JHARKHAND Rai University

| Diploma 1st Sem | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Choice Based Credit System (CBCS) | | | | | | | | | | | | |
| SEM I | | | | | | | | | | | | |
| | | | Periods | | | Evaluation Scheme | | | | | | |
| S. No | Subject Code | Name of Subject | L | T | P | Assignment | TA | Total | ESE | Subject Total | Credit | Hours |
| 1 | 9D.102 | Computer Fundamentals | 2 | 0 | 0 | 20 | 10 | 30 | 70 | 100 | 2 | 2 |
| 2 | 9D.103 | Basic Mathematics I | 3 | 0 | 0 | 20 | 10 | 30 | 70 | 100 | 3 | 3 |
| 3 | 9D.104 | Basic Chemistry | 3 | 0 | 0 | 20 | 10 | 30 | 70 | 100 | 3 | 3 |
| 4 | 9D.106 | Basic Physics I | 3 | 0 | 0 | 20 | 10 | 30 | 70 | 100 | 3 | 3 |
| 5 | 40D.101 | Life Skills I | 2 | 0 | 0 | 20 | 10 | 30 | 70 | 100 | 2 | 2 |
| PRACTICAL/DESIGN/DRAWING/SESSIONAL | | | | | | | | | | | | |
| 1 | 9DP.102 | Computer Fundamentals Lab | 0 | 0 | 2 | | 30 | 30 | 20 | 50 | 1 | 2 |
| 2 | 9DP.104 | Basic Chemistry Lab | 0 | 0 | 2 | | 30 | 30 | 20 | 50 | 1 | 2 |
| 3 | 9DP.105 | Basic Engineering Graphics | 0 | 0 | 4 | | 30 | 30 | 20 | 50 | 2 | 4 |
| 4 | 9DP.106 | Basic Physics Lab | 0 | 0 | 2 | | 30 | 30 | 20 | 50 | 1 | 2 |
| 5 | 9DP.107 | Workshop Practice I | 0 | 0 | 4 | | 30 | 30 | 20 | 50 | 2 | 4 |
| | | | | | | | | TOTAL | | 750 | 20 | 27 |

- **MOOCS introduced through SWAYAM in all semester.**

**Program:** Diploma
**Semester:** One
**Course:** Computer Fundamentals
**Course Code:** 9D.102

| L | T | P | C |
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| 3 | 0 | 0 | 3 |

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**Course Objective:**

- At the end of the course, the student should be able to: Design C Programs for problems.
  Write and execute C programs for simple applications.
- At the end of the course, the student should be able to:
  Apply good programming design methods for program development.
  Design and implement C programs for simple applications.
  Develop recursive programs"

**Unit I:**

Introduction – Characteristics of Computer, Evolution of Computer, Capabilities and Limitations of Computer, Generations of Computer, Types of Computer(micro, mini, mainframe, supercomputer), Block Diagram of Computer,

**Unit II:**

Basic components of a Computer system – input unit, output unit, arithmetic and logic unit, control unit, central processing unit, processors, Memory – main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, Cache Memory. Input Devices- Keyboard Direct Entry: Card readers, scanning devices (BAR CODE, OMR, MICR), Voice input devices, Light pen, Mouse, Touch Screen, Digitizer, Scanner. Output Devices- Printers- Impact and Non-impact printers. CRT, LCD, CD-WRITTER, ZIP DRIVE, DVD Introduction to Web Camera, modem

**Unit III:**

Computer Software Definition of software, Types of software, System Software, Operating System, Compilers, Interpreters, Assemblers, Linkers, Loaders, Programming Languages etc.
Business Data Processing- Data Processing; File Management System: File Types, File Organization, File Utilities; Database Management System: Database Models, Main Components of a DBMS, Creating and Using a Database

**Unit IV:**

Data Communication and Computer Networks - Data Transmission mode, Data transmission media, What is computer Network, Network types, Network Topologies, Communication Protocol, OSI Model, The Internet, Definition, Brief History, Basic Services, Email, File Transfer Protocol, Telnet, Internet Search Tools, World Wide Web, WWW Browsers Uses of the Internet, Internet Service Providers and Types of Internet Connection Direct/Leased line Connection, Remote Dial up Connection, SLIP/PPP Connection.

***Suggested Reading:***


1. *Computer Fundamentals by B.Ram, New Age Int.*
2. *Computer Fundamentals by P.K Sinha, Priti Sinha, Publisher Kalyani Publishers, 2nd Edition, 2003.*

**Program:** Diploma
**Semester:** One
**Course:** Computer Fundamentals Lab
**Course Code:** 9DP.102

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

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**List of Experiment**

1. Introduction to M.S.Windows package. Working on MS Word.
2. Putting header, bullets and footers in MS Word.
3. MS Word.; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates.
4. Working with MS Excel.; concepts of Workbook & Worksheets
5. Use of Formulas, Calculations & Functions
6. Working with MS PowerPoint; Creating a New Presentation.
7. Working with Presentation; Using Wizards; Slides & its different views.
8. Adding Graphics, Sounds and Movies to a Slide.

**Program:** Diploma
**Semester:** One
**Course:** Basic Mathematics I
**Course Code:** 9D.103

| L | T | P | C |
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**Course Objective:**

- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- Students will simplify and evaluate algebraic expressions.
- Students will form and solve linear equations in one variable.
- Students will form and graph linear equations in two variables.
- Students will solve nonlinear equations using analytic methods.

**Unit I:**
Trigonometry: Compound Angles, Multiple and Sub multiple Angles Inverse Trigonometric function.

**Unit II:**
Differential Calculus: Function, Limit, Derivatives, Differentiation of implicit function, Inverse Trigonometric function and parametric function. Geometrical Meaning of dy/dx ,dy/dx as a rate Measure. Integral Calculus: Integration, Integration of product of functions, Method of Substitution, Definite Integration.

**Unit III:**
Set Theory: Sets, Subsets Sets operations, Complement of a set, Difference of two sets, De Morgan's law, Cartesian Product of Sets. Algebra: Determinant, Permutation and Combination.

**Unit IV:**
Vectors: Definition of Vector, Algebra of Vectors (Equality, Addition, Subtraction) Scalar and Vector Product of two and three vectors.

***Suggested Reading:***
***1.*** *Basic Mathematics: Neelkant Sapna Publishing House.*
***2.*** *Basic Mathematics Semester I: Dilip Baburao S.chand & Sons.*

**Program:** Diploma
**Semester:** One
**Course:** Basic Chemistry
**Course Code:** 9D.104

| L | T | P | C |
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| 3 | 0 | 0 | 3 |

**Course Objective:**

- Chemistry is the base of all the scientific and technical courses.
- The knowledge gained on polymer chemistry, thermodynamics, spectroscopy, phase rule and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

**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 orbital &distinction between orbits And orbitals, Hunds Rule ,filling up the orbital's by Aufbau's principle (till Atomic no 30), Definition &types of valence (electrovalence& covalent) Octet rule, Duplet rule .formation of electrovalent &covalent compounds e.g. Nacl, CaCl2, $CO_2$ $Cl_2$, NH3C2H4,N2, $C_2H_2$Distician between Electrovalent & covalent compounds.

**Unit II:**

Electrochemistry : Brief study of redox reaction ,oxidation potential , Electrochemical series for Cation & anion ,Electrolysis of $CuSO_4$ solution By using carbon electrode , Faraday's first &second law of electrolysis & numerical, electrochemical cell & batteries ,definition types such As primary & secondary cell & their example .construction, working & Application of electrolysis such as electroplating &electro refining, Electrometallurgy & electrotyping

**Unit III:**

Metal & Alloys: Metal, occurrence of Metal, Definition of Metallurgy Mineral, Ore Gangue Flux & Slag, stages of Extraction of metal from Its Ores in detail such as Fe, Al, Cr, Ni. Alloys: definition of alloy, purposes of Making alloy .preparation methods, classification of alloys such as Ferrous & Non Ferrous & their example.

**Unit IV:**

Non Metallic Materials & Plastics : Basic concept of organic Chemistry nomenclature of different functional group & isomerism Definition of Plastic , formation of Plastic by Addition &condensation polymerization .study of Resin , Fillers ,Plasticizers Accelerates, Pigments, & their example .Engineering Application of Plastic based on their properties. Rubber natural rubber its processing, Drawbacks of Natural Rubber, vulcanization of rubber with chemical reaction .synthetic rubber , definition & distinction between natural &synthetic rubber .Thermal insulating material : definition &characteristics of thermal insulator. Preparation, properties & application of thermocol & glass wool Properties &application of Asbestos cork.

***Suggested Reading:***


1. *Engineering Chemistry Jain & Jain Dhanpat Rai and Sons*
2. *Engineering Chemistry S. S. Dara S. Chand Publication*
3. *Industrial Chemistry B. K. Sharma Goel Publication*
4. *Environmental Chemistry & Pollution Control S. S. Dara S. Chand Publication*

**Program:** Diploma
**Semester:** One
**Course:** Basic Chemistry Lab
**Course Code:** 9DP.104

| L | T | P | C |
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**List of Experiment**

1. Study of Indicator (Methyl Orange)
2. Study of Indicator (Phenolpthalein)
3. To Determine The Strength of NaOH Solution(Standard Oxalic Acid Solution Supplied)
4. Preparation of Copper Sulphate Crystal from Its Impure Sample.
5. Salt Analysis. (Wet Test & Dry Test).

**Program:** Diploma
**Semester:** One
**Course:** Basic Physics I
**Course Code:** 9D.106

| L | T | P | C |
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**Course Objective:**

- An ability to apply Knowledge of mathematics, science and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate and solve engineering problems.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Unit I:**

Physical World and Measurement: Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements, Dimensions of physical quantities, dimensional analysis and its applications.

**Unit II:**

Kinematics & Laws of Motion: Frame of reference. Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion, velocity-time, position-time graphs, and relations for uniformly accelerated motion (graphical treatment). Relative velocity. Laws of Motion: Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction. Uniform circular motion, Dynamics of uniform circular motion: Centripetal force.

**Unit III:**

Work, Energy and Power: Work done by a constant force and a variable force; kinetic energy, work- energy theorem, power. Potential energy, conservative forces, Non-conservative forces: elementary idea of elastic and inelastic collisions.

**Unit IV:**

Motion of System of Particles, Rigid Body Dynamics, Oscillations & SHM: Centre of mass of a two-particle system, momentum conversation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod. Moment of a force, torque, angular momentum, conservation of angular momentum, Rigid Body Dynamics :Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; Oscillations & SHM
:Periodic motion – period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring–restoring force and force constant; energy in S.H.M.-kinetic and potential energies; simple pendulum–derivation of expression for its time period; free and forced (damped) oscillations, resonance.

***Suggested Reading:***


1. *Engineering Physics – R.K. Gaur & S.L.Gupta*
2. *Modern Engineering Physics- A.S.Vasudeva*
3. *Concept of Physics – H.C.Verma*
4. *Waves & Oscillations – Brij Lal & Subramaniam*

**Program:** Diploma
**Semester:** One
**Course:** Basic Physics I Lab
**Course Code:** 9DP.106

| L | T | P | C |
|---|---|---|---|
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**List of Experiment**

1. To measure the thickness of the given glass plate using Screw Gauge.
2. To measure the length and diameter of the given solid cylinder using Vernier calipers.
3. To measure the thickness of the given glass plate using Spherometer.
4. Find the resistance of a given wire using Meter Bridge.
5. To establish the current voltage relationship for a metallic conductor and find its resistance.

**Program:** Diploma
**Semester:** One
**Course:** Life Skills I
**Course Code:** 40D.101

| L | T | P | C |
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**Course Objective:**
To impart basic skills of Professional Communication in English through intensive practice to the Students, so as to enable them to function confidently & effectively in that Language in the Professional Sphere of their life. The student must have some basic command of English so that the Student must be able to:

- Write reasonably & grammatically
- Understand (if not use) at least some 2500 general purpose words of English
- Use some 2000 (at least 1500) general-purpose words of English to express himself/herself in writing & 1500 such words to talk about day-to-day events & experiences of life.
- Understand slowly-delivered spoken material in Standard Indian English, and
- Speak reasonably clearly (if not fluently) on routine matters with his fellow Students, with proper word stress, intonation pattern, accent and perfect articulation

**Unit I:**
Basic Grammar

Noun, Verb, Adverb, Adjective & Preposition, Sentence, Tense: Present ,Past & Future, Voice, Narration, Concord, English Modals, Connectives, Degree of Comparison, Nominalization.

**Unit II:**
Practice Exercise

Re-Writing Sentences, Gap Filling, Common Errors, Phrases & Idioms, Homophones ( Commonly Confused Words), Vocabulary Building, Word Quiz

**Unit III:**
Written Communication Skills

Requisites of good sentence writing, Effective sentence structure, Sentence Building, Sentence coherence, Sentence Emphasis/theme, Development of a paragraph, Paragraph structure, Principles of paragraph Writing, Paragraph length/ coherence/ Division.

**Unit IV:**
Etiquettes & Manners

Dinning etiquettes, Workplace etiquettes, Professional Manners, Social Etiquettes, Group Behavior, Tour & Travel Etiquettes.

***Suggested Reading:***


1. *Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw-Hill. New Delhi*
2. *Swets, Paul. W. 1983. The Art of Talking So That People Will Listen: Getting Through to Family, Friends and Business Associates. Prentice Hall Press. New York*
3. *Lewis, Norman. 1991. Word Power Made Easy. Pocket Books*
4. *Sen , Leena .Communication Skills ; Eastern Economy Edition*
5. *Ghanekar , Dr. Anjali . Essentials of Business Communication Skills ; Everest Publishing House*
6. *David Green . Contemporary English Grammar, Structure & Composition ; MacMillan*
7. *Dictionary; Oxford*
8. *Dictionary ; Longman*

**Program:** Diploma
**Semester:** One
**Course:** Basic Engineering Graphics
**Course Code:** 9DP.105

| L | T | P | C |
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**Course Objective:**

- Student's ability to perform basic sketching techniques will improve.
- Students will be able to draw orthographic projections and sections.
- Student`s ability to use architectural and engineering scales will increase.
- Students will become familiar with auto cad two dimensional drawings.

**Unit I:**

Drawing Instruments and their uses: Letters and numbers (single stroke vertical), Convention of lines and their applications, Scale (reduced, enlarged & full size) plain scale and diagonal scale, Sheet layout, Introduction to AutoCAD (Basic draw and modify Command),Geometrical constructions.

**Unit II:**

Engineering curves & Loci of Points: To draw an ellipse by: Directrix and focus method, Arcs of circle method, concentric circles method. To draw a parabola by: Directrix and focus method, Rectangle method. To draw a hyperbola by: Directrix and focus method. Passing through given points with reference to asymptotes .Transverse Axis and focus method. To draw involutes of circle & polygon (up to hexagon),To draw a cycloid, epi cycloid, hypocycloid ,To draw Helix & spiral ,Loci of Points :Loci of points with given conditions and examples related to simple mechanisms.

**Unit III:**

Orthographic projections: Introduction to Orthographic projections .Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only).Dimensioning technique as per SP-46. Isometric projection. Isometric scale, Conversion of orthographic views into isometric View/projection (Simple objects), Projection of Straight Lines and Planes. (First Angle Projection Method only)

**Unit IV:**

Lines inclined to one reference plane only and limited to both end sin one quadrant. Projection of simple planes of circular, square, rectangular, rhombus, Pentagonal, and hexagonal, inclined tone reference plane and perpendicular to the other.

***Suggested Reading:***


1. *Engineering Drawing N. D. Bhatt Charotar Publishing House*
2. *Engineering Drawing and Graphics+ AutoCAD K. Venugopal New Age Publication*
3. *Engineering Drawing R. K. Dhawan S. Chand Co.*
4. *Engineering Drawing ---K. R. Mohan Engineering Graphics Dhanpat Rai and Publication Co.*
5. *Engineering Drawing -P S Gill.*

**Program:** Diploma
**Semester:** One
**Course:** Workshop Practice I Lab
**Course Code:** 9DP.107

| L | T | P | C |
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**Course Objective:**

- Students will be able to use their skills during their project work.
- Students will be able to understand the practical difficulties encountered in industries during assembly work.
- Students will be able to do simple electronic and electrical work throughout their career.
- Students will be able to rectify simple problems connected with fittings.

**Unit I:**

WELDING SHOP: Introduction, Types of welding, ARC welding, Gas welding, Gas Cutting. Welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece Different types of flame. Elementary symbolic representation Safety precautions in welding safety equipments and its use in welding processes.

**Unit II:**

SHEET METAL SHOP: Introduction, Various types of tools, Equipments and accessories. Different types of operations in sheet metal shop. Soldering and riveting Safety precautions. TURNING SHOP: Introduction, Various marking, measuring, cutting, holding and striking tools. Working Principle of Drilling machine, Tapping dies its use.

**Unit III:**

Drilling and Tapping .Turning: Plain, taper. Threading and Knurling. Safety precautions and safety equipments.

**Unit IV:**

PLUMBING SHOP: Introduction, Various marking, measuring, cutting, holding and striking tools. Different types of PVC pipes, flexible pipes used in practice. PVC pipes fittings and accessories, Adhesive solvents- chemical action, piping layout.

***Suggested Reading:***


1. *Workshop Technology S.K. Hajara Chaudhary Media Pro-motors and Publishers ,New Delhi*
2. *Workshop Technology B.S. Raghuwanshi Dhanpat Rai and sons, New Delhi*
3. *Production Technology R K Jain Khanna Publishers, New Delhi*
4. *Workshop Technology H.S.Bawa Tata McGraw Hill Publishers*