



MATS UNIVERSITY

Raipur (C.G.)

Syllabus Scheme

(2nd Semester)

For

Diploma in Engineering

(MECHANICAL & CIVIL ENGINEERING)



School of Engineering & I.T.
ARANG, RAIPUR (C.G.)



MATS UNIVERSITY

ARANG, RAIPUR (C.G.)



Scheme of Teaching & Examination

Diploma in Engineering (MECHANICAL AND CIVIL ENGINEERING)

II – Semester

S.N.	code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	DP200	Applied Mathematics-II	4	-	-	70	30	4
2.	DP201	Applied Chemistry	3	-	-	70	30	3
3.	DP202	Engineering Drawing	3	2	-	70	30	4
4.	DP203	Basic Electrical and Electronics	4	-	-	70	30	4
5.	DP204	Computer Fundamentals and Its Applications	3	-	-	70	30	3
6.	DP205	Chemistry Lab	-	-	2	30	20	1
7.	DP206	Engineering Drawing Lab	-	-	2	30	20	1
8.	DP207	Basic Electrical and Electronics Lab	-	-	2	30	20	1
9.	DP208	Computer Fundamental Lab	-	-	2	30	20	1
10.	DP209	Workshop Practice -II	1	-	2	30	20	2
Total			18	02	10	500	250	24

L – Lecture, T – Tutorial, ESE – End Semester Examination,
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

MATS UNIVERSITY, RAIPUR (C.G.)
SCHOOL OF ENGINEERING & I.T.

Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Applied Mathematics-II
Total Theory Periods	:	60
Total Tutorial Periods	:	00
Total Credits	:	04
Code	:	DP 200

UNIT-I: Function and Limit : Function-

Definitions of variable, constant, intervals such as open, closed, semi-open etc. Definition of Function, value of a function and types of functions, Simple Examples.

Limits- Definition of neighborhood, concept and definition limit. Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples

UNIT-II: Derivatives :

Definition of Derivatives, notations. Derivatives of Standard Functions Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. Derivatives of composite function (Chain rule). Derivatives of inverse and inverse trigonometric functions. Derivatives of Implicit Function, Logarithmic differentiation Derivatives of parametric Functions. Applications of Derivative.

UNIT-III : Integration :

Introduction, Definition, Method of substitution, Integration by parts, Integration by Partial Fraction Method, Integration of the form and Reduction Formula., Definite Integral – Introduction

UNIT-IV : Statistics :

Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. Graphical representation (Histogram and Ogive Curves) to find mode and median Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations.

UNIT-V : Complex Number :

Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. Subtraction, Multiplication and Division). De-Moivre's theorem (without proof) Examples based on it, roots of complex numbers, roots of unity, Euler's form of Circular functions, hyperbolic functions and relations between circular & hyperbolic functions

References:-

1. Introductory Method of Numerical Analysis, Sastry S. S. (, PHI)
2. Mathematical Statistics, Ray and Sharma
3. Modern Algebra Sharma and Seth (Ram Prasad and Sons)
4. Mathematics for polytechnic, S. P. Deshpande Pune Vidyarthi Griha
5. Applied Mathematics, EEB Publication, Bhopal

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Applied Chemistry
Total Theory Periods	:	48
Total Tutorial Periods	:	00
Total Credits	:	03
Code	:	DP 201

UNIT-I : Atomic Structure :

Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape of the orbitals & distinction between Orbits & Orbitals, Hund's Rule, Filling Up of the Orbitals by Aufbau's Principle (till Atomic no. 30), Definition & types of valency (Electrovalency & Covalency), Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds

UNIT-II : Electro Chemistry :

Acids and bases- Concept of acids and bases, their strength in ionization constant. PH value, acid base titration, choice of indicators. Hydrolysis, Buffer solution **electrolysis** - Concept of electrolysis. Kohlrausch law, Ostwald dilution laws, Transport no. Faraday's law of electrolysis. Engineering applications (electro-metallurgy, electroplating & electro-refining)

UNIT-III : Solutions & Colloids :

Solute, solvent, solution & colloids. Particle size and colloidal state Types of colloidal solution, preparation of colloids, properties of colloidal solutions, Origin of charge on colloidal particles, precipitation of Coagulation of colloidal solution. Protective colloids and Gold number, Emulsions cleansing action of soaps, Detergents, Gels.

UNIT-IV : Metals :

Occurrence of Metals, Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties of metals such as Hardness, Toughness, Ductility, Malleability, Tensile strength, Machinability, Weldability, Forging, Soldering, Castability. Stages of Extraction of Metals from its Ores in detail i.e. Crushing, Concentration, Reduction, and Refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W.

UNIT-V : Fuels and Explosives :

Classification of fuels, solid fuels, liquid fuels, gaseous fuels, characteristics of a good fuel, calorific value, Determination of calorific value by Bomb calorimeter, Explosives- classification and application.

Lubricants, Paints and Varnishes- Lubricant- meaning types, theory of lubrication, properties of good lubricants with special emphasis on Flash, Fire point, pour point and cloud point. Specification number and viscosity, Paints and Varnish – Constituents, properties and uses.

References:-

1. Jain & Jain- Engineering Chemistry, Dhanpat Rai and Sons
2. Engineering Chemistry by O. P. Agrawal.
3. S. S. Dara Engineering Chemistry S. Chand Publication
4. Vedprakash Mehta Polytechnic Chemistry Jain brothers
5. Physical Chemistry by Glosstone.
6. Modern Text Book of Applied Chemistry by P.C. Jain, Dr. G. C. Saxena and Dr.A. K. Goswami.

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Engineering Drawing
Total Theory Periods	:	48
Total Tutorial Periods	:	16
Total Credits	:	04
Code	:	DP 202

UNIT-I : Introduction, Engineering curves and scales :

Introduction to drawing equipments, instruments and their uses, Planning of drawing sheet as per I.S. 696 – 1972, Indian standard practices of laying out and folding of drawing Different types of lines used in engineering drawing, Standard practice for writing single stroke vertical and inclined capital and lower cases letters (practice to be done on sketch book), Standard practice of writing numerals (practice to be done on sketch book)

Engineering curves and scales : Types and Method of construction of engineering curves, Practice problems of drawing various Engineering Curves, Importance of scale in engineering drawing, Types of scales- plain, diagonal etc, Practical problems for constructing various types of scale.

UNIT -II : Orthographic projection of points, lines and planes :

Definitions of various terms associated with orthographic projections, Planes of projections, Concept of Quadrants, First and third angle method of projection, Projection of line (limited to first quadrant), Projection of planes with respect to reference planes, Practice problems on projection of points, lines and planes.

UNIT-III : Projection of Solids and Section of Solids :

Projection of simple solids – cube, prism, cylinder, cone and pyramids, Sectional view – need for sectional view – cutting plane – cutting, plane line-representation ad per I.S. code- hatching – section of simple solids, cube, prism, cylinder, cone.

UNIT-IV : Isometric projections :

Limitations of orthographic projections, Definitions of the terms axonometric, oblique, Isometric and diametric, projections, Procedure for preparing isometric oblique, Isometric view of geometrical solids and simple machine parts, Practice problems.

UNIT-V : Nuts & Bolts : Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts, keys and couplings,

References:-

- 1 I.S. 696. (Latest revision). BIS, India.
- 2 Engineering Drawing N.D. Bhatt, Charoter Publisher, Anand.
- 3 Engineering Drawing & Machine Drawin, R. K. Dhawan, Kumar, S. Chand Co.
- 4 Engineering Drawing, R.B. Gupta, Satya Prakashan, Delhi.
- 5 Geometrical Drawing, P.S. Gill , ketson & Sons.
- 6 Machine Drawing, By P.S. Gill, ketson & Sons.
- 7 Engineering Drawing Gujral & Shende, Khanna Pub. N.Delhi.

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SCHOOL OF ENGINEERING & I.T.

Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Basic Electrical and Electronics
Total Theory Periods	:	60
Total Tutorial Periods	:	00
Total Credits	:	04
Code	:	DP 203

UNIT-I : D.C. Circuit :

Ohm's Law, series and parallel circuit, various basic definitions related to dc circuit/network, Source transformation and network reduction technique, ideal and practical current and voltage sources, Kirchhoff's laws and its application. **Electric Induction** -Faraday's Laws, Lenz Law; Thumb rule, Fleming's rules.

UNIT-II : A.C. Circuit :

Principles of A.C. Circuits, Definition of cycle, frequency, amplitude and time period. Instantaneous, RMS and maximum value of sinusoidal wave; form factor and Peak Factor, average values, Concept of Phase and Phase difference, Concept of resistance, inductance and capacitance in simple A.C. Circuit. Power factor and improvement of power factor by use of capacitors.

Measuring Instruments

Principle and construction of instruments used for measuring current, voltage, Power and energy.

UNIT-III :Transformers :

Introduction to single line diagram of power system (generation, transmission and distribution), What is transformer and its importance in power system, classification of transformer in detail, Working, Principle and construction of single phase transformer, Transformation ratio, emf equation, losses and efficiency, Auto-transformer, Applications of various transformer.

UNIT-IV: Electrical Machine:

D.C. Machines-Working, Principle and construction of D.C. machines (D.C. motor and generator), Classification of D.C. machines, Application of D.C. Machines.

A.C. Motor- Induction motor- Working, principle and construction of 3-phase induction motors, Type of induction motors- slip ring and squirrel cage. Slip and torque speed characteristics of induction motor. Application of 3-phase induction machines Concept of single phase induction motors and its applications.

UNIT-V: Basic Electronics :

Difference between conductor, insulator and semi-conductor and its properties. Basic idea of semiconductors P and N-type, Diodes, Zener diodes and their applications, Transistor-PNP and NPN, their characteristics and uses. Characteristic and application of thyristors, Introduction: - rectifier, inverter, chopper, cyclo-converter. Characteristics and applications of servo motors.

References:-

1. A text book of basic electrical engineering, Sahadev and Chaturvedi.
2. A text book of basic electrical engineering, B. L. Thereja. Vol-I
3. A text book of basic electrical engineering, B. L. Thereja. Vol-II
4. Basic Electrical Engineering by I. J. Nagrath, (T.M.H.)
5. Cotton, H. "Advance Electrical Technology," ISSAC Pitman, Londo

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Computer Fundamentals and Its Applications
Total Theory Periods	:	48
Total Tutorial Periods	:	00
Total Credits	:	03
Code	:	DP 204

UNIT- I : Computer Appreciation :

Definition of electronic compute, history, generation, characteristics & application of computers, classification of computers, RAM, ROM, computer, hardware, CPU, various I/O devices, peripherals, storage media, software, definition and concepts.

UNIT-II : Data Communication & Networks :

Computer networks, networking of computers, introduction to LAN, WAN, MAN, network topologies, basic concepts in computers networks, introduction to GPRS, CDMA, GSM & FM technologies.

UNIT-III : Familiarization with Operating System :

Introduction to computer Operating System (Dos, 2000/XP), Introduction to Dos structure, system files, batch files & configuration files, Booting the system from hard disk. Brief Introduction to Dos internal & external commands, Familiarization with windows structures, its use and application.

UNIT-IV: Computer Applications Software :

Word processing software - MS-WORD, Data analysis software - MS-EXCEL Introduction to electronic spreadsheet, Presentations software - MS-POWER POINT

UNIT-V : Internet Technology :

What is Internet, Equipment Required for Internet connection (MODEM and Terminal Adapters?)
Sending & receiving Emails, Browsing the WWW, Creating own Email Account, Internet chatting (textual /voice), Bulletin Boards, Video conferencing, FTP (uploading and downloading files), Web-Site Access and Information Search, Browsers and search engines.

Reference Books-

1. Introduction to Computers- Peter Norton's, Tata McGraw Hills Publishing Co.l Ltd. N. Delhi, IInd Edition, 1998
2. Vikas Gupta , Comdex Computer Course Kit First , Dreamtech publication
3. Henry Lucas Information Technology for management 7th Tata Mc-Graw Hills
4. B.Ram, Computer Fundamentals Architecture and Organisation , Revised 3rd , New Age International.
5. Computer Today S.K.Basanbhara, Galgotia Publication, 1 st Edition, 2000
6. Computer Organization and Architecture , William Stalling, Prentice Hall of India Pvt.Ltd , N.Delhi, IV th - Edition, 1999.
7. Structured computer Organization , Andrews Tanenbaum, Prentice Hall of India Pvt.Ltd, N.Delhi, III rd- Edition, 1997

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Chemistry Lab
Total Practical Periods	:	24
Total Credits	:	01
Code	:	DP 205

LIST OF EXPERIMENTS

1. Identification of two cations and two anions in a given sample of ore/powder/mixture.
2. To determine percentage of copper in a given sample by Brass titration.
3. Qualitative Analysis of **any five Solutions**, Containing One Basic & One Acidic Radical.
4. To determine percentage of Iron in a iron salt by redox titration.
5. To Determine the % of Fe in the Given Ferrous Alloy by KMnO Method.
6. Calorimetric estimation of metals in a given sample of a alloy.
7. Measurement of Ph of different solutions.
8. Proximate analysis of a sample of coal.
9. To find out the Flash point/Fire point of dry/non drying oils.
10. Determination of Calorific value (C.V.) of solid fuel by Bomb Calorimeter

List of apparatus

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Engineering Drawing Lab
Total Practical Periods	:	24
Total Credits	:	01
Code	:	DP 206

LIST OF PRACTICAL WORK

1. Problems on Scales and Letterings (One sheet).
2. Problems on Curves (One sheet).
3. Simple Orthographic Projections- One for First Angle and One for Third Angle Projection (Two sheets).
4. Orthographic projections with sections (One sheet).
5. Isometric projection for two objects (One sheet).
6. Projection of Points and Lines (One sheet).
7. Projection of Planes (One sheet).
8. Projection of Solids (Two sheets).
9. Section of Solids (Two sheets).
10. Development of surface (Two sheets).

List of apparatus

MATS UNIVERSITY, RAIPUR (C.G.)
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Semester : 1st Diploma in Engineering
Branch : All Streams of Diploma in Engineering
Subject : Basic Electrical and Electronics Lab
Total Practical Periods : 24
Total Credits : 01
Code : DP 207

List of Experiment

1. To study the symbolic representation of various elements & sources used in electric circuit.
2. To Study various instruments & devices used in electric laboratory.
3. To verify ohm's law
4. To study series & parallel connection of electric circuit
5. To verify kirchhoff's law.
6. To determine value of R & L of choke coil.
7. To determine the efficiency of a transformer by direct loading test.
8. To study the auto transformer.
9. To study the various parts of DC machine.
10. To study the constructional details of three phase induction motor.
11. To study & draw VI characteristics of SCR.
12. Demonstrate the function of diode as a rectifier.
13. To study & testing of common electrical appliances. e.g. ceiling fan, water heater, grinder, etc
14. To calibrate of energy meter using voltmeter and ammeter.

List of apparatus

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Computer Fundamental Lab
Total Practical Periods	:	24
Total Lecture Periods	:	12
Total Credits	:	02
Code	:	DP 208

List of Experiments

- 1. Practice on Windows 7/8 :** Starting Windows, Exploring the desktop, Arranging windows, My Computer, The start button, Creating Shortcuts, Practice on moving and sizing of windows - Study of file organization: creating, copying, moving, renaming and deleting. - Practice on Windows Accessories- Notepad, Word Pad and Paint. - Editing document & formatting text, Previewing and printing document/Image file. - Practice on Windows Explorer. - Recycle bin - Shutting down windows.
- 2. Practice on MS-Word :** Create and format document, - Edit and Modify text- changing font size type and style, AutoText, AutoComplete, AutoCorrect, grammar and spellchecker, Find and replace of text- Open save and print a document - Insert, modify table
- 3. Practice on Microsoft Excel :** Create, save & format worksheet, - Open and save worksheet file, - edit & modify data, - use formula and functions, - split windows and freeze pans, - Create, edit, modify, print worksheet/charts.
- 4. Practice on PowerPoint :** Create, edit, insert, move, slides - Open and save presentation- Insert picture, slide layout, action button - Present slide show.
- 5. Practice on:** Identification of type of Account. - Connecting to internet, Dial up access, - Web browsing,- Searching websites.
- 6. Practice on:**
Information searching - Email services
Creating email accounts & Receiving and sending mails

List of Apparatus

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Semester	:	1 st Diploma in Engineering
Branch	:	All Streams of Diploma in Engineering
Subject	:	Workshop Practice – II
Total Practical Periods	:	24
Total Lecture Periods	:	12
Total Credits	:	02
Code	:	DP 209

List of Experiments

- 1. Smithy Shop**
- 2. Machine Shop**
- 3. Moulding Shop**

1. Smithy Shop

- 1.1 identification of various tools and equipments used & their use.
- 1.2 Perform various smithy operations.
- 1.3 Up setting.
- 1.4 Drawing down.
- 1.5 Bending
- 1.6 Setting down.
- 1.7 Welding.
- 1.8 Cutting.
- 1.9 Punching.

2. Moulding Shop

- 2.1 Identification and use of the various tools.
- 2.2 Perform various sheet-metal operations.
- 2.3 Shearing
- 2.4 Bending
- 2.5 Drawing
- 2.6 Squeezing.
- 2.7 Marking on sheet
- 2.8 Snipping.
- 2.9 Grooving

3. Machine shop

- 3.1 Identification and use of the various tools and equipments.
- 3.2 Classification of lathe and operation of lathe.
- 3.3 Plane turning
- 3.4 Taper turning
- 3.5 Treading
- 3.6 Drilling
- 3.7 Various attachment used in lathe.

List of Apparatus :