BHAGWANT UNIVERSITY
Sikar Road, Ajmer
Rajasthan

Syllabus
(Yearly)

Institute of Engg. & Technology
Diplomа
(Common for All Branches)

1st YEAR

Subject Code	Subject Name	Hours Per Week				Distribution of Maximum Marks					
						University Exam			Practical Exam		
		L	T	P	Total	Internal	External	Total	Internal	External	Total
01DYCB101	ENGLISH	2	-	-	2	30	70	100	-	-	-
01DYCB102	APPLIED PHYSICS	2	-	-	2	30	70	100	-	-	-
01DYCB103	APPLIED CHEMISTRY	2	-	-	2	30	70	100	-	-	-
01DYCB104	COMPUTER & INFORMATION TECHNOLOGY FUNDAMENTALS	2	-	-	2	30	70	100	-	-	-
01DYCB105	APPLIED MATHEMATICS	3	1	-	4	30	70	100	-	-	-
01DYCB106	APPLIED MECHANICS	3	1	-	4	30	70	100	-	-	-
01DYCB201	COMMUNICATION TECHNIQUE LAB	-	-	2	2	-	-	-	50	-	50
01DYCB202	PHYSICS LAB	-	-	2	2	-	-	-	50	-	50
01DYCB203	CHEMISTRY LAB	-	-	2	2	-	-	-	50	-	50
01DYCB204	COMPUTER PROGRAMMING LAB	-	-	2	2	-	-	-	50	-	50
01DYCB205	APPLIED MECHANICS LAB	-	-	2	2	-	-	-	50	-	50
01DYCB206	ENGINEERING DRAWING	-	-	4	4	-	-	-	50	100	150
01DYCB207	WORKSHOP PRACTICE	-	-	2	2	-	-	-	50	100	150
01DYCB208	ELECTRICAL & ELECTRONICS LAB	-	-	4	4	-	-	-	50	100	150
01DYCB301	DISCIPLINE & EXTRA-CURRICULAR ACTIVITIES			2	2	-	-	-	-	-	50
TOTAL		**14**	**2**	**20**	**36**	**180**	**420**	**600**	**400**	**300**	**700**

Grand Total Marks - 1300

01DYCB101 **ENGLISH**

Unit- 1
Narration, Voice, Basic Sentence Patterns. (Nine basic sentence patterns)

Unit- 2
Transformation of Sentences, Determiners, Preposition.

Unit-3
Tenses, Common errors (noun, Pronoun, Articles. Adverb, Punctuation, Preposition etc.)

Unit-4
Modals in Conversational Usage, Prefix, Suffix, Idioms & Phrasal verbs:

Unit-5 Modals
Can, Could, Should, Will, Would, May, Might, Must, Need not, Dare not, Ought to, Used to.

Unit-6 Phrases
At all; instead of: In Spite of; As well as; Set up; Up set; Look up; Call off; Call out; Come across; Set right; Look other.

Unit-7 Idioms
Work up (excite) ; Break down; Stand up for; Turn down; Pass away; Pass on; Back up; Back out; Carry out; Done for (ruined); Bring about; Go through; Ran over; Look up (improve); Pick out (selected).

Unit-8
Composition -1. Unseen Passage, Précis Writing

Unit-9
Letter Writing, Paragraph Writing, Report Writing

Unit-10
Essay Writing – Essays on general and local topics related to Environmental problems.

REFERENCE BOOKS:

1. Intermediate English Grammar — Raymond Murphy, Pub: Foundation Books, New Delhi
2. Eng. Grammar, usage & Composition — Tickoo & Subramanian Pub: S. Chand and Co.
3. Living Eng. Structure — Stannard Alien. Pub: Longman
4. A Practical Eng. Grammar (and its Exercise Books) — Thomson and Martinet. Pub: ELBS

01DYCB102 **APPLIED PHYSICS**

Unit-1 Units and Dimensions

Idea of various systems of units, SI units –Basic, Supplementary and Derived Units, Prefixes & Symbols, Dimensions and Dimensional Formulas, Principle of Homogeneity of Dimensions, Dimensional Analysis, Applications and Limitations

Unit-2 Elasticity

2.1 Elasticity
2.2 Stress and Strain
2.3 Elastic Limit & Hooke's law
2.4 Young's Modulus, Bulk Modules & Modulus of Rigidity, Poisson's Ratio.

Unit-3 Properties of Liquids

3.1 Surface Tension & Surface Energy
3.2 Cohensive & Adhensive Force
3.3 Angle of Contact
3.4 Capillarity & Expression for Surface Tension
3.5 Streamline & Turbulent Flow
3.6 Reynolds Number.
3.7 Viscosity & Coefficient of Viscosity
3.8 Stoke's law & Terminal Velocity

Unit-4 Gravitation & Satellites

4.1 Newton's law of Gravitation
4.2 Acceleration due to Gravity
4.3 Kepler's laws of Planetary Motion (statement only)
4.4 Artificial Satellites (simple idea), Geo-Stationary Satellites
4.5 Escape Velocity
4.6 Velocity & Time Period of an Artificial Satellite.

Unit-5 Sound Waves

5.1 Velocity of Sound Waves: Newton's Formula, Laplace Correction, Factors affecting Velocity of Sound Waves
5.2 Propagation of Progressive Wave, Displacement, Velocity and Acceleration of a particle during propagation of wave, Superposition of Waves, Stationary Waves (without mathematical analysis), Resonance tube

Unit-6 Transfer of Heat

Modes of Transmission of Heat –Idea of Conduction, Convection & Radiation, Thermal Conductivity & Coefficient of Thermal Conductivity, Black Body, Kirchoff's laws & Stefan Boltzmann's Law (statement only), Newton's Law of Cooling & its Derivation from Stefan's Law

Unit-7 Electrostatics

7.1 Coulomb's Law

7.2 Intensity of Electric Field, Intensity due to a Point Charge
7.3 Electric Lines of Forces & Electric Flux
7.4 Electric Potential, Electric Potential due to a Point Charge

Unit-8 D.C. Circuits
8.1 Resistivity, Effect of Temperature on Resistance
8.2 Ohm's Law
8.3 Resistance in Series and Parallel and their Combination
8.4 Kirchoff's Law
8.5 Wheatstone Bridge
8.6 Meter Bridge
8.7 Principle of Potentiometer

Unit-9 A.C. Circuits
9.1 Faraday's Laws of Electro Magnetic Induction, Lenz's Law
9.2 Self and Mutual Inductance
9.3 Alternating Current, Phase & Phase Difference
9.4 Instantaneous, Average and rms value of AC
9.5 Behaviour of Resistance, Capacitance and Inductance in an AC Circuit
9.6 AC Circuits Containing, R-L, R-C and LCR in Series
9.7 Power in AC Circuit and Power Factor
9.8 Choke Coil

Unit-10 Semi Conductor Physics
10.1 Energy Bands in Conductor, Semi Conductor & Insulator
10.2 Chemical Bonds in Semiconductor
10.3 Intrinsic and Extrinsic Semiconductors
10.4 PN-Junction Diode, Working. Biasing and Characteristics Curves
10.5 Zener Diode and Voltage Regulation using it
10.6 Half Wave & Full Wave Rectifiers (only working, no derivations)
10.7 Junction Transistors, Working, Biasing and Characteristic Curves
10.8 Brief Idea of Using Transistors as an Amplifier (without mathematical analysis)

Unit-11 Modern Physics
11.1 Photo Electric Effect
11.2 Einstein's Equation
11.3 Photo Cells
11.4 Lasers: Stimulated Emission and Population Inversion, Types of Laser-Helium Neon and Ruby Laser, Application of Lasers (brief idea only), Material Processing, Lasers in Communication, Medical Application.

Unit-12 Nuclear Physics
12.1 Idea of Nuclear Force
12.2 Mass-Defect and Binding Energy
12.3 Nuclear Reactions.
12.4 Natural and Artificial Radioactivity

12.5 Law of Radioactive Disintegration
12.6 Half Life & Mean Life
12.7 Idea of Nuclear Fission and Fusion
12.8 Chain Reaction
12.9 Nuclear Reactor

Unit-13 Pollution and its control
13.1 Introduction to Pollution –Water, Air, Soil, Noise, Nuclear and mental pollution
13.2 Types of Pollution
13.3 Brief idea about Noise Pollution and its Control
13.4 Nuclear Hazards
13.5 Nuclear Waste Management

REFERENCE BOOKS:

1. Engineering Physics — Gaur & Gupta
2. Applied Physics Vol. –I — Hari Harlal, NITTTR
3. Applied Physics Vol. –II — Hari Harlal, NITTTR
4. A Text Book of Applied Physics — N.S. Kumar

01DYCB103 APPLIED CHEMISTRY

Unit-1 Atomic Structure
1.1 Constituents of the Atom
1.2 Bohr's Model of the Atom
1.3 Quantum Number and Electronic Energy Levels
1.4 Aufbau's Principle, Pauli's Exclusion Principle, Hund's Rule, $n + I$ Rule
1.5 Electronic Configuration of Elements (s,p,d Block Elements)

Unit-2 Development of Periodic Table
2.1 Modern Periodic Law, Long form of Periodic Table.
2.2 Study of Periodicity in Physical and Chemical Properties with special, reference to : - Atomic and Ionic Radii, Ionization Potential. Electron Affinity. Electronegativity. Variation of Effective Nuclear Charge in a Period. Metallic Character.

Unit-3 Electro Chemistry
3.1 Ionization, Degree of Ionization, Factors which Influence Degree of Ionization.
3.2 Hydrolysis –Degree of Hydrolysis, Hydrolysis Constant.
3.3 pH Value
3.4 Buffer Solution
3.5 Electrolysis, Faraday's Laws of Electrolysis

Unit-4 Kinetic Theory of Gases
4.1 Postulates of kinetic Theory
4.2 Ideal Gas Equation, Pressure and Volume Corrections, Vender Walls Equations
4.3 Liquefaction of Gases, Critical Pressure and Critical Temperature for Liquefaction.
4.4 Liquefaction of Gases by Joule –Thomson Effect, Claude's Method and Linde's Method

Unit-5 Carbon Chemistry
5.1 Definition of Organic Chemistry, Difference between Organic and Inorganic Compounds.
5.2 Classification and Nomenclature –Open Chain and Closed Chain Compounds, IUPAC System of Nomenclature. (up to C5).

Unit-6 Metals and Alloys
6.1 General Principles and Terms listed in Metallurgy.
6.2 Metallurgy of Iron and Steel
6.3 Different forms of Iron
6.4 Effect of Impurities on Iron and Steel
6.5 Effect of Alloying Elements in Steel

Unit-7 Pollution
7.1 Water Pollution: Causes and Effects, Treatment of Industrial Water Discharges –Screening, Skimming and Sedimentation Tanks, Coagulation, Reduction's Chlorination, Biological Methods.
7.2 Air Pollution: Causes and Effects, Control Methods –Electrostatic Precipitator, Scrubbers, Gravitational Setting Methods, by Plants.
7.3 Awareness on Green House Effect, Depletion of Ozone Layer and Acid rain.

Unit-8 Water
8.1 Sources of Water
8.2 Hardness of Water
8.3 Degree of Hardness, Estimation of Hardness by EDTA method, Problems on Calculation of Hardness
8.4 Disadvantages of Hardness
8.5 Softening Methods: Lime-Soda Method, Permutite Method, Ion-Exchange Method
8.6 Problems on Softening of Water
8.7 Drinking Water, its Requisites, Purification and Sterilization of Water.

Unit-9Fuels
9.1 Definition, Classification
9.2 Calorific Value (HCV and LCV) and Numerical Problems on Calorific Value
9.3 Combustion of Fuels, Numerical Problems on Combustion
9.4 Solid Fuels: Coal and Coke
9.5 Liquid Fuels: Petroleum and its Distillation, Cracking, Octane and Cetane Values of Liquid Fuels, Synthetic Petrol, Power Alcohol
9.6 Bio-Gas
9.7 Nuclear Fuels –Introduction to Fission and Fusion Reactions.

Unit-10 Corrosion
10.1 Definition
10.2 Theories off Corrosion: Acid Theory (Rusting), Direct Chemical Corrosion or Dry Corrosion, Wet Corrosion or Electro-Chemical Corrosion (Galvanic and Concentration Cell Corrosion) Various Methods for Protection from Corrosion.

Unit-11 Polymers
11.1 Definition
11.2 Plastics: Classification, Constituents, Preparation, Properties and Uses of Polythene, Bakelite, Terylene and Nylon.Rubber, Natural Rubber, Vulcanization, Synthetic Rubbers – Bunda-N, Buna-S, Butyl and Neoprene

Unit-12 Cement and Glass
12.1 Manufacturing of Portland cement
12.2 Chemistry of Setting and Hardening of Cement
12.3 Glass: Preparation, Varieties and Uses.

Unit-13 Lubricants
13.1 Definition, Classification
13.2 Properties of Lubricants: Viscosity, Oiliness, Flash Point, Fire Point, Acid Value, Saponification, Emulsification, Cloud and Pour Point.
13.3 Artificial Lubricants

Unit-14 Miscellaneous Materials
14.1 Refractories : Definition, Classification and Properties
14.2 Abrasives: Natural and Synthetic Abrasives
14.3 Paint and Varnish: Definition and Function of Constituents
14.4 Soap and Detergents: Definition, Properties and Uses

Unit-15 New Engineering Materials
(Brief Idea of Following)
15.1 Superconductors
15.2 Organic Electronic Materials
15.3 Fullerenes
15.4 Optical Fibers

REFERENCE BOOKS:

1. Engineering Chemistry II (Hindi) — Mathur and Agarwal
2. Chemistry of Engineering Materials — C.V. Agarwal
3. Engineering Chemistry — P.C. Jain and Monika
4. Engineering Chemistry — M.M. Uppal

01DYCB104 COMPUTER AND INFORMATION TECHNOLOGY FUNDAMENTALS

Unit-1 Introduction
1.1 Computer: An Introduction

1.2 Generation of Computers & Types: PC, PC/XT, PC/AT, Main Frame Super, Lap Top, Pam Top.

1.3 Data Representation: Bit, Nibble, Byte, Word, Number System: Decimal, Binary, Hexadecimal & their Conversions, Arithmetic Operations (Addition, Subtraction using Binary Number System, Is, 2s Compliment, Coding Technique: BCD, EBCDIC, ASCII.
1.4 Idea of: Hardware, Software, Firmware, Free ware, Human ware.
1.5 Computer Languages and Translators: Machine, Assembly, High Level Language, Scripting Language, Object Oriented Language, Platform Independent Language, Translators: Assembler, Interpreter, Compiler.

Unit-2 Introduction to Computer
2.1 Central Processing Unit (CPU)
2.2 Memory Unit
2.3 Input/Out Devices: Keyboard, Mouse (Optical), Digitizer, Scanner, Web Camera, Monitor (CRT, TFT), Printers, Plotters, Bar Code Reader
2.4 Secondary Storage Devices: Floppy, Hard Disk, CD, DVD, Flash Drive
2.5 Block Diagram Showing Interconnection of Computer Parts

Unit-3 Operating System
3.1 Definition of Operating System (OS)
3.2 Types of OS: Single user, Multi User, Multi Programming, Time Sharing, Multi Processing

Unit-4 Introduction to Windows XP
4.1 Introduction to Windows Environment
4.2 Parts of Windows Screen
4.3 Icon, Menu, Start Menu
4.4 Minimizing, Maximizing, Closing Windows
4.5 Windows Explorer, Recycle Bin, Clipboard, My Computer, My Network Places
4.6 Control Panel: Adding New Hardware and Software, Display, Font, Multimedia, Mouse, International System
4.7 Accessories: Paint, Media Player, Scan disk, System Information

Unit-5 Information Concepts and Processing
5.1 Definition of Data, Information
5.2 Need of Information
5.3 Quality of Information
5.4 Concepts of Data Security, Privacy, Protection
5.5 Computer Virus and their types
5.6 Scanning & Removing Virus

Unit-6 Computer and Communication
6.1 Need of Data Transmission
6.2 Data Transmission Media
6.3 Baud rate and Bandwidth, Digital and Analog Transmission Serial and Parallel Data Transfer, Protocols, MODEM.
6.4 Networking of Computers: LAN, WAN, MAN Blue tooth
6.6 LAN Topologies: Bus, Star, Ring, Hybrid
6.7 Introduction to Ports: RS 232, IEEE 488, PS2, USB, UTP

Unit-7 Internet

7.1 Introduction to Internet
7.2 Bridges, Routers, Switch, Gate way
7.3 www, Web Site, URL
7.4 e-mail, e-commerce
7.5 Web browsing, Web page
7.6 Introduction to Hyper text & HTML
7.7 Introduction to http & ftp Protocol

Unit-8 Information Processing

8.1 Word processor:Introduction to MS-Word,Starting MS-Word,Special Features of MS-Word,Using Help,Opening Document, Typing and Editing,Copying, Inserting, Moving, Deleting,Copying from One Document to Others.,Undo, Redo, Spell Check, Find and Replace Formatting:Characters and Fonts,Spacing,Removing Characters Formatting,Inserting Symbols,Paragraphs,Page Setting,Header and Footer,Page Breaks,Borders and Shading,Print Preview and Printing,Tables and Columns,Mail Merge,Auto Text and Auto correct,Introduction to Macro

8.2 Electronic Spread Sheet:Introduction to Ms-Excel:Working with Spread Sheet,Editing the Worksheet,Worksheet Formatting,Formula Entering,Function Wizard,Saving and Printing Work Book,Analysis Tools,Data Tools,Charts,Linking Work Sheets,Report Wizard,Data Base Application:Data Base Components,Working with Database,Creating Excel Database,Adding Records using Data Form,Deleting Records using Menu Command,Deleting Records using Data Form,Editing Records,Finding Records based on Criteria

Unit-9 Power Point

9.1 Introduction to Power Point
9.2 Creating a Presentation/Slide
9.3 Adding Animation in Slide
9.4 Running a Slide Show

REFERENCE BOOK:

1. Computer Fundamental — V.K. Jain, Standard Pub. & Distributors
2. PC Software for Windows made simple — R.K. Taxali, TMH
3. Mastering Windows XP — TMH
4. BPB Computers Course — BPB Editorial Board. BPB in Hindi

01DYCB105 APPLIED MATHEMATICS

Unit-1

1.1 Introduction to Different Types of Expansion:Factorial Notation,Meaning of C (n,r), P (n,r),Binomial Theorem for Positive Index, any Index, Exponential Theorem,Logarithm Theorem

1.2 Complex Number:Definition of Complex Number,Operations on Complex Number (Add., Sub., Multiplication, Division),Conjugate Complex Number,Modulus and Amplitude of a Complex Number,Polar form of a Complex Number

Unit-2 Trigonometry

2.1 Allied Angle sin (180+A), sin (90+A) etc.
2.2 Sum and Difference Formula (without proof) and their Application
2.3 Product Formula and C-D Formula
2.4 T-Ratios of Multiple and Sub-Multiple Angles (2A, 3A, A/2)
2.5 Solution of Trigonometric Equations: sin X =0, tan X = 0, cos X =0, sin X =A, cos X =A & tan x =A

Unit-3 Matrices and Determinants

3.1 Definition and Properties of Determinants
3.2 Definition and Types of Matrix
3.3 Transpose of a Matrix. Symmetric, Skew Symmetric Matrices, Orthogonal matrices, Hermitian and Skew-Hermitian
3.4 Minors and Cofactors
3.5 Adjoint and Inverse of a Matrix
3.6 Cramer's Rule
3.7 Solution of Simultaneous Linear Equations by Inverse Matrix Method.
3.8 Characteristic Matrix, Characteristic Equation, Eigen-Values & Vectors, Cayley Hamilton Theorem (verification only)

Unit-4 Numerical Integration

4.1 Trapezoidal Rule
4.2 Simpson's 1/3 Rule
4.3 Simpson's 3/8 Rule
4.4 Newton- Raphson Rule

Unit-5 Two Dimensional Coordinate Geometry

5.1 General Introductions
5.2 Distance Formula and Ratio Formula
5.3 Co-ordinate of Centroid, In-Centre, Ortho-Centre and Ex-Centre of a Triangle
5.4 Area of Triangle
5.5 Straight Line Scope form, Intercept form, Perpendicular form, One Point Slope form, Two Point form & General form
5.6 Angle between Two Lines
5.7 Perpendicular Distance of a Line from a Point

Unit-6 Conic

6.1 Circle: Definition and Standard Equations, Equations of Tangent and Normal at a Point (Simple problems)
6.2 Parabola: Definition and Standard Equations, Equations of Tangent and Normal at a Point (Simple problems)

6.3 Ellipse and Hyperbola: Definition and Standard Equations, Equations of Tangent and Normal at a Point (Simple problems)

Unit-7 Function

7.1 Definition of Function
7.2 Range and Domain of Function
7.3 Types of Function: Absolute Value Function, Exponential value Function, Identity Function, Reciprocal Function, Rational and Irrational Function, Increasing and decreasing Function
7.4 Limits: Concept of Limit, L.H.L., R.H.L., Limit of Standard Functions, Concept of Continuity and Differentiability at a Point (simple Problems)

Unit-8 Differential Calculus

8.1 Standard Formulae (Except Hyperbolic Function): Derivative of Sum, difference, Multiplication and Division of two functions, Differentiation of Function of a Function, Logarithmic Differentiation, Differentiation of Implicit Functions, Differentiation of Parametric Functions, Differentiation by Trigonometric Transformations, Differentiation of a Function w.r.t. Another Function
8.2 Second Order Derivative

Unit-9 Applications of Differential Calculus

9.1 Geometrical meaning of dy/dx. Tangents and Normals
9.2 Angle of Intersection between two Curves
9.3 Derivative as a Rate Measurer
9.4 Errors and Approximations
9.5 Maxima and Minima of Function with one Variable

Unit-10 Integral Calculus

10.1 General Introduction of Integral Calculus
10.2 Integration of Sum and difference of Functions.
10.3 Integration by Simplification
10.4 Integration by Substitution
10.5 Integration by Parts
10.6 Integration of Rational and Irrational Functions
10.7 Integration of Trigonometric Functions
10.8 Definite Integral and its Properties

Unit-11 Differential Equations

11.1 Definition of differential Equation. Order, Degree and Solution of a differential Equation.
11.2 Solution of a differential Equation of First Order and First Degree using: Variable Separable Method, Homogeneous Form, Reducible to Homogeneous Form, Linear differential Equatio, Bernoulli's Equation, Exact differential Equation, Substitution Method
11.3 Solution of Linear Differential Equation of Higher order with Constant Coefficients
11.4 Applications of Differential Equations to L-R, L-C, L-C-R Circuits of Standard Forms

Unit-12 Vector Algebra

12.1 Definition, Addition and Subtraction of Vectors

12.2 Scalar and Vector Product of two Vectors
12.3 Scalar Triple Product and Vector Triple Product
12.4 Applications of Vectors in Engineering Problems

REFERENCE BOOKS:

1. Mathematics XI & XII — NCERT, New Delhi
2. Mathematics XI & XII — Rajasthan Board, Ajmer
3. Polytechnic Mathematics — H.K. Dass
4. Text Book on Differential Calculus — Chandrika Prasad

01DYCB106 APPLIED MECHANICS

Unit-1 Force
1.1 Definition
1.2 Units
1.3 Different Types of Forces

Unit-2 Coplanar Forces
2.1 Resolution of Forces
2.2 Law of Parallelogram of Forces
2.3 Resultant of two or more Forces
2.4 Basic Conditions of Equilibrium
2.5 Lami's Theorem (No Proof)
2.6 Jib Crane
2.7 Law of Polygon of Forces (Only Statement)

Unit-3 Moment
3.1 Definition, Units & Sign Convention
3.2 Principle of Moments
3.3 Application of Equilibrium Conditions for non-concurrent Forces

Unit-4 Application of Principles of Forces & Moments
4.1 Levers & their Types.
4.2 Reactions of Simply Supported Beams (Graphical & Analytical Method)
4.3 Steel Yard.
4.4 Lever Safety Valve
4.5 Foundry Crane

Unit-5 Centre of Gravity
5.1 Concept
5.2 Centroid
5.3 Calculation of C.G. of Regular Bodies
5.4 Calculation of C.G. of Plain Geometrical Figures

Unit-6 Friction
6.1 Types of Friction

6.2 Laws of Friction
6.3 Angle of Friction
6.4 Angle of Repose
6.5 Friction on Horizontal and Inclined Planes
6.6 Application of Laws of Friction Related to Wedge, Ladder and Screw Jack.

Unit-7 Simple Machines
7.1 Basic Concepts
7.2 Loss in Friction
7.3 Inclined Plane
7.4 Simple & Differential Wheel and Axle (Neglecting Rope thickness), Screw Jack, Lifting Crabs, Systems of Pulleys,Worm and Worm Wheel

Unit-8 Rectilinear Motion
8.1 Concept
8.2 Motion under Constant Velocity
8.3 Motion under Constant Acceleration
8.4 Velocity-time graph and its uses

Unit-9 Motion under Gravity
9.1 Concept
9.2 Vertical Motion
9.3 Smooth Inclined Plane

Unit-10 Projectiles
10.1 Concept
10.2 Range, Maximum Height and Time of Flight
10.3 Equation of Trajectory
10.4 Calculation of Velocity of Projectile at Certain Height and at certain instant

Unit-11 Newton's Laws of Motion
11.1 Definitions
11.2 Momentum and its Unit
11.3 Application of Second Law of Motion

Unit-12 Impact and Collision
12.1 Concept
12.2 Impulse and Impulsive Force
12.3 Law of Conservation of Momentum
12.4 Collision between Two Rigid Bodies
12.5 Newton's Experimental Law of Collision, Coefficient of Restitution

Unit-13 Circular Motion
13.1 Concept
13.2 Motion under Constant Velocity
13.3 Motion under Constant Acceleration

13.4 Relationship between Linear Velocity and Angular Velocity
13.5 Centrifugal and Centripetal Forces, their Applications

Unit-14 Work, Power and Energy
14.1 Work Done by a Constant Force
14.2 Work Done by Uniform Variable Force: Power, Indicated Power, Brake Power, Efficiency, Power required for an Engine on Horizontal and Inclined (smooth and rough) Planes, Energy, Potential Energy, Kinetic Energy of Rectilinear Motion, Kinetic Energy of Circular Motion.

01DYCB201 COMMUNICATION TECHNIQUE LAB

We envisage two successive stages for attaining skill in communication ability;

1) Listening
2) Speaking

We can club them together as shown above**.**

1. **Listening: 6**

1.1 For improving listening skills the following steps are recommended,
1.1.1 Listen to prerecorded Tapes
1.1.2 Reproduce Vocally what has been heard
1.1.3 Reproduce in written form
1.1.4 Summarize the text heard
1.1.5 Suggest substitution of words and sentences
1.1.6 Answer questions related to the taped text
1.1.7 Summaries in writing

2. **Speaking: 6**

2.1 Introducing English consonant-sounds and vowel-sounds
2.1.1 Remedial Exercises where necessary
2.1.2 Knowing word stress
2.1.3 Shifting word stress in poly-syllabic words [for pronunciation practice read aloud a Para or page regularly while others monitor]

3. **Vocabulary: 10**

3.1 Synonyms. Homonyms. Antonyms and Homophones
3.2 Words often confused, as for example,

[I-me, your-yours: its-it's; comprehensible-comprehensive; complement-compliment]
3.3 context based meanings of the words, for example,
3.3.1 man[N] man[vb]; step[INI, step[vb]
3.3.2 conflict_____Israel Palestinian conflict

Emotional conflict,
Ideas conflict
3.3.3 learn_____1 learn at this school

I learnt from the morning news

4. Delivering short Discourses: 15
4.1 About oneself
4.2 Describing a place, Person, Object
4.3 Describing a picture, Photo
5. Group Discussion: 15
5.1 Developing skill to initiate a discussion [How to Open]
5.2 Snatching initiative from others [watch for weak points,etc]
6. Expand a topic-sentence into 4-5 sentence narrative.8
Note:

1. The medium of teaching and examination will be English
2. The question on essay writing (Unit7) will be compulsory. The student will have to attempt one essay out of two, touching the given points on general/ local topic related to environmental problems.
3. At least on question will be set from each unit.
4. No theory question will be set from syllabus of practicals

REFERENCE BOOKS:

1. 1. Intermediate English Grammar Raymond Murphy,
Pub: Foundation Books,
New Delhi
2. English Grammar, Usage and Composition Tickoo and Subramanian
Pub: S.Chand and Co.
3. Living Engl. Structure Standard Alien
Pub: Longman
4. A Practical Eng. Grammar Thomson and Martinet

(And it's Excersise Books) Pub: ELBS
5. High School English Grammar Wren& Martin and composition

01DYCB202 PHYSICS LAB

At least 15 experiments to be performed from the following list:-
1. To measure Internal Dia, External Dia and Depth of a Calorimeter using Vernier Calipers.
2. To Measure Density of a Wire using Screw gauge
3. To Measure Radius of Curvature of a Lens, Mirror using Spherometer.
4. To Determine Refractive Index of Glass using Prism.
5. To Determine the Refractive Index of Glass using Traveling Microscope
6. To Determine Focal Length of a Convex Lens by Displacement Method.
7. To Determine the Velocity of Sound at 0^{o} c using Resonance Tube.

8. To Determine Young's Modulus of Elasticity using Searle's Apparatus.
9. To Determine Acceleration due to Gravity using Simple Pendulum.
10. To Verify Newton's Law of Cooling.
11. To Verify Law of Resistances.
12. To Determine Specific Resistance of Material using Meter Bridge.
13. To Determine Internal Resistance of a Primary Cell using Potentiometer.
14. To Compare emf of two Primary Cells using a Potentiometer.
15. To Draw Characteristic Curves of PN Diode and Determine its Static and Dynamic Resistance.
16. To Draw Characteristic Curves of a PNP/NPN Transistors in CB/CE Configuration.
17. To Measure Resistance of a Galvanometer by Half-Deflection Method.

01DYCB203 CHEMISTRY LAB

1. Identification of Acid and Basic Radicals in a Salt (Total Numbers =5)
2. Analysis of a Mixture Containing Two Salts (Not Containing Interfacing Radicals). (Total Numbers =5)
3. Determination of Percentage Purity of an Acid by Titration With Standard Acid.
4. Determination of Percentage Purity of a Base by Titration With Standard Alkali Solution.
5. Determination of the Strength of Ferrous Sulphate using Standard Ferrous Ammonium Sulphate and Potassium Dichromate as Intermediate Solution
6. Determination of the Strength of Ferrous Sulfate Solution using Standard Solution of Thiosulphate.
7. Determination of the Strength of Copper Sulphate Solution using a Standard Solution of thiosulphate.
8. Determination of pH Values of Given Samples.
9. Determination of Hardness of Water by EDTA Method.
10. Estimation of Free Chlorine in Water.
11. Determination of Acid Value of Oil.
12. Preparation of Soap.

01DYCB204 COMPUTER PROGRAMMING LAB

1. Study of Computer Components
2. Practice of Computer Booting Process in XP
3. Demonstration of Windows Environment
4. Practice of using My Computer, Windows Explorer
5. Practice of using Control Panel
6. Practice of My Network Places
7. Practice of CD and DVD Writing
8. Practice of Paint
9. Installation of Windows XP by using NTFS File System
10. Demonstration of Network
11. Visit to Internet Site

12. Crating e-mail Account, Sending and Receiving e-mails
13. Sending e-mail with Attachments & Signature
14. Searching Web Page/ Site using Search Engine :(eg. Google.com, yahoo.com, altavista.com etc.)
15. Exercise Based on Ms-Word:
    - 15.1 Document Preparation
    - 15.2 Printing Document
    - 15.3 Mail Merge usage
    - 15.4 Draw Table
16. Exercise Based on Ms-Excel:
    - 16.1 Work Book Preparation
    - 16.2 Printing Workbook
    - 16.3Database usage
    - 16.4 Draw Charts
17. Exercise Based on Power Point:
    - 17.1 Creating Slide
    - 17.2 Adding, Animations in Slide
    - 17.3 Running Slide
18. Creating Simple, Web Page using HTML.

01DYCB205 APPLIED MECHANICS LAB

1. Use of Engineering Calculator.
2. Verification of the Law of Parallelogram and Polygon of Forces
    - 2.1 By using Force Board
    - 2.2 By using Force Table
3. Verification of the Principle of Moments in case of
    - 3.1 Compound Lever
    - 3.2 Bell crank Lever
4. Determination of Reactions in Case of Simply Supported Beams.
5. To Determine Coefficient of Friction between two Surfaces on
    - 5.1 Horizontal Plane
    - 5.2 Inclined Plane.
6. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Simple Wheel and Axle
7. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of differential Wheel and Axle
8. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Single Purchase Crab
9. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Double Purchase Crab
10. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Worm and Worm Wheel
11. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Screw Jack

12. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of First System of Pulleys
13. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Second System of Pulleys
14. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Third System of Pulleys.
15. Determination of Value of "g" by Simple Pendulum

01DYCB206 ENGINEERING DRAWING

Note: All drawing should be as per IS-SP: 16-1988
Unit-1
Introduction of Drawing Instruments.

Unit-2 Lines, Lettering and Dimensioning
2.1 Types of Line
2.2 Lettering – Single Stroke, Italics
2.3 Various Systems of Placing the Dimensions

Unit-3 Geometrical Construction and Engineering Curves
3.1 Regular Polygons of Given Side
3.2 Conic sections –Construction of Ellipse, Parabola, Hyperbola
3.3 Construction of Cycloid, Epicycloids and Hypocycloid
3.4 Construction of Involutes, Archimedean Spiral and Cylindrical Helix

Unit-4 Scales
4.1 Type of Scales (Reducing and Enlarging)
4.2 Representative Fraction
4.3 Plain and Diagonal Scales

Unit-5 Theory of Orthographic Projections
5.1 Introduction of Projections, Reference Planes and Projectors
5.2 Angle of Projections (First Angle and Third Angle Projections)
5.3 System of Rotations
5.4 Projection of Points in Different Quadrants

Unit-6 Projection of Lines
6.1 Parallel to Both the Planes
6.2 Parallel to One and Perpendicular to Other Planes
6.3 Parallel to One and Inclined to Other Planes
6.4 Inclined to Both the Planes
6.5 True Length of a Line and its Apparent and True Inclinations

Unit-7 Projection of Planes

7.1 Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular Planes.
7.2 Plane Parallel to One & Perpendicular to Other
7.3 Plane Perpendicular to Both the Planes.
7.4 Plane Perpendicular to One and Inclined to Other Plane.

Unit-8 Projection of Solids
8.1 Projection of Cube, Prism, Pyramid, Cylinder and Cone
8.2 Projection of Solid whose Axis is Perpendicular to One and Parallel to Other plane.
8.3 Projection of Solid Whose Axis is parallel to One and Inclined to Other Plane.
8.4 Projection of Solid Whose Axis is Parallel to both the Planes (excluding inclined to both the planes)

Unit-9 Conversion of Pictorial Views into Orthographic Views
Orthographic Projections of Simple solid Object from Pictorial/Isometric vies.

Unit-10 Section of Solids and Development of Surfaces
10.1 Introduction of Sectional Planes
10.2 Sectional Plane Perpendicular to one Reference Plane and Parallel to other
10.3 Sectional Plane Perpendicular to one and inclined to other
10.4 Section of all types of Geometrical Solids. Viz, Prism, Pyramid, Cone and Cylinder.
10.5 Apparent Section and True Section.
10.6 Development of Surfaces of Regular Solids viz, Prism, Pyramid, Cone and Cylinder.
10.7 Sectional Plan, Sectional Elevation and Sectional Side View and Development of Surface of Solid after Section.

Unit-11 Isometric Projection
11.1 Isometric Axes, Isometric Scale, Isometric Lines and Isometric Planes
11.2 Isometric View and Isometric Projection of Plane (Square, Rectangular, Pentagonal Hexagonal, Circular)
11.3Isometric View and Isometric Projection of Prism, Pyramid, Cone,Cylinder, Sphere, their Frustum and Combination of these Solids.

Unit-12 Sections and Conventions
12.1 Conventional Method of Representing Full, Half, Removed, Revolved, Partial and Offset Section.
12.2 Section Lines for Different Material as per ISI Recommendations.

Unit-13 Rivets and Riveted Joints
13.1 Different Types of Rivets –Snap Head, Pan Head with Tapered Neck, Rounded Counter Sunk Head, Flat Counter Sunk Head.
13.2 Lap Joint – Single Riveted, Double Riveted (Chain Riveting and Zigzag Riveting)
13.3 Butt Joint –Single Riveted, Double Riveted Chain Riveting and Zigzag Riveting (using Single and Double Cover Plates)

Unit-14 Screw Threads and Fasteners
14.1 Classification of Threads

14.2 Profiles and uses of –Metric, BSW, Square, ACME, Knuckle, Sellers
Threads Machine Screw –Fillister, Flat Counter Sunk, Rounded Counter Sunk, Cup and Socket.
Set Screws –Oval, Conical, Flat and Cup Pointed Hexagonal Bolt and Nut, Stud and Collar Stud.

Unit-15 Foundation Bolt and Locking Devices
15.1 Drawing and uses of Rag, Lewis and Eye Bolt
15.2 Locking by Simple Lock Nut, Split Pin and Spring Washer. Castle Nut,Locking by Plate

Unit-16 Keys and Pulleys
16.1 Drawing and uses of Various Types of Keys –Saddle Key-Hollow and Flat, Sunk-Rectangular, Square, Key with Gib Head, Woodruff Key
16.2 Pulley –Straight Arms flat Belt Pulley, V-Belt Pulley

Unit-17 Shaft Couplings
17.1 Muff Coupling
17.2 Protected Type Flange Coupling.

Unit-18 Bearings
18.1 Simple Bush Bearing.

Unit-19 Building Drawing
19.1 Introduction of Orientation and Sun Chart Diagram of Residential Building.
19.2 Section of a Wall Including Foundation.
19.3 Sectional Plan of One Room and Toilet from Given Sketch

PRACTICALS
1. Preparation of following on Imperial Size Drawing Sheet:-
    - 1.1 Lines, Letters and Scales
    - 1.2 Geometrical Constructions and Engineering Curves.
    - 1.3 Projection of Lines
    - 1.4 Projection of Planes
    - 1.5 Projection of Solids
    - 1.6 Orthographic Projections of Simple objects
    - 1.7 Section and Development of Surfaces of Solids i.e. Cone, Cylinder, Sphere etc.
    - 1.8 Section and Development of Surfaces of Prism and Pyramids
    - 1.9 Isometric Projections
    - 1.10 Riveted Joints
    - 1.11 Screw Threads and Fasteners
    - 1.12 Pulleys
    - 1.13 Couplings
    - 1.14 Bearing
    - 1.15 Building Drawing
2. Preparation of following Drawings in Sketch Book (Home Assignment):
    - 2.1 Lettering (On Graph Sheet)
    - 2.2 Projection of Points in Different Quadrants
    - 2.3 Isometric Projection of Various Planes

2.4 Various Types of Rivet Heads
2.5 Section and Conventions
2.6 Set Screws
2.7 Machine Screws
2.8 Foundation Bolts, Keys

REFERENCE BOOKS

1. Engineering Drawing	N D Bhatt
2. Machine Drawing	N D Bhatt
3. Engineering Graphics	V. Laxmi Narayan
4. Machine Drawing	V. Laxmi Narayan

01DYCB207 WORKSHOP PRACTICE

Note:

1. A group of student shall be required to do practicals in all the shops during the year. The practical examination will be taken in the shops covered during year.
2. Theory parts of syllabus should be dealt with the respective practicals in practicals classes.
3. Students have to prepare a practical notebook showing the names, specifications and uses of tools and equipment for each shop with figures. This notebook shall be submitted at the time of the Board's practical examinations (PR).

Unit-1 carpentry shop

Theory: knowledge of common Indian Timbers, name, function, material and specification of common Hand Tools, Holding Tools, Cutting Tools, Measuring and marking tools used in carpentry, safety measures. Introduction of carpentry joints and their relative advantages and uses, Elementary idea about the wooden polishing work. Introduction to various carpentry machine (Bank saw, circular saw, wood turning lathe, wood planner).

Exercises:

1. Preparation of cross-half lap joint.
2. Preparation of Dovetail joint.
3. Preparation of Bridle joint.
4. Preparation Mortise and tenon joint.
5. preparation of Mitre joint.
6. Demonstration of job on Wooden Polishing Work.

Unit-2 **Welding and Sheet Metal Shop**

2.1 Welding Shop:

Theory: Introduction to Welding and its Importance in Engineering Practices, Common Materials that can be Welded. Gas Welding Theory : Gas Welding Equipment Adjustment of different types of Flames, Practice in Handling Gas Welding Equipment. Electric arc Welding Theory (AC and DC), Safety Precautions while using Electric arc Welding. Practice in Setting Current and Voltage for Striking Proper arc. Common Welding Defects and Inspection, various

type of Joints. And Edge Preparation. Explain Soldering, Brazing and Tipping of Tools, Gas Cutting Theory.

2.2 Welding Metal Shop :

Theory: Name, Functions and Specification of Common Sheet Metal Tools like Slakes, Hammers, Hand Snips, Hand Punches, Groovers, Rivet Sets, Chisels Name and Function of Marking and Measuring Tools, Scale, Circumference Rule, Straight Edge, Scriber, Semi Circular Protector, Trammel. Preliminary Idea of Simple Sheet Metal Operations, Different Types of Sheet Metal Edges and Joints, Riveting Methods, Development of Surface in Sheet Metal Work

Exercises:

Preparation of following utility Jobs Involving Various Sheet Metal Joints (Single and Double Hem Joints, Wired Edge, Lap Joint, Grooved Seam Joint, Single and Double Seam Joint) and Exercises (Soldering and Riveting Joints)

1. Preparation of a Soap Tray & Mug
2. Preparation of Funnel

Unit-3 Fitting and Plumbing Shop

3.1 Fitting Shop:

Theory : Introduction to different materials used in Fitting Shop. Description of Work Bench, Names, Functions and Specification of Holding Devices.Specification of Files, PrecautionsWhile filing.Marking of Jobs, use of Marking and Measuring Tools.What is Chipping, Where Chipping is done. Names Functions and Specifications of Chisels, Hammers etc.Simple Operation of Hack sawing, different types of Blades, and their uses, Fitting of Blade in Hacksaw Frame.Name, Functions and Specifications of Drills, Selection of Drills for Tapping, Types of Tapes, Tapping and Dieing Operations.Precaution While Drilling Soft Metals, Specially Lead.

3.2 Plumbing Shop :

Theory: Classification of Pipes According to Materials and use I.S.I. Specification for Pipes. Introductions to Cement and PVC Pipes and their uses.Names Functions and Specifications of Plumbing Tools and Accessories such as Pipe Dies, Wrenches, and Pipe Vices, Different Pipe Fittings.

Exercises:

1. Cutting and Treading on G.I. Pipe
2. Exercise on PVC Pipe Fitting.
3. Repair of Taps and Cocks.

REFERENCE BOOKS:

1. Workshop Technology — Gupta & Malani
2. Workshop Technology — Kumar & Mittal
3. Workshop Technology — Hajra, Chaudhary
4. Workshop Technology — B.S. Raghuwanshi

01DYCB208 ELECTRICAL & ELECTRONICS WORKSHOP

A- ELECTRICAL WORKSHOP

1. Study of Symbol, Specification and Approximate Cost of Common Electrical Accessories, Tools and Wires & Cables required for Domestic Installation.
2. Study of:
    2.1 Basic Electricity Rules for a Domestic Consumer
    2.2 Safety Precautions & use of Fire Fighting Equipments
3. Use of series of Phase Tester, Series Test Lamp, Tong Tester and Megger in Testing of Electrical Installation.
4. (a)Prepare a Potential Divider and Measure Resistance of a Filament Lamp Using Voltmeter and Ammeter.
   (b) Measurement of Power and Energy Consumption by an Electric Heater using Watt Meter and Energy Meter.
5. Preparation of Wiring Diagram, Wiring, Testing, Fault Finding & Costing for:
    5.1 Control of one Lamp by one Switch (using Batten and Tumbler Switch)
    5.2 Control of Stair Case Wiring (using Casing Capping, CFL and Flush Type Switches)
    5.3 Control of one Bell Buzzer and Indicator by one Switch (Using Conduit and Flush type Switch).
6. Prepare one Switch Board as per Institutional Requirement (Using Flush type Switches, Sockets, MCB, ELCB, Etc.)
7. Study, Connecting, Testing and Fault Finding of
    7.1 Fluorescent Tube and its Accessories
    7.2 Celling Fan with resistance type and Electronic Regulator
8. Study, Functioning, Fault Finding & Repairing of following Domestic Appliances – Automatic Electric Iron, Air Cooler, Electric Water Pump
9. Design, Draw and Estimate the Material required for Installation For a small Residential Building/Office/Hall.

* **Accessories used in all above Experiments must be According to Latest Technology.**

B- ELECTRONICS WORKSHOP

1. Identification of following Resistors and finding their Values:
    1.1 Carbon and Metal Film
    1.2 Variable Resistance Log and Linear
    1.3 Semi Variable Preset of One Turn & Multiturn
2. Identification of following Capacitor and finding their Values:
    2.1 Mica
    2.2 Ceramic
    2.3 Polystyrene
    2.4 Electrolytic
    2.5 Tantalum
3. Identification of following Switches and Study of their Working Mechanism
    3.1 Toggle
    3.2 Bandwidths
    3.3 Rotary
    3.4 Push to on and off
    3.5 Press to on and off
4. Identification and Testing of following type of Connectors:
    4.1 Rack and Panel
    4.2 Printed Circuit Edge

4.3 Coaxial
4.4 Tape & Ribbon
4.5 Plate

5. Study of Different Relays and their Contacts.
6. Study of following Tools used in Electronic Workshop:
   6.1 Component Lead Cutter
   6.2 Wire Strippers
   6.3 Soldering Iron & Soldering Station
   6.4 De-Solder Pump
7. Measurement of voltage, Current and Resistance using Analog & Digital-Multimeter.
8. Testing of Electronic, Component such as Capacitor, Inductor, Diode and Transistor.
9. Measurement of Amplitude & Frequency of a Signal using CRO.
10. Verification of Ohm's law using Resistive Circuit and Analog Meters.
11. Soldering of different passive component combination on general Purpose PCB.
12. Sketching of different Electronic Components Symbol on Drawing Sheet.

REFERENCE BOOKS:

1. Electrical Workshop	M.L. Gupta
2. Domestic Devices & Appliances	K.B. Bhatia
3. Electrical Workshop	S.L. Uppal
4. Electrical Component & Shop Practice	K.R. Nahar

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