



## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Course of study and Scheme Examination of Diploma First Semester (2015-16) in Electrical and Electronics Engineering

### FIRST SEMESTER

| S<br>·<br>N<br>o | Subject<br>Code | Board of<br>Study   | Subject                           | Periods Per Week |           |           | Scheme of Examination |            |            |            |           | Total<br>Marks | Credit<br>[L+[T+P]]<br>2 |
|------------------|-----------------|---------------------|-----------------------------------|------------------|-----------|-----------|-----------------------|------------|------------|------------|-----------|----------------|--------------------------|
|                  |                 |                     |                                   |                  |           |           | Theory                |            |            | Practical  |           |                |                          |
|                  |                 |                     |                                   | L                | T         | P         | ESE                   | CT         | TA         | ESE        | TA        |                |                          |
| 1                | 200111<br>(46)  | Humanities          | Communication<br>Skill-I          | 3                | 1         | -         | 100                   | 20         | 20         | -          | -         | 140            | 4                        |
| 2                | 200112<br>(14)  | Basic Science       | Applied Maths-I                   | 3                | 2         | -         | 100                   | 20         | 20         | -          | -         | 140            | 4                        |
| 3                | 200113<br>(15)  | Basic Science       | Applied Physics                   | 3                | 1         | -         | 100                   | 20         | 20         | -          | -         | 140            | 4                        |
| 4                | 200114<br>(11)  | Basic Science       | Applied Chemistry                 | 3                | 1         | -         | 100                   | 20         | 20         | -          | -         | 140            | 4                        |
| 5                | 200115<br>(20)  | Civil Engg.         | Environmental Engg.               | 3                | 1         | -         | 100                   | 20         | 20         | -          | -         | 140            | 4                        |
| 6                | 200116<br>(37)  | Mechanical<br>Engg. | Work Shop Practice<br>(Theory)    | 1                | -         | -         | -                     | -          | 20         | -          | -         | 20             | 1                        |
| 7                | 200121<br>(15)  | Basic Science       | Applied Physics Lab               | -                | -         | 3         | -                     | -          | -          | 50         | 20        | 70             | 2                        |
| 8                | 200122<br>(11)  | Basic Science       | Applied Chemistry<br>Lab          | -                | -         | 3         | -                     | -          | -          | 50         | 20        | 70             | 2                        |
| 9                | 200123<br>(37)  | Mechanical<br>Engg. | Work Shop Practice<br>(Practical) | -                | -         | 8         | -                     | -          | -          | 100        | 40        | 140            | 4                        |
| <b>Total</b>     |                 |                     |                                   | <b>16</b>        | <b>06</b> | <b>14</b> | <b>500</b>            | <b>100</b> | <b>120</b> | <b>200</b> | <b>80</b> | <b>1000</b>    | <b>29</b>                |

L - Lecturer,                      T - Tutorial,                      P - Practical,

ESE - End Semester Exam,              CT - Class Test,              TA - Teachers Assessment

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT- COMMUNICATION SKILL-I

Code - 200111(46)

Minimum Number of class tests to be conducted -2

**SCHEME OF STUDY**

| S.No. | Topic                      | No. of Hours /<br>Period of Study | Marks<br>Allotted |
|-------|----------------------------|-----------------------------------|-------------------|
|       |                            | <b>Theory</b>                     |                   |
| 1.    | Passages for comprehension | 16                                | 30                |
| 2.    | Short Stories              | 08                                | 15                |
| 3.    | Applied Grammar            | 16                                | 25                |
| 4.    | Letter Writing             | 08                                | 20                |
| 5.    | Report Writing             | 08                                | 10                |
|       | <b>TOTAL</b>               | <b>56</b>                         | <b>100</b>        |

**Note:** For spoken English integrated approach may be adopted .

**COURSE CONTENTS**

| S.No. | Topics                       | Sub Topic  |
|-------|------------------------------|--|
|       | <b>Section -A</b>            |  |
| 1.    | Passage for<br>Comprehension | (1)Language of Science<br>(2) Robotic Revolution<br>(3) Designing a Car<br>(4)New Wonders of camera<br>(5)Non-conventional sources of Energy<br>(6)Our Environment<br>(7)Enterpreneurship<br>(8)Safety practices |
| 2.    | Short-Stories                | (1)Selfish Giant-Oscar Wilde<br>(2)A Letter to God-Gregario Lapex<br>Y-Fuentes<br>An astrologer's Day –R.K. Naragyan   |
| 3.    | Applied Grammar              | (1)Determiners<br>(2)Auxiliaries<br>(3)Tenses  |

|                  |                |  |
|------------------|----------------|--|
|                  |                | (4)Conditional<br>(5)Passive<br>(6)Prepositions<br>(7)Subject-verb Agreement<br>(8)Clauses & Connectors  |
| <b>SECTION-B</b> |                |  |
| 4.               | Letter Writing | (1)Application (For Job/Leave)<br>(2)Letter of Enquiry and replies<br>(3)Letter for Order Placement<br>(4)Letter of Complaints (To Editor/<br>Appropriate Authorities) |
| 5.               | Report Writing | (1)Writing Progress – Report of a job<br>(2)General outline for preparing A Project Report.  |

#### **LIST OF REFERENCE BOOKS**

1. Communication Skill for Teaching Students Book-I. M/s Somaiya Publications. Pvt. Ltd., Bhopal.
2. Living English Structure –W.S. Allen
3. Practical English Grammar (Exercises I by Thomson & Martinet)
4. English conversation practice by Grant Taylor.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT - APPLIED MATHEMATICS-I

Code - 200112(14)

Branch / Discipline - Computer Science and Engineering / Electronic & Telecommunication / Information Technology / Civil / Mechanical / Electrical / Metallurgy / Mining and Mine Surveying / Instrumentation.

Minimum number of class tests to be conducted - 2

## SCHEME OF STUDY

| S. No.       | Unit     | Topic                      | No. of Hours/ Periods | Marks Allotted |
|--------------|----------|----------------------------|-----------------------|----------------|
| 1.           | Unit -01 | Algebra                    | 06                    | 10             |
| 2.           | Unit -02 | Trigonometry               | 08                    | 10             |
| 3.           | Unit -03 | Coordinate Geometry        | 08                    | 10             |
| 4.           | Unit -04 | Conic Section              | 08                    | 10             |
| 5.           | Unit -05 | Differential Calculus      | 06                    | 10             |
| 6.           | Unit -06 | Methods of Differentiation | 08                    | 10             |
| 7.           | Unit -07 | Vector Algebra             | 08                    | 10             |
| 8.           | Unit 08  | Multiplication of Vector   | 07                    | 10             |
| 9.           | Unit -09 | Statistics                 | 06                    | 10             |
| 10.          | Unit -10 | Dispersions & Deviation    | 07                    | 10             |
| <b>TOTAL</b> |          |                            | <b>70</b>             | <b>100</b>     |

## COURSE CONTENTS

| S. No. | Topic    | Topic/ Sub Topic   | Contents  |
|--------|----------|--|---|
| 1.     | Topic-01 | Algebra-<br>Determents Mean and R.M.S. VALUE quadratic Equation Partial Fraction | Concept and principles of determents. Properties of determents Computation of Mean and R.M.S. Value General equation of second degree, Nature of roots, Formation of Equation Class- I, |

|    |                 |  |  |
|----|-----------------|--|--|
|    |                 |  | II,III, IV   |
| 2. | <b>Topic-02</b> | <b>Trigonometry</b><br>Trigonometrically ratios of multiple and submultiples angles<br>Trigonometrically Equations | Half angles, Double Angles, Triple angles General solution of Trigonometrically equation   |
| 3. | <b>Topic-03</b> | Coordinate Geometry<br>Coordinate S/systems<br>Distance Division   | Cartesian and Polar coordinates<br>distance between two points,<br>Division of a line segment  |
|    |                 | Standard form of the equation of a straight line<br>Change of Axes   | Locus standard forms. General equation of a straight line and its rotation to the structural forms,<br>Straight line through one and two point<br>Transformation of coordinates when the origin is shifted or the axes are rotated |
| 4. | <b>Topic-04</b> | <b>Conic Section</b><br>Circle<br>Conic Section  | Definition, Standard forms, General equation, Center and radius.<br>Parabola Ellipse   |
| 5. | <b>Topic-05</b> | <b>Differential Calculus</b><br>Functions Limit  | Independent and dependent variables, different type of functions, Concept of limit and its valuation   |
| 6. | <b>Topic-06</b> | <b>Method of Differentiation</b><br>Differentiation by first principle   | Differentiation by first principle of Algebra, Trigonometrical, Exponential and Logarithmic functions. Differentiation of sum, Product and quotient of two functions and functions of a function                                   |
| 7. | <b>Topic-07</b> | <b>Vector Algebra</b><br>Introductions Vector<br>Addition of Vector  | Concept of Vector and Scalar Quantities Understand the Principle of addition, subtraction of Vector  |

|    |          |   |   |
|----|----------|---|---|
|    |          | Component of Vector   | Component of Vector, Standard unit Vectors $i, j, k$  |
| 8. | Topic-08 | <b>Multiplication of Vector</b>                                 | Scalar product and its applications, Vector products and application  |
| 9. | Topic-09 | <b>Statistics</b><br>Frequency Distribution<br>central Tendency | Introduction , Graphical representation , Histogram, Frequency polygon, Frequency , Curve, Central Tendency Mean, Median , Mode |
| 10 | Topic-10 | <b>Dispersions &amp; Deviation</b>                              | Measure of dispersion Range<br>Quartile deviation Standard,<br>Deviation Root Mean square<br>deviation                          |

#### LIST OF REFERENCE BOOKS

- Mathematics for Polytechnic Volume I, TTTI Publication
- Applied Mathematics, EEB Publication , Bhopal
- Differential Calculus, By Gorakh Prasad
- Integral Calculus, By Gorakh Prasad
- Coordinate Geometry, By. S.L. Loney

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT - APPLIED PHYSICS

Theory Code - 200113(15)

Minimum number of class tests to be conducted - 2

## SCHEME OF STUDY

| S.No.                               | Unit<br>Topic/ Sub Topic |  | No. of Hours/Periods |           | Marks<br>Allotted |  |
|-------------------------------------|--------------------------|--|----------------------|-----------|-------------------|--|
|                                     |                          |  | Theory               | Practical |                   |  |
| <b>General Properties of Matter</b> |                          |  |                      |           |                   |  |
| 1.                                  | Unit -01                 | Unit , Measurement & Vector  | 05                   | 42        | 10                |  |
| 2.                                  | Unit –02                 | Force, Motion & Gravitation  | 08                   |           | 10                |  |
| 3.                                  | Unit -03                 | Elasticity, Surface Tension & Viscosity  | 07                   |           | 10                |  |
| <b>Sound</b>                        |                          |  |                      |           |                   |  |
| 4.                                  | Unit –04                 | Periodic Motion & Waves, Ultrasonic  | 05                   |           | 10                |  |
| <b>Heat</b>                         |                          |  |                      |           |                   |  |
| 5.                                  | Unit –05                 | High Temperature Measurement , Kinetic theory of Gases                             | 06                   |           | 10                |  |
| 6.                                  | Unit -06                 | Thermodynamics   | 03                   |           | 10                |  |
| <b>Light</b>                        |                          |  |                      |           |                   |  |
| 7.                                  | Unit –07                 | Reflection, Refraction & Dispersion of Light                                       | 05                   |           | 10                |  |
| 8.                                  | Unit -08                 | Optical Instruments  | 05                   | 10        |                   |  |
| <b>Electricity &amp; Magnetism</b>  |                          |  |                      |           |                   |  |
| 9.                                  | Unit -09                 | Magnetism  | 05                   | 10        |                   |  |
| <b>Modern Physics</b>               |                          |  |                      |           |                   |  |
| 10.                                 | Unit –10                 | Photoelectric effect, x-rays, laser, fiber optics, Microwaves, Electron Microscope | 07                   | 10        |                   |  |
| <b>TOTAL</b>                        |                          |  | <b>56</b>            | <b>42</b> | <b>100</b>        |  |

## COURSE CONTENTS -

### GENERAL PROPERTIES OF MATTER :-

#### 1.Units, Measurement & Vectors :-

Fundamental units, Derived units, unit system, S.I. units – Their importance & notation, Base, S.I. units system & Abbreviations, Principle of vernier calipers, screw gauge & Speedometer.

Scalar & Vector quantities, Representation of Vectors, kinds of Vectors, addition & Subtraction of vectors, multiplication of a vector by a scalar, linear combination of vectors, Resolution of vector, position vector, scalar products & vector product.

#### 2.Force, Motion & Gravitation

2.1**Classification of motion**– Characteristic of different types of motion, Newton's laws of motion, Conservative & non-conservative force, speed & Velocity , Acceleration, equation of motion, concept of mass, weight & weightlessness, Friction, limiting friction, Angle of friction and coefficient of friction, Static & dynamic friction, Friction-a necessity and an evil.

2.2**Circular motion**Motion of a particle on the circle with constant speed, Related Physical quantities, Relation between linear & angular velocities, centripetal & centrifugal forces, Banking of Road and bending of cyclist.

2.3**Rotatory motion**Axis of motion, moment of inertia, Radius of gyration , Kinetic energy of rotation, derivation of equation of kinetic energy of a rotating body. Torque acting on a particle, angular momentum, relation between torque and angular acceleration.

Newton's law of Gravitation, Basic forces in nature, Gravitational field, Potential, Relation between "g" & "G" , factors influencing "g" escape velocity, kepler's Laws of planetary motion, satellites, Time period of satellites , simple pendulum.

#### 3.Elasticity, Surface Tension & Viscosity :-

Concept of elasticity , Deformation, Stress, Strain- its kinds and units,



Hooke's law, elastic unit, elastic fatigue, Moduli of elasticity's, Young's Modulus and its determination by Searl's method.

Molecular forces, cohesive and adhesive forces, surface tension & surface energy, Reason for spherical shape of Rain Drops, Angle of contact, pressure difference a liquid surface excess pressure inside a liquid drop & soap bubble, shape of liquid surface In a capillary tube, Rise of liquids in a capillary tube, Determination of surface tension by capillary rise method. 'Effect of temperature on surface tension, examples of surface tension.

Concept of viscosity & coefficient of viscosity, streamline and Turbulent flow, Reynolds number, Poiseuille's equation for the flow of liquid through a tube, Stoke's law & Terminal velocity, Determination of "n" by falling sphere method.

### Sound

#### 4. Periodic motion & waves, Ultrasonic :-

Necessary conditions for the appearance & pursuance of periodic motion, classification of periodic motion based on forces acting on the source, necessary condition for the motion to be simple harmonic, characteristics of simple harmonic motion, Energy of a particle executing simple harmonic motion, Types of wave motion, equation of a plane progressive wave, Particle velocity & wave velocity.

Ultrasonic waves, production of Ultrasonic waves, applications of Ultrasonic waves.

### Heat

#### 5. High Temperature Measurement, Kinetic theory of Gases :-

Principle of Resistance Thermometer, Platinum resistance Thermometer, See back Effect and Thermoelectric Thermometer, Thermocouple, Temperature of inversion and neutral temperature, Relate Thermos e.m.f. with temperature, Optical pyrometer, Comparative study for range and accuracy of above Thermometers.

Concepts of a perfect gas, Postulates of kinetic Theory of gases, Pressure exerted by a perfect gas (no derivation of formula) Kinetic interpretation of temperature and Absolute Zero, deduction of gas laws.

#### 6. Thermodynamics :-

First law of Thermodynamics, Mechanical equivalent of heat, specific

heat of gases, Relation  $C_p - C_v = R/J$  , Isothermal & Adiabatic changes, concept of Latent heat of fusion of ice and vaporization of water.

## Light

### 7. Reflection, Refraction & Dispersion of light: -

Laws of reflection at plane & spherical surface. Definition of center of curvature, radius of curvature, principle axis, principal focus and focal length, engineering application of laws of reflection.

Refraction at a plane surface, laws of refraction, Absolute and relative refractive index, critical angle and total internal reflection of light, refraction through lens (no derivation of formula), Magnification combination of Lenses and power of lens.

Refraction through prism, angle of minimum deviation and their relation, Dispersion and Dispersive power, pure and impure spectrum, Electromagnetic spectrum and its visible range.

### 8 Optical Instruments :-

Simple microscope, compound microscope, Astronomical telescope , Terrestrial telescope , Kaleidoscope.

## Electricity & Magnetism

### Electrostatics :-

Electric Charge, Coulomb's Law , Electric Field & Potential, Potential Difference Between Two Points, Equipotential Surfaces, dielectric Strength, Capacity, Units, Principle of Capacitor, Factors Affecting Capacity, Type of Capacitors.

### Magnetism:-

Magnetic lines of force, lines of induction, Magnetic induction, magnetic field around a current carrying conductor, direction of magnetic field and current, magnetic field due to a circular loop, Biot Savarts law field due to a long linear conductor, force experienced by a current carrying conductor in a magnetic field, definition of unit current, force between two long parallel conductors.

Magnetic materials, molecular theory & magnetism, Di. Para and ferromagnetic substances. Fleming's Right hand & Left Hand Thumb Rule, Maxwell's Screw Rule, Hysterisis Loop, Electromagnetic Induction,

Introduction, faraday's law of Electromagnetic Induction, Induced E.M.F., Lenz's law , Self & Mutual Induction.

**9 Modern Physics :-**

Photoelectric effect : Photoelectron, laws of photoelectric emission, Planck's quantum law , Einstein's photoelectric equation, Threshold frequency , Photo cell.

X-rays : production properties & uses.

Laser : Spontaneous and stimulated emission, population inversion, pumping and active system , method of production, ruby and semi conductor laser, uses.

Fiber optics : Principle, application & uses.

Electron microscope its principle & construction .

**(PRACT. CODE – 200121(15))**

**LIST OF EXPERIMENTS**

- 1.To measure radius of curvature of given curved surface using .
- 2.To determine the value of "g" using simple pendulum.
- 3.To determine Young's modulus of elasticity of the material of given wire using Searl's apparatus.
- 4.To determine surface tension of water by capillary rise method.
- 5.To determine coefficient of viscosity of a fluid by Poiseuille's method.
- 6.To determine refractive index of the material of prism using graph.
- 7.To determine focal length of concave mirror & convex lens.
- 8.To determine focal length of combination of two lenses.
- 9.To determine mechanical equivalent of heat by using Joules colorimeter.
- 10.To plot magnetic lines of force in N-N and N-S condition.

**REFERENCE BOOKS -**

- 1.Applied Physics Vol. I&II H.C. Saxena & Prabhakar Singh
- 2.Applied Physics Vol. I&II D.Halliday & R.Rasnick
- 3.Engineering Physics – BVN Rao
- 4.Principles of Physics – K.K. Mohindroo
- 5.Basic Principles of Physics – Brij Lal Subramanyam .

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT - APPLIED CHEMISTRY

Theory Code – 200114(11)

Minimum number of class tests to be conducted – 2

SCHEME OF STUDY

| S. No. | Chapter      | Topics  | No. of Theory hours / Periods | No. of Practical Hours/ Periods | Marks Allotted |
|--------|--------------|---|-------------------------------|---------------------------------|----------------|
| 1.     | Chapter -1   | (a)Atomic structure<br>(b)Nuclear Chemistry                       | 08                            | 42                              | 10             |
| 2.     | Chapter – 2  | (a)Periodic Table and periodic properties.<br>(b)Chemical Bonding | 07                            |                                 | 10             |
| 3      | Chapter – 3  | (a)Electrochemistry<br>(b)Colloids                                | 07                            |                                 | 10             |
| 4      | Chapter – 4  | Metals and metallurgy   | 04                            |                                 | 10             |
| 5      | Chapter – 5  | (a)Metal alloys<br>(b)Corrosion and protection                    | 07                            |                                 | 10             |
| 6      | Chapter – 6  | Polymers and Polymerisation                                       | 05                            |                                 | 10             |
| 7      | Chapter – 7  | Fuels & Explosives  | 05                            |                                 | 10             |
| 8      | Chapter – 8  | Lubricants paints and varnishes                                   | 04                            |                                 | 10             |
| 9      | Chapter – 9  | Water Treatment   | 04                            |                                 | 10             |
| 10     | Chapter – 10 | Pollution   | 05                            |                                 | 10             |
|        |              | <b>Total</b>  | <b>56</b>                     | <b>42</b>                       | <b>100</b>     |



|     |             |  |  |
|-----|-------------|--|--|
|     |             |  | Kohlrausch law, Ostwald dilution laws, Transport no. Faraday's Law of Electrolysis Electrochemical equivalent, Definition of pH, Law of mass action, Buffer solutions, calculation of Ph. Value of a Buffer solution, Acid Base Concept.   |
|     |             | (b) Colloids   | Types of colloidal solution, preparation of colloids, properties of colloidal solutions, Origin of change on colloidal particles, precipitation of Coagulation of colloidal solution. Protective colloids and Gold number, Emulsions cleansing action of soaps, Detergents, Gels.  |
| 4   | Chapter – 4 | Metal and metallurgy                                       | Occurrence, extraction, properties and engineering uses of heavy metals with special reference to Cu, Fe, Zn, Al, Si, Ge, C Electro magnetic properties of Fe, Ni, Co, Cr.   |
| 5   | Chapter – 5 | (a) Metal & Its Alloys<br><br>(b) corrosion and protection | Properties, constitution and Engineering uses of common alloys like Brass, Bronze, German Silver, Duralumin, Solder, stainless steel pressure and die casting alloy, Bearing alloys.<br><br>Corrosion of metals, Types of corrosion, Galvanic Series, corrosion control, protective coatings. Coating processes with special emphasis on electroplating and electro typing . |
| 06. | Chapter -06 | Polymers & Polymerization                                  | Physical properties of the polymers condensation and addition polymerization. Copolymers, effect of structure of polymer on properties, classification of polymers, Rubber –Vulcanization and compounding reclaimed rubber , Bunas SBR Neoprene ,Polyurethanes silicons, Fibers- Nylon, Dacron, orlon, polyester, Plastics and Resins – Thermoplastics                       |

|     |             |                                   |  |
|-----|-------------|-----------------------------------|--|
|     |             |                                   | and Thermosetting resins, Thermo cole and glass wool. Adhesives  |
| 07. | Chapter -07 | 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.  |
| 08. | Chapter -08 | Lubricants , Paints and Varnishes | Lubricant- meaning types, theory of lubrication, properties of a 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. 05  |
| 09. | Chapter –09 | Water Treatment                   | Water hardness, types and units, Determination of hardness of water by E.D.T.A. method and O Hehners method. Softening of hard water , lime soda process and Permutit process.   |
| 10  | Chapter –10 | Pollution                         | Pollution – meaning, causes of Pollution, air pollution, pollutants, causes of depletion of ozone layer, influence of ozone layer depletion. Acid rain, Water pollution, sources of Water pollution BOD, COD, Soil pollution, Green house effect, Radioactive Pollution, Effects and preventive measures of pollution. |

**PRACT. CODE – 200122(11)**  
**PRACTICALS/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. To determine percentage of Iron in a iron salt by redox titration.
4. Calorimetric estimation of metals in a given sample of a alloy.
5. Measurement of Ph of different solutions.
6. To find out the hardness of water by EDTA method.
7. Proximate analysis of a sample of coal.
8. To find out the Flash point/Fire point of dry/non drying oils.

9. Determination of Viscosity by Red wood Viscometer.
10. Determination of Calorific value (C.V.) of solid fuel by Bomb Calorimeter.

#### **LIST OF REFERENCE BOOKS**

1. Engineering Chemistry by O. P. Agrawal.
2. Engineering Chemistry by Jain and Jain.
3. Physical Chemistry by Glosstone.
4. Organic Chemistry by Sarkar and Rakshit.
5. Engineering Chemistry by M. M. Uppal Revised by S. C. Bhatia.
6. Modern Text Book of Applied Chemistry by P.C. Jain, Dr. G. C. Saxena and Dr. A. K. Goswami.



Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT - ENVIRONMENTAL ENGINEERING

Code 200115(20)

Branch /Discipline - Mechanical Engg./Civil/Electrical/Metallurgical  
/Instrumentation/ Mining and Mine surveying

Minimum number of class tests to be conducted – 2

SCHEME OF STUDY

| S. No. | Chapter   | No. of Hours / Period | Marks Allotted |
|--------|---|-----------------------|----------------|
| 1.     | Introduction and global warming                             | 05                    | 10             |
| 2.     | Air quality, Definitions, characteristics and perspectives. | 05                    | 10             |
| 3.     | Metrology and natural purification processes.               | 05                    | 10             |
| 4.     | Engineered system for Air pollution control.                | 06                    | 10             |
| 5.     | Engineered system for Resources and Energy recovery.        | 06                    | 10             |
| 6.     | Noise pollution and control.                                | 06                    | 10             |
| 7.     | Industrial Waste  | 06                    | 10             |
| 8.     | Environment & pollution control laws.                       | 05                    | 10             |
| 9.     | Air pollution from thermal power plants etc.                | 06                    | 10             |
| 10.    | Water contamination in Ocean                                | 06                    | 10             |
|        |   | <b>64</b>             | <b>100</b>     |

COURSE CONTENTS -

**Chapter – 1 INTRODUCTION AND GLOBAL WARMING**

The Environment, the impact of human being upon the environment, the impact the Environment upon human beings, Improvement of Environment quality, the role of the Environmental engineer. Global warming – reasons.

**Chapter – 2 AIR QUALITY: DEFINITIONS, CHARACTERISTICS & PERSPECTIVES**

Air pollution-Historical overview, global Implication of Air pollution, Units of measurement, sources of pollutants.

CLASSIFICATION OF POLLUTANTS – Particulates, hydrocarbons, carbon monoxide, Oxide of Sulphur, Oxides of Nitrogen, photochemical oxidants, Indoor air pollution Measurements of above pollutants.

Air quality managements concepts.

**Chapter –3 METROLOGY AND NATURAL PURIFICATION PROCESS**

Elemental properties of the atmosphere – Scales of motion, Heat pressure, wind, moisture, Relative humidity.

Devices used for the measurement of above properties.

Influence of Metrological phenomena on air quality & dispersion, pressure system & Dispersion Winds & dispersion moisture and dispersion, modeling.

Effects of Air pollution metrological conditions-changes on the Mesoscale & Microscale, changes on Microscale.

**Chapter – 4 ENGINEERED SYSTEMS FOR AIR POLLUTION CONTROL**

Atmospheric cleansing processes, Approaches to contaminant control.

Central devices for particulate contaminants Gravitational settling chambers, centrifugal collectors, wet collectors, Fabric filters (Baghouse filters) Electrostatic precipitators (ESP) control devices for gaseous contaminants-absorption, condensation, combustion, Automotive emission control.

**Chapter – 5 ENGINEERED SYSTEMS FOR RESOURCE AND ENERGY RECOVERY**

Processing techniques – Mechanical size alteration, Mechanical component separation, Magnetic & Electromechanical separation, Dewatering and Dewatering.

Materials recovery systems – Materials specifications, processing and recovery systems.

Recovery of biological conversion products-Composting (Aerobic conversion), Anaerobic Digestions.

Recovery of Thermal conversion products – Combustion of waste materials, Incineration with heat recovery, use of refuse Derived fuels (RDF), Gasification, pyrolysis.

Recovery of energy from conversion products energy – Recovery systems, Efficiency-factors, Determination of energy output and efficiency.

Materials and energy-Recovery systems.

## **Chapter – 6 NOISE POLLUTION AND CONTROL**

Sources of noise pollution, control of noise pollution, unit of noise measurement, Noise intensity level-allowable limit for different situations. Noise measurement, The problem of noise pollution and legal measures for its control.

## **Chapter – 7 INDUSTRIAL WASTES**

Industrial Waste treatment – Economics of waste treatment benefits of pollution abatement (primary, secondary and intangible benefits), difficulties in achieving, pollution abatement through industrial waste treatment, theories of waste treatment of specific – industrial waste such as textile, dairy paper and pulp, and distillery waste.

## **Chapter – 8 ENVIRONMENTAL AND POLLUTION CONTROL LAWS**

Air (prevention and control of pollution) Act, 1981 and Air (prevention and control of pollution Rules 1982-short title, extent and commencement, definitions. The environment (Protection) Act 1986-short title, extent and commencement Definitions-Measures to protect and improve environment.

**Chapter–9** Air Pollution from thermal power plants, Nuclear power plants, Fertilizer and chemical plants, Acid rain, Methods of prevention.

**Chapter–10** WATER CONTAMINATION IN OCEAN – Reasons, its effects, method of prevention.

## **REFERENCE BOOKS**

1. Air pollution by Perkins.
2. Liquid waste of industry, theories, practices and treatment by Nelson L. Vamerow.
3. Management of solid waste in developing countries by Flint off.
4. Environmental Engineering (International edition) by Peavy, Howards. (Mc Graw H Series in Environmental engineering)
5. Air Pollution – Its origin and control by Kenneth work and Warmer. (W.H.O. Publication)
6. industrial waste by Namit.
7. Thermal Environment by Burgess H. Jennings.
8. Environment & Pollution control law by Vijay Malik ( EBC publishing Pvt. Ltd.) Lucknow.
9. Environment protection-Problems, Policies administration, Law edited by Paras Diwan Deep & Deep Publications.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1<sup>st</sup> Semester

SUBJECT - WORKSHOP PRACTICE

Theory Code – 200116(37)  
Practical Code -200123(37)

## SCHEME OF STUDY

| S.No. | TOPIC                    | No. of Hours / Periods |            | TOTAL No. of Hours / Periods |
|-------|--------------------------|------------------------|------------|------------------------------|
|       |                          | LECTURE                | PRACTICAL  |                              |
| 1.    | Measurement              | 1                      | 07         | 08                           |
| 2.    | Safety                   | 1                      | 07         | 08                           |
| 3.    | Wood working (Carpentry) | 3                      | 20         | 23                           |
| 4.    | Metal working            | 3                      | 29         | 32                           |
| 4.1   | Fitting                  |                        |            |                              |
| 4.2   | Smithy                   |                        |            |                              |
| 4.3   | Sheet metal              |                        |            |                              |
| 5     | Joining Methods.         | 3                      | 20         | 23                           |
| 5.1   | Welding                  |                        |            |                              |
| 5.2   | Soldering & Brazing      |                        |            |                              |
| 5.3   | Riveting                 |                        |            |                              |
| 6     | Machine Shop             | 3                      | 29         | 32                           |
|       | <b>Total</b>             | <b>14</b>              | <b>112</b> | <b>126</b>                   |

## LIST OF PRACTICALS

- (1) Measurement  
Identification and use of the various measuring tools & instruments.
  - 1.1 Linear measurements and measuring devices.
  - 1.2 Angular measurements and measuring devices
  - 1.3 Other measuring tools such as surface plate, Surface gauge, plate  
Safety in different shop of workshops.
2. Wood working (carpentry shop)
  - 2.1 Identification of carpentry tools and their uses.
  - 2.2 Perform various wood working operations.
3. Fitting shop.
  - 3.1 Identification of various tools used and the operations performed in fitting shop.
    - 3.1.1 Perform various fitting operations.
    - 3.1.2 Marking of job as per dimension.
    - 3.1.3 Sawing.
    - 3.1.4 Chipping .

- 3.1.5 Filling .
- 3.1.6 Taping .
- 3.1.7 Reaming.
- 3.1.8 Drilling.
- 3.2 Smithy Shop
  - 3.2.1 identification of various tools and equipments used & their use.
  - 3.2.2 Perform Various smithy operations.
  - 3.2.3 Up setting .
  - 3.2.4 Drawing down.
  - 3.2.5 Bending
  - 3.2.6 Setting down.
  - 3.2.7 Welding.
  - 3.2.8 Cutting .
  - 3.2.9 Punching.
  - 3.2.10 Fullering.
- 4.3 Sheet metal.
  - 4.3.1 Identification and use of the various tools.
  - 4.3.2 Perform various sheet-metal operations.
  - 4.3.3 Shearing
  - 4.3.4 Bending
  - 4.3.5 Drawing
  - 4.3.6 Squeezing.
  - 4.3.7 Marking on sheet
  - 4.3.8 Snipping.
  - 4.3.9 Grooving
- 5 Welding Shop
  - 5.1 Identification and use of the various tools and equipments.
  - 5.2 Perform the arc welding and gas welding operations.
  - 5.3 Perform the soldering and Brazing operations.
- 6 Machine shop
  - 6.1 Identification and use of the various tools and equipments.
  - 6.2 Classification of lathe and operation of lathe.
  - 6.3 Plane turning
  - 6.4 Taper turning
  - 6.5 Treading
  - 6.6 Drilling
  - 6.7 Various attachment used in lathe.

#### **LIST OF BOOKS**

- (1) Workshop Technology (Vol-1)  
Hazra & choudhary .
- (2) Workshop Technology – (Vol-1 & 2)  
Chapnan
- (3) Manufacturing process (Vol-1)  
Delela
- (4) Materials and Manufacturing  
Lindberg processes.