their properties, Ultrasonic, Audible range, Production of ultrasonic, properties and uses.

**UNIT III PROPERTIES OF MATTER:**
Elasticity: Meaning, definition, stress, stain, Hook's law and elastic limit**,** Surface Tension: Meaning, definition, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method. Viscosity: Meaning, definition, streamline and turbulent flow, critical velocity, Stoke's law.

**UNIT IV : HEATING EFFECT OF CURRENT AND THERMOELECTRICITY & ELECTROSTATICS:**
Heating effect of electriccurrent: Joule's law, work energy and power in electric circuit, calculation of electric energy,
Thermoelectricity: Seeback effect and thermoelectricpower, Neutral temperature, temperature of inversion and relation between them, Thermo electric thermometer and thermocouples.
Coulomb's law, Electricfield intensity, potential.

Capacity, principle of capacitor, types of capacitor, combination of capacitors

**UNIT V MODERN PHYSICS:**

Semiconductors, Types of semiconductors Explanation of conductor, semiconductor and insulators on the basis of bandtheory, P-N junction, diode as rectifier

Lasers: Energy levels, spontaneous and stimulated emission; population inversion, pumping methods, Types of lasers; Ruby and He-Ne laser characteristics, engineering and medical applications of lasers.

Fiber Optics: Introduction to optical fibers, , critical angle and total internal reflection, light propagation, acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors.

**Reference Books: -**


1. Applied Physics Vol. 1 &2,Saxena And Prabhakar
2. Physics, Ttti Publication
3. Physics Vol. 1 &2Halliday And Resnicr
4. Engineering Physics,Gaur And gupta
5. Principle Of physics, Brijlal & Subramanyan


**List of suggestive core experiments: -**

1. Refractive index of prism (I-d ) curve
2. Refractive index of prism (spectrometer)
3. Focal length of a convex lens by u-v method
4. Focal length of a convex lens by displacement method
5. Verification of Ohm's law
6. To find out unknown resistance by meter bridge
7. To find out internal radius of hollow tube by vernier calipers.
8. To find out volume of given cylinder by screw gauge.
9. Surface tension by Capillary rise method.
10. Coefficient of viscosity
11. Coefficient of Thermal conductivity by searl's method.
12. Verification of Newton's cooling law.

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**Mathematics (103)/(DIP-103)**

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Describethealgebraicprocesserstosolveaboveequationsbymeansofdifferentconcepts. |
| **CO-2** | Determine the identities of trigonometry and solve the problems. |
| **CO-3** | Explaintwo-dimensionalco-ordinategeometryfromconceptofpointup-tostraight Lines and solve its problems. |
| **CO-4** | Analyze the data by means of statistical processes. |
| **CO-5** | Explaintheconceptsofcalculus,derivediffernetmethodsofdifferentiationand Integration and solve its problems. |

**COURSE CONTENTS:**
**UNIT I ALGEBRA**:
Permutation Meaning of factorial n Permutation of 'n' dissimilar thing taken 'r' at a time, Combination: Combination of n dissimilar things taken 'r' at a time, Binomial Theorem: Statement of the theorem for positive integer General Term, Middle term, Constant term, Partial Fractions: Define a proper-improper fraction, break a fraction into partial fraction whose denominator contains Linear, Repeated linear and Non repeated quadratic factors. Determinant: Concept & principles of determinants, Properties of determinant, Simple examples. Comp ex Numbers: Algebra of Complex Numbers, Polar form.
**UNIT II TRIGONOMETRY:**
Allied angles: Trigonometrically ratios of sum and difference of angles,(Only statement), Sum and difference of trigometric ratios (C-D formula), Multiple angles (Only double angle and half angle)**,** Properties of triangle (without proof).
**UNIT III MATRIX:**
Definition of Matrix. Types of Matrix, Row, Column, Square, Unit, Upper and lower triangular, Symmetric & Skew Symmetric, Singular and non-Singular**,** Matrices: Ad joint of a Matrix, Inverse of a Matrix.
**UNIT IV CO-ORDINATE GEOMETRY:**
Co-ordinate System: Cartesian and Polar, Distance, Division, Area of a triangle, Locus of a point and its equation, Slope of St. Line Angle between two St. lines, Parallel and perpendicular Stlines, Standard and general equation of Stline, Point of intersection of two st lines.
**UNIT V STATISTICS:**
Measures of Central tendency (Mean, Mode, Median), Measures of Dispersion (Mean deviation, standard deviation), **DIFFERENTIAL CALCULUS:** Define constant, variable, function, Value of the function, Concept of limit of a function, **INTEGRAL CALCULUS:** Definition as a inverse process of differentiation, Standard Results (including inverse function), **VECTOR ALGEBRA:** Concept of Vector and Scalar Quantities, Different types of vectors, Addition and subtraction of vectors.

**Reference Books: -**


1. Mathematics for Polytechnics Vol. I andII, Prepared by T.T.T.I. Bhopal
2. Differential Calculus,Gorakh Prasad.
3. Integral Calculus, GorakhPrasad
4. Co-ordinate Geometry, S.L.Loni
5. Engineering Mathematics (M.P. Hindi GranthAkadami),Dr. S.K. Chouksey& ManojSingh
6. Mathematical Statistics, Ray andSharma
7. Higher Engineering Mathematics, B.S. Grewal

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**Computer Fundamentals and Its Application (104)/(DIP-104)**

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Understand the general computer organization and various i/o devices. |
| **CO-2** | Learn evolution of computer and classification of computer system and its applications. Decimal, Binary, Octal, Hexadecimal number |
| **CO-3** | Understand Software, programming languages, and language classification. Learn ASCII, Unicode, and Data representation- Bit, Nibble, Byte, KiloByte, MegaByte, GigaByte, TeraByte, PetaByte. |
| **CO-4** | Outline concept of operating system and office software. |
| **CO-5** | Understand the concept of various system security threats. |

**COURSE CONTENTS:**
**UNIT I COMPUTER ORGANIZATION**:
Block Diagram of computer system: Central Processing Unit, Memory Unit, ALU, Control unit, Input & Output devices. Keyboard, Mouse, printers and its types, Card Readers, Bar Code Readers, OCR, OMR, MICR , Web Camera, Microphone, Joystick, Plotters, Monitors and its types: Short Notes on CRT, TFT, LCD ,LED, Plasma monitors, Projector, Speaker.
**UNIT II EVOLUTION AND GENERATION OF COMPUTER SYSTEMS:**
Computer System Characteristics and capabilities: Speed, Accuracy, Reliability, Memory Capabilities, Repeatability, Types of Computers & its applications: Analog, Digital & Hybrid, General & Special Purpose Computer, Application of computer system Computer Generations & Classification of Computer Systems: Short Note on Micros, Minis, Mainframes & Supercomputer .
**UNIT III CODES & DATA REPRESENTATION:**
Codes used for information exchange between computers–ASCII, Unicode, Data representation- Bit, Nibble, Byte, Kilobyte, Megabyte, GigaByte, TeraByte, PetaByte etc. COMPUTER SOFTWARES & LANGUAGE: System Software V/s Application Software. Types of System Software, Operating System, Loader, Linker, Language Processor, Assembler, Compiler and Interpreter
**UNIT IV STORAGE DEVICES & COMPUTER NETWORK:**
Storage Fundamentals, Primary & Secondary Storage. RAM, dynamic and static ROM, PROM,EPROM, EEPROM, Tape storage Devices, Characteristics & limitations, Floppy & their types. Direct access Storage– Hard Disk, Disk Cartridges, Mass Storage Device Optical Disk, CD Rom, DVD, flash drive, ZIP drive, Computer network basics: Topologies and its types: BUS, RING MESH, TREE, Transmission Media and its types: Guided Media (Wired Media), Unguided Media (Wireless Media), OSI model and its layer
.
**UNIT V CONCEPT OF OPERATING SYSTEM:**
Introduction, Functions of operating system, Types –batch, single user, multiuser, multiprogramming, multitasking, multithreading, Realtime, embedded, Network, Distributed, CLI (Command Line Interface) and GUI modes of O.S. Booting Process, BIOS, POST,

Bootstrap Loader. **SYSTEM SECURITY:** Introduction to viruses, worms, Trojans, Antivirus scanning & Removal of Viruses, Safety measures- Firewall, updates, Patches.

**Reference Books: -**


1. Fundamentals of Computers: Balaguruswamy, Tata MacGraw hills.
2. Computer Today: S K Basandra,Galgotia Publications.
3. Digital Computer Fundamentals: Bartee, Thomas.C, Tata MacGrawhills.


**List of suggestive core experiments: -**

1. Study the uses of input and outputdevice
2. study the uses of storagedevices
3. Backup of data on tape, floppy & hard disk, CD, DVD and in PENdrive
4. use of windows media player, recording, editing playing sound and video files.
5. MICRO-SOFT DISK OPERATING SYSTEM (MS-DOS): System files: BIOS, COMMAND.COM, CONFIG.SYS, Autoexec.batfile.
6. MS-DOSCOMMANDS
   - ✓ Internal Commands – dir, cd, md, rd, del, ren, date, time, vol &copy
   - ✓ External commands – Sys, format, edit, find,diskcopy,Xcopy, backup &restore
7. PRACTICE ON WINDOWS 2000/XP/Vista
   - ✓ Starting Windows, Exploring the desktop, Arranging windows, My Computer, The start button,
   - ✓ Creating Shortcuts, Practice on moving and sizing of windows.
   - ✓ Practice on Windows Explorer
   - ✓ File organization: creating, copying, moving, renaming, and deleting and use of recyclebin.
   - ✓ Practice on Windows Accessories – Notepad, WordPad and Paint, Character Map.
   - ✓ Creating editing, formatting, previewing and printing documents using WordPad.
   - ✓ Shutting down windows.
8. PRACTICE ONMS-WORD
   - ✓ Creating editing, formatting, saving, previewing and printing documents.
   - ✓ Auto Text, AutoComplete, AutoCorrect, grammar and spellchecker, Find and replace of text.
   - ✓ Insert, modify table.
   - ✓ Mail merge, Macro, Hyperlink
   - ✓ Header, footer, Watermark.
9. PRACTICE ON MICROSOFTEXCEL
   - ✓ Creating editing, formatting, saving, previewing and printing worksheet.
   - ✓ Use of formula and functions.
   - ✓ Split windows and freeze pans.
   - ✓ Create, edit, modify, print worksheet/charts.
   - ✓ Import & Export Data &worksheet
   - ✓ Pivot table- create, modify
   - ✓ Sorting &Filter data
   - ✓ Header, footer, Watermark.
10. PRACTICE ONPOWERPOINT
    - ✓ Create, edit, insert, move, slides.
    - ✓ Open and save presentation.
    - ✓ Insert Object, picture, Diagram, chart, Table, Movie &Sound, Hyperlink
    - ✓ Slide design, layout, background.

- ✓ slide show, setup, action button, animation scheme, custom animation, Slide transition and materslide.

**11.** PRACTICE ON Internet

- ✓ Connecting to internet
- ✓ Web browsing
- ✓ Searching websites
- ✓ Email services
- ✓ Creating email accounts & sending and receiving e-mails with or without attachments.

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**Basic Mechanical Engineering (105)/(DIP-105)**

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Identify engineering materials, their properties. |
| **CO-2** | Understand basics of thermodynamics and concept of pump, heat engines and boiler operation |
| **CO-3** | Understand functions and operations of reciprocating machine like engine. |
| **CO-4** | Understand of fundamentals of fluid mechanics, fluid properties. |
| **CO-5** | Understand of functions & manufacturing operations. |

**COURSE CONTENTS:**

**UNIT-I: Material Science**
Material science: Classification of engineering material, Mechanical properties like strength, hardness, toughness , ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials ,Hooks law and modulus of elasticity, Basic numerical on hooks law, Hardness and Impact testing of materials ,BHN.

**Unit-II: Thermodynamics and Energy Systems**
Fundamentals of thermodynamics: Study of heat, work, and energy transfer, types of Systems, thermodynamic equilibrium, Properties, State, Process and Cycle, Elementary introduction to Zeroth, First and Second laws of thermodynamics (Kelvin-Planck and Clausius Statements). Classification of Boilers, Boiler Mountings & accessories. (only working ) Babcock & Wilcox, Cochran Boilers.

**UNIT III : Reciprocating Machines :**
Working principle of steam Engine, Carnot cycles, Otto cycles, P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. Basic numerical on Carnot cycles, Otto cycles (only).

.**UNIT IV : Fluid Mechanics and Hydraulics**
Fundamentals of fluid mechanics, fluid properties pressure, density and viscosity etc. Types of fluids, Newton's law of viscosity, Pascal's law, Bernoulli's equation for incompressible fluids & numerical, working principle of Hydraulic machines such as pumps, turbines.

**UNIT V- Manufacturing Process & Measurements:**
Fundamentals of manufacturing process such as casting, Types welding (gas & arc) . Lathe and drilling m/c with their various operations. Measurement: Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.

**Reference Books:**

1. Basic Mechanical Engineering – M.P. Poonia & S.C. Sharma, Khanna Publishing House, Delhi
2. Elements of Mechanical Engineering – M. L. Mathur, F. S. Mehta and R. P. Tiwari, Jain Brothers,
New Delhi
3. Engineering Heat Transfer – Gupta & Prakash, Nem Chand & Brothers, New Delhi
4. Workshop Technology (Vol. 1 and 2) – B. S. Raghuvanshi, Dhanpath Rai and Sons, New Delhi.
5. Basic Mechanical Engineering – J Benjamin Elements of Mechanical Engineering – Roy and Choudhary
6. Engineering Thermodynamics – Spalding and Cole

## BME –DIPLOMA 1ST YEAR

### List of suggestive core experiments

Theory related experiments including core experiments as follows:

1- Study of Universal Testing machines.

2- Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and Sine-bar.

3- Study of Lathe Machine.

4- Study of Drilling Machines.

5- Verification of Bernoulli's Theorem.

6- Study of various types of Boilers.

7- Study of different IC Engines.

8- Study of different types of Boilers Mountings and accessories.

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## Engineering Workshop Practice (106)/(DIP-106)

**COURSE OUTCOMES:**
**After Completing the course student should be able to:**

| | |
|---|---|
| CO1 | Use various carpentry tools in performing carpentry shop operation. |
| CO2 | Use various tools in performing fitting shop operations. |
| CO3 | Apply the Arc and Gas welding technique performing basic fabrication work |
| CO4 | Operate, control different machines and equipment's adopting safety practices |
| CO5 | Use various foundry tools in preparation of mould and castings. |

***Course Content:***

| S.No. | List of suggestive core experiments: - |
|---|---|
| I | **Carpentry**: i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like planning, marking, chiselling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc. |
| II | **Fitting:** i) Demonstration of different fitting tools and drilling machines and power tools ii) Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc |
| III | **Welding:** i) Demonstration of different welding tools / machines. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint |
| IV | **Sheet Metal Working:** i) Demonstration of different sheet metal tools / machines. ii) Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting. iii) One simple job involving sheet metal operations and soldering and riveting. |
| V | **Foundry:** Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns. Moulding: Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns. |

**Reference Books:**


1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York

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**Disaster Management (107)/(DIP-107)**

**COURSE CONTENTS:**
Students must be able to know about different types of disasters