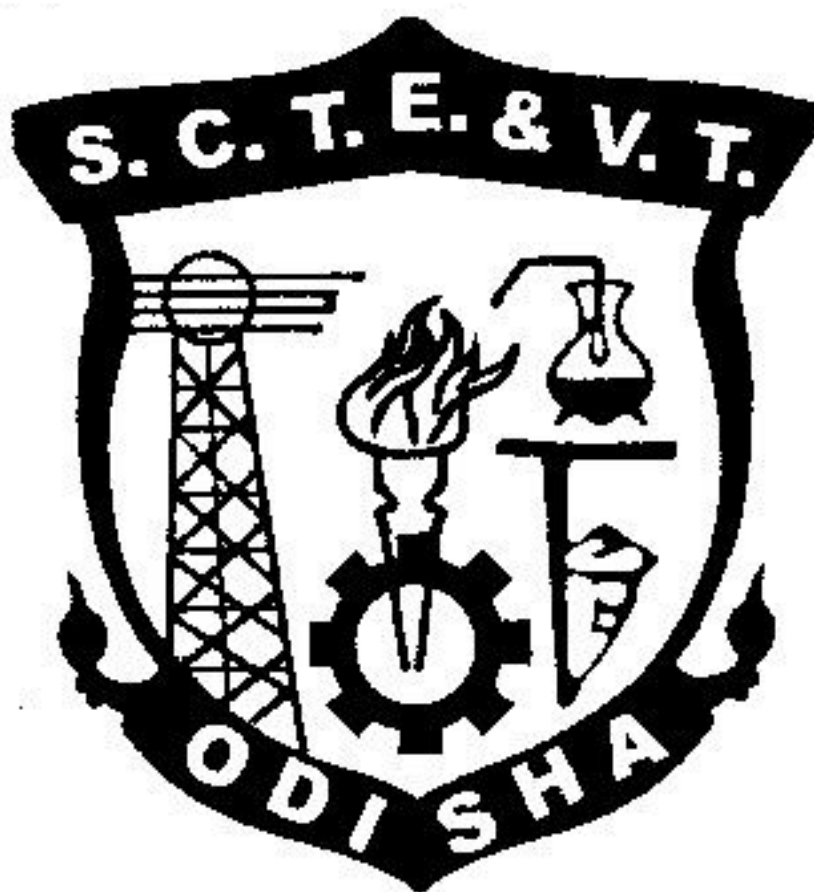


**REVISED CURRICULUM FOR DIPLOMA IN ENGINEERING  
(EFFECTIVE FROM ACADEMIC SESSION 2013-14)**



**STATE COUNCIL FOR TECHNICAL EDUCATION &  
VOCATIONAL TRAINING, ODISHA, BHUBANESWAR**

**STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA**

**TEACHING AND EVALUATION SCHEME FOR FIRST SEMESTER DIPLOMA IN ENGINEERING COURSES**

Sr. No.	Subject Code	SUBJECT	PERIODS			EVALUATION SCHEME					
			L	T	P	SESSIONAL EXAM			END SEM EXAM	PRACTICAL EXAM	TERM WORK
						TA	CT	TOTAL			
<b>THEORY</b>											
1.	BST101 OR BST102	ENGINEERING PHYSICS OR ENGINEERING CHEMISTRY	4	-	-	10	20	30	70	-	-
2.	BST103	ENGINEERING MATHEMATICS - I	5	-	-	10	20	30	70	-	-
3.	BET101 OR BET102	BASIC ELECTRICAL ENGINEERING OR BASIC ELECTRONICS ENGINEERING	4	-	-	10	20	30	70	-	-
4.	BET103 OR BET104	ENGINEERING MECHANICS OR COMPUTER APPLICATION	4	-	-	10	20	30	70	-	-
5.	HMT101	COMMUNICATIVE ENGLISH-I	2	-	-	10	20	30	70	-	-
<b>TOTAL</b>			<b>19</b>	<b>-</b>	<b>-</b>	<b>50</b>	<b>100</b>	<b>150</b>	<b>350</b>	<b>-</b>	<b>-</b>
<b>PRACTICAL / TERM WORK</b>											
6.	BSP101 OR BSP102	ENGINEERING PHYSICS PRACTICAL OR ENGINEERING CHEMISTRY PRACTICAL	-	-	4	-	-	-	-	25	25
7.	BEP101 OR BEP102	BASIC ELECTRICAL ENGINEERING PRACTICAL OR BASIC ELECTRONICS ENGINEERING PRACTICAL	-	-	4	-	-	-	-	-	25
8.	BEP103 OR BEP104	ENGINEERING MECHANICS PRACTICAL OR COMPUTER APPLICATION PRACTICAL	-	-	4	-	-	-	-	-	25
9.	BEP105 OR BEP106	ENGINEERING DRAWING OR WORKSHOP PRACTICE	-	-	6	-	-	-	-	100	25
10.	HMP101	COMMUNICATIVE ENGLISH-I PRACTICAL	-	-	2	-	-	-	-	-	25
<b>TOTAL</b>			<b>-</b>	<b>-</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>125</b>	<b>125</b>
<b>GRAND TOTAL</b>			<b>19</b>	<b>-</b>	<b>20</b>	<b>50</b>	<b>100</b>	<b>150</b>	<b>350</b>	<b>125</b>	<b>125</b>

**Abbreviations: L-Lecturer, T-Tutorial, P-Practical, TA-Teachers Assessment, CT-Class Test**

**Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50%**

# BST101 ENGINEERING PHYSICS

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective :

Technology is the applied aspect of pure science which provides concepts, theories and formulae. All technological progress depends on scientific understanding of the working of nature; pure science & technology therefore, are closely interlinked. Engineering, being the science of measurement and design, has been offspring of Physics that plays the primary role in all professional disciplines of engineering. The different streams of Physics provide Fundamental Facts, Principles, Laws, and Proper Sequence of Events to streamline Engineering Problems.

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Dimensions & Vectors	04
2	Curvilinear Motion & Kinematics	10
3	Gravitation, Planetary Motion & Simple Harmonic Motion	10
4	Sound & Acoustics	06
5	Heat & Thermodynamics	06
6	Optics	04
7	Magnetostatics & Electrostatics	06
8	Current Electricity & Electromagnetism	08
9	Electromagnetic Induction	03
10	Modern Physics	03
	<b>TOTAL</b>	<b>60</b>

**1. DIMENSIONS AND VECTORS** - Dimension & Dimensional Formula of Physical Quantities- Definition and concepts. Principle of Homogeneity, Checking the correctness of physical equations, Resolution of vectors, Dot Product and Cross Product of vectors, Simple Numericals.

**2. CURVILINEAR MOTION & KINEMATICS** - Definition & concepts- Projectile Motion, Angle of projection, Trajectory, Maximum Height, Time of Flight And Horizontal Range, Condition for maximum range of the projectile, Friction-Definition of Static, Limiting and Dynamic friction, Laws of limiting Friction, Methods to reduce friction, Simple numericals.

**3. GRAVITATION, PLANETARY MOTION & Simple Harmonic Motion** – Kepler' s Laws of Planetary motion-Statement with explanation, Variation of acceleration due to gravity with latitude, altitude & depth, Definitions-Uniform Circular motion, angular displacement, angular velocity and angular acceleration, Simple harmonic motion-Definition and parameters of S.H.M.-amplitude, frequency and time period, Explanation of SHM as a projection of a uniform circular motion on any diameter and Derivation of velocity and acceleration of a particle executing SHM.

**4. SOUND & ACCOUSTICS** -Longitudinal & transverse waves-Definition & comparison, Progressive and stationary wave-Definition & comparison, Different wave parameters (Amplitude, frequency, time period wave length and velocity)-Definition & derivation of related formulae, Ultrasonic-Definition, properties & applications, Doppler's effect (source at rest & listener in motion and vice-versa)-Definition, Conceptual explanation and applications.

**5. HEAT & THERMODYNAMICS** - Coefficient of Linear, Superficial & Cubical Expansion of solids-Definition & Derivation of relation between them, 1<sup>st</sup> Law of Thermodynamics-Statement & Explanation,  $C_p$  and  $C_v$  - Definition & Derivation of relation between them, Mechanical Equivalent of heat-Definition and explanation, Thermal conductivity- Definition, S.I. unit, dimension & derivation of formula.

**6. OPTICS** - Refractive Index-Definition and conceptual explanation. Refraction through a prism. Total internal reflection & Critical Angle-Definition, Explanation and applications (mirage, looming etc.). Fiber Optics- Definition, concept and applications.

**7. MAGNETOSTATICS & ELECTROSTATICS** - Coulomb's Laws in Magnetism-Statement with explanation, Definitions-Unit Pole, Magnetic Field Intensity, Magnetic Lines of Force, Magnetic Flux, Flux Density, Electric field Intensity, Electric Potential, Capacity of a conductor, Capacitance. Derivation of formula for capacity of a Parallel Plate Capacitor and the effect of dielectric on it. Numerical problems on Grouping of capacitors in series & parallel.

**8. CURRENT ELECTRICITY & ELECTRO-MAGNETISM** - Kirchoff's Laws-Statement with explanation, application to Wheatstone Bridge, Electro-magnetism- Biot Savart's Law (Statement with explanation), Formula for magnetic field induction due to current through a straight wire and at the centre of a circular coil (Formula with concept). Motion of a charged particle inside a uniform magnetic field, Expression for the force acting on a current carrying straight conductor placed in a uniform magnetic field, Fleming's Left Hand Rule-Statement, explanation and vector diagram, Simple numerical .

**9. ELECTRO-MAGNETIC INDUCTION** - Faraday's Laws of Electromagnetic Induction-Statement with explanation. Lenz's Law, Fleming's Right Hand Rule- Statement, explanation and vector diagram.

**10. MODERN PHYSICS**- Concept of Photoelectric Effect, Einstein's Photoelectric equation, Laws of photoelectric emission, Application of Photo cells, LASER, characteristics of LASER, Principle of LASER, Applications of LASER.

**Books Recommended:**

1. Text Book of +2 Physics – Vol-I & II by Barik, Das & Sharma (Klayani Publishers).
2. Engineering Physics by Gaur & Gupta (Dhanpat Rai & Co., New Delhi)
3. Fundamental of Physics - Halliday, Resnick & Walker (Willey Toppan Publishers)
4. Engineering Physics – B. L. Theraja ( S. Chand Publishers, New Delhi)
5. Modern physics- R. Murugesan (S. Chand Publication)
6. Fiber Optics-D.A.Hill
7. Fundamental of Physics for +2 Vol-I & II- V.K Mehta, Rohit Mehta (S. Chand Publication)

# BST102 ENGINEERING CHEMISTRY

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective:

Engineering Chemistry is concerned with the changes of matters with its environment and an ever growing subject. So, the aim of teaching Engineering Chemistry in Diploma Courses is to acquaint the students with the basic Chemistry of different materials used in industry and to equip the students with the basic principles of chemical changes taking place in different aspects connected to engineering fields. They also develop the right attitude to cope up with the continuous flow of new technology.

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Physical Chemistry	20
2	Inorganic Chemistry	08
3	Organic Chemistry	08
4	Industrial Chemistry	12
5	Environmental Chemistry	12
	<b>TOTAL</b>	<b>60</b>

## 1. PHYSICAL CHEMISTRY

- 1.1 General concept of Atomic structure, Rutherford's Atomic model, Bohr's Atomic model, Bohr-Bury scheme, Electronic configuration, Aufbau's principle, Atomic weight, Molecular weight, Equivalent weight
- 1.2 Concept of Chemical Bond such as Electrovalent, Covalent and Coordinate bond with examples
- 1.3 Concept of Arrhenius, Lowry Bronsted and Lewis theory for acid and base with examples.

Definition of Salt, Types of salt, Neutralization of Acid and Base, Determination of equivalent weight of Acid, Base and Salt.

Definition of Normal, Molar, Molal solution and Normality, Molarity and Molality (Simple problems)

pH of solution, Importance of pH in industry

- 1.4 Electrochemistry: Definition of Electrolyte, Electrolysis, Electrolytic cell, Faraday's 1<sup>st</sup> and 2<sup>nd</sup> law of Electrolysis, Industrial application of Electrolysis- Electroplating ( Chromium and Zinc), Electrorefining.
- 1.5 Corrosion: Definition of Corrosion, Types of Corrosion- Atmospheric Corrosion, Waterline Corrosion, Protection from Corrosion by (i) Alloying and (ii) Galvanization

## 2. INORGANIC CHEMISTRY

- 2.1 Metallurgy: Definition of Mineral, ore, flux, slag, General methods of extraction of metal, Dressing, concentration, Calcinations, Roasting, Smelting, Refining of ore (a brief idea)
- 2.2 Alloys: Definition of alloy, Composition and uses of Brass, Bronze, Alnico, Duralumin

## 3. ORGANIC CHEMISTRY

- 3.1 Hydrocarbons: Saturated and Unsaturated Hydrocarbons, Aliphatic and Aromatic Hydrocarbons.
- 3.2 IUPAC system of nomenclature of Alkane, Alkene, Alkyne, Alkyl halide and Alcohol

## 4. INDUSTRIAL CHEMISTRY

- 4.1 Water: Sources of water, Soft water, Hard water, Types of Hardness (temporary and permanent), Removal of hardness by lime soda method, Ion exchange method.
- 4.2 Lubricants: Definition of lubricant, Types and uses of lubricants, Purpose of lubrication
- 4.3 Fuel: Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel.

Solid: Coal-Lignite, Bituminous and Anthracite

Liquid: Diesel, Petrol, Low Sulphur Heavy Stock (LSHS)

Gaseous: Composition and uses of Producer gas and Water gas, Elementary idea about LPG and CNG

- 4.4 Polymer: Definition of Monomer, Polymer, Homopolymer, Co-polymer and Degree of polymerization

Difference between Thermosetting and Thermoplastic, Composition and uses of Poly-Vinyl Chloride and Bakelite

## 5. ENVIRONMENTAL CHEMISTRY

- 5.1 Explain structure of atmosphere (i) Troposphere (ii) Stratosphere
- 5.2 Definition with example- Pollutant, Contaminant, Receptor, Pathway of pollutant and receptor, Types of pollutant
- 5.3 Definition of water pollution, Different sources of water pollution, Control of water pollution
- 5.4 Definition of air pollution, major air pollutants, Control of air pollution
- 5.5 Brief idea on Greenhouse Effect, Depletion of Ozone Layer, Acid Rain

### Books Recommended

1. Text Book of Intermediate Chemistry Part-1 and Part-2 by Nanda, Das, Sharma, Kalyani Publishers
2. Engg. Chemistry by B.K. Sharma, Krishna Prakashan Media Pvt. Ltd
3. Environmental Chemistry by Dr. Sunakar Panda

### Reference Books

1. Engineering Chemistry by Y.R. Sharma and P. Mitra, Kalyani Publishers
2. Engineering Chemistry- Jain & Jain, Dhanpat Roy and Sons
3. Environmental Chemistry by A.K. Dey

# BST103 ENGINEERING MATHEMATICS - I

Semester & Branch: First sem Diploma in Engg.  
Theory: 5 Periods per Week  
Total Periods: 75 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective:

1. This subject helps the students to develop logical thinking which is useful in comprehending the principles of all to the subjects.
2. Analytical and systematic approach towards any problem is developed through learning of this subject.
3. Mathematics being a versatile subject can be used at every stage of human life.

## Topic wise distribution of periods

Sl. No.	Subject	Unit	Topic	Periods
A	Algebra	1	Complex Numbers	08
		2	Binomial Theorem	08
		3	Determinants	05
		4	Matrices	05
		5	Partial Functions	04
B	Trigonometry	6	Trigonometry	16
C	Two Dimensional Geometry	7	Analytical Geometry in Two Dimension (Straight Line)	12
		8	Circle	07
D	Vector	9	Vector Algebra	10
			<b>TOTAL</b>	<b>75</b>

## 1. COMPLEX NUMBERS

- 1.1 Define real and imaginary number.
- 1.2 Define complex numbers conjugate, Modulus and amplitude of a complex number.
- 1.3 State and explain Properties of complex number.
- 1.4 Determination of three cube roots of unity and their properties.
- 1.5 Express complex number in polar form (without proof) & State De' Moivre's theorem and its application for determination of nth roots of unity.
- 1.6 Problems on above (1.1 – 1.5)

## 2. BINOMIAL THEOREM

- 2.1 Factorial notation, Permutation, combination Working formula of  $p(n,r)$  &  $C(n,r)$
- 2.2 Establish the following formulae
  1.  $P(n,r) = r! C(n,r)$
  2.  $C(n,r) = C(n,n-r)$
  3.  $C(n,r) + C(n,r-1) = C(n+1,r)$
  4.  $C(n,0) = C(n,n) = 1$
  5.  $C(n,r) / C(n,r-1) = (n-r+1) / r$ .
- 2.3 Statement of Binomial Theorem for positive integral index only.
- 2.4 Establish the formula for General terms, middle term/ terms and term independent of x.
- 2.5 Establish the relationship between Binomial co-efficient such as

i)  $C_0 + C_1 + C_2 + \dots + C_n = 2^n$

ii)  $C_1 + C_3 + C_5 + \dots = 2^{n-1}$

iii)  $C_0 + C_2 + C_4 + \dots = 2^{n-1}$

2.6 Problems on above (2.1 – 2.5)

### 3. DETERMINANTS

3.1 Define determinant (second and third order).

3.2 Explain minor ( $M_{ij}$ ) of  $a_{ij}$ , CO-factor ( $C_{ij}$ ) of  $a_{ij}$ , Explain  $C_{ij} = (-1)^{i+j} M_{ij}$ .

3.3 Study properties of determinants.

3.4 Cramer's Rule : (solutions of simultaneous equations of two and three unknown).

3.5 Problems on above (3.1 – 3.4).

### 4. MATRICES

4.1 Define matrix and its representation state its order.

4.2 State types of matrices with examples.

4.3 Perform Addition, subtraction and multiplication of a matrix with a scalar and multiplication of two matrices (upto third order only).

4.4 Explain transpose, adjoint and inverse of a matrix upto third order.

4.5 Solution of simultaneous equations by matrix method (linear equations in two and three unknowns).

4.6 Problems on above (4.1 – 4.5)

### 5. PARTIAL FRACTIONS

5.1 Define algebraic fractions, partial fractions and types of partial fractions.

5.2 Partial fraction of a proper fraction having denominator.

(i) Linear non-repeated (ii) Some Linear factors repeated along with non-repeated factors.

(iii) Quadratic factors non-repeated (iv) Quadratic factors repeated.

5.3 Problems on above (5.1 – 5.2)

### 6. TRIGONOMETRY

6.1 Preliminary ideas of Trigonometrical functions, Circular functions and their Identity.

6.2 Trigonometrical ratios.

6.3 Compound angles, multiple & sub-multiple angles like  $2A$ ,  $3A$ ,  $A/2$ ,  $A/3$

6.4 Study properties of triangles and establish Sine and Cosine formulae only.

6.5 Define inverse circular functions and study its characteristic properties.

6.6 Problems on above (6.1 – 6.5)

### 7. ANALYTICAL GEOMETRY IN-TWO DIMENSIONS (STRAIGHT LINE)

7.1 Define co-ordinates of point on a plane in Cartesian and rectangular co-ordinates.

7.2 Derive the formula for

1. Distance between two given points.

2. Division point in the ratio  $m : n$  between two given points both externally and internally.

3. Area of the triangle whose vertices are given.

7.3 Define slope of a line and find angle between two lines, Conditions of perpendicularity and parallelism of two lines.



- 7.4 Define locus and equation of locus from the given conditions.
- 7.5 Derive standard forms of straight lines.
  1. Slope intercept form.
  2. Slope point form.
  3. Two point forms.
  4. Intercept form.
  5. Normal / Perpendicular form.
  6. General equation of straight line.
  7. Transformation of general form  $ax + by + c = 0$  into slope, intercept and normal form.
- 7.6 Determine point of intersection of two straight lines.
- 7.7 Derive equation of straight lines.
  - (a) Passing through a point and parallel to a line.
  - (b) Passing through a point and perpendicular to a line.
  - (c) Passing through the point of intersection of two straight lines.
- 7.8 Determine perpendicular distance from a point to a line.
- 7.9 Problems on above (7.1 – 7.8)

## **8. CIRCLE**

- 8.1 Find equation of circle with given centre (h, k) and radius r.
- 8.2 Derive general equation of a circle and determine its centre and radius.
- 8.3 Find equation of a circle passing through three non-collinear points.
- 8.4 Find equation of a circle, whose end points of a diameter being given.
- 8.5 Problems on above (8.1 – 8.4)

## **9. VECTOR ALGEBRA**

- 9.1 Define scalar and vector, distinguish between Scalar and vector quantities, given examples and explain geometrical representation of a vectors.
- 9.2 Explain types of vectors.
- 9.3 State magnitude and direction of vector.
- 9.4 Explain addition and subtraction of vectors and Multiplication of a vector by scalar.
- 9.5 Define position vector of a point and explain resolution of vectors into components.
- 9.6 Explain scalar product of two vectors, geometrical meaning of scalar product and properties of scalar products.
- 9.7 Find angle between two vectors, scalar & vector projection in a given direction.
- 9.8 Define vector product of two vectors.
- 9.9 Explain geometrical meaning of vector product and properties of a vector product.
- 9.10 Problems on above (9.1 – 9.9).

### **Books Recommended**

1. Elements of Mathematics – Vol -1 & II (Odisha State Bureau of Text Book Preparation & Production)

### **Reference Books**

1. A Text book of Engineering Mathematics by Dr. Chittaranjan Mallick & S.Mallick (Kalyani Publisher)

# BET101 BASIC ELECTRICAL ENGINEERING

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective

1. To be familiar with A.C. fundamental and circuits.
2. To be familiar with basic principle and application of energy conversion devices such as D.C. Machine, A.C. Motor (both 1- phase & 3- phase & 1 phase Transformer).
3. To be familiar with the generation of electrical power.
4. To be acquainted with wiring and protective devices.
5. To be familiar with circulation and commercial billing of electrical power & energy.

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Fundamentals	09
2	Magnetic circuit	04
3	A.C. Theory	13
4	Generation Elect. Power	04
5	Conversion of Electrical Energy	15
6	Wiring and Power Billing	06
7	Measuring Instrument	06
8	Renewable energy	03
	<b>TOTAL</b>	<b>60</b>

## 1. FUNDAMENTALS

- 1.1 Concept of current flow.
- 1.2 Concept of source and load.
- 1.3 State Ohm's law and concept of resistance.
- 1.4 Relation of V, I & R in series circuit.
- 1.5 Relation of V, I & R in parallel circuit.
- 1.6 Division of current in parallel circuit.
- 1.7 Effect of power in series & parallel circuit.
- 1.8 Star – Delta Transformation & Delta - Star Transformation.
- 1.9 Superposition Theorem, Thevenin Theorem, Maximum Power Transfer Theorem.
- 1.10 State and explain Kirchhoff's Law.
- 1.11 Solve simple problems on Kirchhoff's law.
- 1.12 State and explain Faraday's laws of electromagnetic induction, Flemings Left hand rule and Right hand rule.

## 2. MAGNETIC CIRCUITS

- 2.1 Electricity & Magnetism.
- 2.2 Magnetic Materials & B-H Curves.
- 2.3 Permeability, Reluctance.
- 2.4 Solutions of Simple magnetic Circuits.

### **3. A.C. THEORY**

- 3.1 Generation of alternating emf.
- 3.2 Difference between D.C. & A.C.
- 3.3 Define Amplitude, instantaneous value, cycle, Time period, frequency, phase angle, phase difference.
- 3.4 State and explain RMS value, Average value, Amplitude factor & Form factor with Simple problems.
- 3.5 Represent AC values in phasor diagrams.
- 3.6 Explain AC through pure resistance inductance & capacitance
- 3.7 Explain AC through RL, RC, RLC series circuits.
- 3.8 Solve simple problems on RL, RC & RLC series & Parallel circuits.
- 3.9 Explain impedance triangle and power triangle.
- 3.10 Complex impedance & power using j- operator.

### **4. GENERATION OF ELECTRICAL POWER**

- 4.1 State briefly different electrical power generating plants. (Hydro electric, Thermal & Nuclear).
- 4.2 Block diagram of Hydro electrical, Thermal and Nuclear power plant & brief explanation.

### **5. CONVERSION OF ELECTRICAL ENERGY**

- 5.1 Introduction of DC machines.
- 5.2 Main parts of DC machines.
- 5.3 Principle of operation of DC generator, Classification of DC generators.
- 5.4 EMF equation of generator.
- 5.5 Simple problem on relation of load current, armature current and field current.
- 5.6 Principle of operation of DC motor.
- 5.7 Classification of DC motor.
- 5.8 Motor equation and Simple problem on relation of load current, armature current and field current.
- 5.9 Uses of different types of DC generators & motors.
- 5.10 Necessity of different types of starter used in DC motor.
- 5.11 Principle of operation of single phase induction motors.
- 5.12 Types and uses of single phase induction motors.
- 5.13 Introduction to poly phase circuit, advantages & comparison with single phase.
- 5.14 Line & phase quantities in star – delta network.
- 5.15 Three phase power Calculation (For balance circuit).
- 5.16 Main parts of 3-phase induction motors.
- 5.17 Principle of operation of 3-phase induction motors.
- 5.18 Types and uses of 3-phase induction motors.

### **6. WIRING AND POWER BILLING**

- 6.1 Types of wiring and their comparison.
- 6.2 Layout of household electrical wiring (single line diagram showing all the important component in the system).
- 6.3 List out the basic protective devices used in house hold wiring.
- 6.4 Calculate energy consumed in a small electrical installation.

## **7. MEASURING INSTRUMENTS**

- 7.1 Introduction to measuring instruments.
- 7.2 Torques in instruments.
- 7.3 State different uses of PMMC type of instruments (Ammeter & Voltmeter).
- 7.4 State different uses of MI type of instruments (Ammeter & Voltmeter).
- 7.5 Draw the connection diagram of A.C/ D.C Ammeter, voltmeter, energy meter and wattmeter. (Single phase only).

## **8. INTRODUCTION TO RENEWABLE POWER GENERATION**

- 8.1 Solar, Wind & Tidal

### **Books Recommended**

1. Basic Electrical Engineering by T.K. Nagsarkar & M.S. Sukhija (Oxford University Press)
2. ABC of Electrical Engineering by Jain & Jain (Dhanpat Rai Publication).

### **Reference Books**

1. Fundamentals of Electrical Engineering and Electronics by J.B Gupta.
2. Basic Electrical Engineering by V.N. Mittle (TMH).
3. Electrical Technology by Edwar Hughes (Pearson Education, New Delhi).
4. Basic Electrical Engineering by Chakraborty (Mgrew Hill).
5. Basic Electrical Engineering by V.K. Mehata, Rohit Mehata.
6. A Text Book of Electrical Technology Vol. I & II by B.L. Theraja & A.K.Theraja.

# BET102 BASIC ELECTRONICS ENGINEERING

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Aim:

Electronics plays major in our day to day life. In each and every field, electronics systems are used. Basic electronics is one of the subjects which is the base of all advance electronics .It starts with PN junction which makes the student to follow the functioning of all semiconductor based electronics. This is a core group subject and it develops cognitive and psychomotor skills. Basic electronics is one of the subjects which is the base of all advance electronics. The student will also acquire brief knowledge about communication system as well as transducers and measuring instruments.

## Objective:

### Student will be able to:

- 1 Know what is Electronics & its application.
- 2 Describe the formation of PN junction.
- 3 Draw the characteristics of basic components like diode, transistor etc.
- 4 Draw and describe the basic circuits of rectifier, filter, regulator and amplifiers.
- 5 Know voltage & power amplifiers.
- 6 Test diode and transistors.
- 7 Read the data sheets of diode and transistors.

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Electronic Devices	05
2	Semiconductor Diode	09
3	Rectifiers & Filters	08
4	Transistors	12
5	Regulated Power Supply	08
6	Small Signal Amplifiers (CE)	07
7	Audio & Video Power Amplifier & Oscillator	04
8	Transducers & Measuring Instruments	04
9	Communication Systems	03
	<b>TOTAL</b>	<b>60</b>

## 1. ELECTRONIC DEVICES

- 1.1 Define Electronics & its application.
- 1.2 Define Electronic Emission & different types of Emission.
- 1.3 Classification of Solid according to electrical conductivity (Conductor, Semiconductor & Insulator) with respect to energy band diagram only.
- 1.4 Discuss Intrinsic & Extrinsic Semiconductor.
- 1.5 Explain the difference between vacuum tube & semiconductor.
- 1.6 State basic concept of integrated circuits (I.C) & its use.

## 2. SEMICONDUCTOR DIODE

- 2.1 Define Rectifier & state its use.

- 2.1.1 Rectifying diode
  - Review of P-type and N-type semiconductor, PN junction Diode, circuit diagram & its symbol, PN junction Barrier voltage, Depletion region, Junction Capacitance.
- 2.1.2 Forward & reverse bias & V-I Characteristics of PN junction diode.
- 2.1.3 Specifications:-(Definition)
  - Forward voltage drop, Reversed saturation current, maximum forward current, power dissipation of diodes of different power ratings
- 2.2 Zener Diode
  - 2.2.1 Construction (reference to doping level)
  - 2.2.2 Symbol ,circuit diagram for characteristics (forward & reverse bias)
  - 2.2.3 Avalanche & Zener breakdown.
- 2.3. Special Diodes
  - 2.3.1 Tunnel diode
- 2.4. Optical Diodes
  - 2.3.4 LED, photo diode & IR LED  
(Symbol, working principle & application of each)

### 3. RECTIFIERS & FILTERS

- 3.1. Rectifier - Definition & Need of rectifier
  - 3.1.1. Types of Rectifier – Half wave rectifier, Full wave rectifier (Bridge & Center tapped)
  - 3.1.2. Circuit operation: Input/output waveforms for voltage & current, Average (dc) value of current & voltage (no derivation), Ripple, ripple factor, ripple frequency, PIV of diode used, transformer utilization factor, efficiency of rectifier. (Definition)
  - 3.1.3. Comparisons of three types of rectifier
- 3.2. Filters - Need of filters & Types of filter
  - [i] Shunt Capacitor [ii] Series Inductor [iii] LC filter [iv]  $\pi$  filter
  - 3.2.1. Circuit operation, ripple factor, ripple frequency, Input/output waveforms, limitations & advantages. (Definition & no derivation)

### 4. TRANSISTORS

- 4.1 Bipolar Junction Transistor (BJT)
  - Basic concept, Define Transistor
  - 4.1.1 Types of transistors, symbols, Transistor operation
    - Conventional current flow, relation between different currents in transistor( $I_e$  ,  $I_c$  &  $I_b$ )
  - 4.1.2 Transistor amplifying action
    - Transistor configurations:- CB, CE, & CC-Circuit diagram to find the characteristics, Input/output characteristics. (No derivation)
  - 4.1.3 Transistor parameters –Input resistance, output resistance,  $\alpha$ ,  $\beta$  & relation between them.
  - 4.1.4 Transistor specification:
    - $V_{CE\text{ Sat}}$ ,  $I_{C\text{ Max}}$ ,  $V_{CE0}$ ,  $I_{CE0}$ ,  $\alpha$ ,  $\beta$   $V_{CE\text{ Breakdown}}$ , Power dissipation (Definition -I using data sheets)
  - 4.1.5 Construction, working principle, characteristics of photo Transistor (Introduction to Opto-coupler only)
- 4.2 Unipolar Transistor (JFET)
  - Symbol, Construction, working principle & applications

#### 4.3 Biasing of BJT

- 4.3.1 Introduction, need of biasing, Types of biasing circuits (only name), circuit operation of Base biased circuit (only), concept of dc load line, Saturation, Cut off, selection of operating point (Q point), need of stabilization of Q point.

### 5. REGULATED POWER SUPPLY

#### 5.1 What is a Regulator?

- 5.1.1 Need of regulators, voltage regulation factor
- 5.1.2 Concept of load regulation & line regulation
- 5.1.3 Basic Zener diode as a voltage regulator

#### 5.2 Linear Regulators

- 5.2.1 Basics block diagram of dc Regulated power supply

#### 5.3 IC's Voltage Regulator – 78xx, 79xx (as fixed ) & LM 317 (as variable )

### 6. SMALL SIGNAL AMPLIFIERS (CE)

#### 6.1 Concept of Amplification

- 6.1.1 Small signal amplifier using BJT power gain, voltage gain.
- 6.1.2 AC Load Line.
- 6.1.3 Function of Input & Output coupling capacitors
- 6.1.4 Function of emitter bypass capacitor.

#### 6.2 AC equivalent circuit of transistor CE amplifier (Circuit diagram only)

#### 6.3 Single stage CE amplifier with voltage divider bias and its explanation.

#### 6.4 Bel, Decibel & Bandwidth (Definition).

#### 6.5 Define Cascade Amplifiers (Multistage Amplifier)

- 6.5.1 Need of Multistage Amplifiers, Gain of amplifier.

### 7. AUDIO & VIDEO POWER AMPLIFIER & OSCILLATOR

#### 7.1 Define voltage & power amplifier and their application.

#### 7.2 Define Oscillator & its application & types (only names)

- 7.2.1 Explain essentials of transistor Oscillator.

### 8. TRANSDUCERS AND MEASURING INSTRUMENTS

#### 8.1 Define Transducer.

#### 8.2 Classify different type of Transducers.

#### 8.3 Discuss working of Thermocouple & its application

#### 8.4 Explain working of Multimeter and comparison between Analog and Digital Multimeter

#### 8.5 Explain Block diagram of CRO, Measurement (Frequency & Amplitude) & its use.

### 9. COMMUNICATION SYSTEM

#### 9.1 Define Modulation & its need.

#### 9.2 Name different types of Modulation (AM, FM & PM)

#### 9.3 Discuss Amplitude Modulation & Frequency Modulation (Signal, Carrier Wave & Modulated Wave) (No Mathematical Derivation.)

#### 9.4 Define Demodulation.

#### **Books Recommended**

1. Grob's Basic Electronics by Mitchel E. Schultz, 10<sup>th</sup> edition, Tata McGraw Hill
2. Principle of Electronics by V. K. Meheta & Rohit Mehta, S.Chand & Company Ltd
3. Electronic Device & Circuit Theory by Robert L. Boylestad & Louis Nashelsky Pearson Publication

#### **Reference Books**

1. Electronics Devices and Circuits by David A. Bell, Oxford University Press
2. Electronic Circuits by Dr. R. S. Sidha, S Chand & Company Ltd

# BET103 ENGINEERING MECHANICS

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective:

### On completion of the subject, the student will be able to:

1. Compute the force, moment & their application through solving of simple problems on coplanar forces.
2. Understand the concept of equilibrium of rigid bodies.
3. Know the existence of friction & its applications through solution of problems on above.
4. Locate the C.G. & find M.I. of different geometrical figures.
5. Know the application of simple lifting machines.
6. Understand the principles of dynamics.

### Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Fundamentals of Engineering Mechanics	14
2	Equilibrium	08
3	Friction	10
4	Centroid & moment of Inertia	14
5	Simple Machines	08
6	Dynamics	06
	<b>TOTAL</b>	<b>60</b>

## 1. FUNDAMENTALS OF ENGINEERING MECHANICS

### 1.1 Fundamentals.

Definitions of Mechanics, Statics, Dynamics, Rigid Bodies, Mass, Weight, Length, Time, Scalar & Vector, Fundamental units. Derived units, S.I. units.

### 1.2 Force

Definition of Force & its units, Representation of Force by vector, Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.

### 1.3 Resolution of a Force.

Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.

### 1.4 Moment of Force.

Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I. units. Classification of moments according to direction of rotation, sign convention, Law of moments, Varignon's Theorem, Couple – Definition, S.I. units, measurement of couple, properties of couple.

### 1.5 Force System.

Definition, Classification of force system according to plane & line of action.

### 1.6 Composition of Forces.

Definition, Resultant Force, Method of composition of forces, such as



1.6.1 Analytical Method such as Law of Parallelogram of forces & method of resolution.

1.6.2 Graphical Method.

Introduction, Space diagram, Vector diagram, Polygon law of forces. Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method.

## **2. EQUILIBRIUM**

2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.

2.2 Lamia's Theorem – Statement, Application for solving various engineering problems.

## **3. FRICTION**

3.1 Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction. Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction.

3.2 Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up & down).

3.3 Ladder, Wedge Friction.

## **4. CENTROID & MOMENT OF INERTIA**

4.1 Centroid – Definition, Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.

4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems. M.I. of plane lamina & different engineering sections.

## **5. SIMPLE MACHINES**

5.1 Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine, define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine.

5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack.

## **6. DYNAMICS**

6.1 Define Kinematics & Kinetics, State Principles of Dynamics, Newton's Laws of Motion, Motion of Particle acted upon by a constant force, Equations of motion, De-Alembert's Principle.

6.2 Work, Power, Energy & its Engineering Applications, explain Kinetic & Potential energy & its application.

6.3 Define Momentum & impulse, explain conservation of energy & linear momentum, explain collision of elastic bodies, and define Coefficient of Restitution.

### **Books Recommended**

1. Engineering Mechanics – by A.R. Basu (TMH Publication Delhi)
2. Engineering Machines – Basudev Bhattacharya (Oxford University Press).
3. Text Book of Engineering Mechanics – R.S Khurmi (S. Chand).

### **Reference Books**

1. Applied Mechanics & Strength of Material – By I.B. Prasad.
2. Engineering Mechanics – By Timosheenko, Young & Rao.
3. Engineering Mechanics – Beer & Johnson (TMH Publication).

# BET104 COMPUTER APPLICATION

Semester & Branch: First / Second sem Diploma in Engg.  
Theory: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Objective:

The students will get to know about the fundamentals of computer. They will get acquainted with various components of computer hardware, software etc. Idea on Role of operating system and its usability will also be known. Knowledge on word processing, electronic spreadsheet, presentation software and Internet will also be acquired. The students will be given brief knowledge about Programming methodology and C programming.

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Computer Organisation	05
2	Computer Software	07
3	Computer Network and Internet	08
4	File Management and Data Processing	05
5	Problem Solving Methodology	05
6	Overview of C Programming language	15
7	Advanced features of C	15
	<b>TOTAL</b>	<b>60</b>

### 1. COMPUTER ORGANISATION

Introduction to Computer  
Evolution of Computers  
Generation of Computers  
Classification of Computers  
Basic Organisation of Computer (Functional Block diagram)  
Input Devices, CPU & Output Devices.  
Computer Memory and Classification of Memory

### 2. COMPUTER SOFTWARE

Software concept  
System software  
Application software  
Overview of Operating System  
Objectives and Functions of O.S  
Types of Operating System  
Batch Processing, Multiprogramming, Time Sharing OS  
Features of DOS, Windows and UNIX  
Programming Languages  
Compiler, Interpreter  
Computer Virus  
Different Types of computer virus  
Detection and prevention of Virus  
Application of computers in different Domain

### **3. COMPUTER NETWORK AND INTERNET**

Networking concept, Protocol, Connecting Media,

Data Transmission mode

Network Topologies,

Types of Network

Networking Devices like Hub, Repeater, Switch, Bridge, Router, Gateway & NIC

Internet Services like E-Mail, WWW, FTP, Chatting, Internet Conferencing, Electronic Newspaper & Online Shopping

Different types of Internet connectivity and ISP

### **4. FILE MANAGEMENT AND DATA PROCESSING**

Concept of File and Folder

File Access and Storage methods.

Sequential, Direct, ISAM

Data Capture, Data storage

Data Processing and Retrieval

### **5. PROBLEM SOLVING METHODOLOGY**

Algorithm, Pseudo code and Flowchart

Generation of Programming Languages

Structured Programming Language

Examples of Problem solving through Flowchart

### **6. OVERVIEW OF C PROGRAMMING LANGUAGE**

Constants, Variables and Data types in C

Managing Input and Output operations.

Operators, Expressions, Type conversion & Typecasting

Decision Control and Looping Statements (If, If-else, If-else-if, Switch, While, Do-while, For, Break, Continue & Goto)

Programming Assignments using the above features.

### **7. ADVANCED FEATURES OF C**

Functions and Passing Parameters to the Function (Call by Value and Call by Reference)

Scope of Variables and Storage Classes

Recursion Function and Types of Recursion

One Dimensional Array and Multidimensional Array

String Operations and Pointers

Pointer Expression and Pointer Arithmetic

Programming Assignments using the above features.

Structure and Union (Only concepts, No Programming)

### **Books Recommended**

1. Computer Fundamentals and Programming in C by Reema Thareja, Oxford University Press
2. Programming in ANSI C by A.N Kamthane, Pearson Education
3. Computer Application by Kalyani Publisher
4. Let us C by Y Kanetkar, BPB
5. Computer Fundamentals, by E. Balaguruswamy, TMH

# HMT101 COMMUNICATIVE ENGLISH - I

Semester & Branch: First sem Diploma in Engg.  
Theory: 2 Periods per Week  
Total Periods: 30 Periods per Semester  
Examination: 3 Hours

Teachers Assessment : 10 Marks  
Class Test : 20 Marks  
End Semester Exam : 70 Marks  
TOTAL MARKS : 100 Marks

## Aim:

To increase communication skills of a student  
To develop their ability to comprehend written and verbal English  
To improve their comprehension in English

## Objective:

To comprehend the given passage  
To answer correctly the questions on seen and unseen passages  
To increase the vocabulary  
To apply rules of grammar for flawless writing

## Pre-Requisite:

Perfection in speaking, reading and writing English  
Perfection in the basic grammar in English

## Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Text	14
2	Application of Grammar	10
3	Paragraph Writing	02
4	Vocabulary Building	04
	<b>TOTAL</b>	<b>30</b>

## 1. TEXT

### [Reading comprehension]

- A. Sub-skills of reading comprehension are to be worked out and tested through an unseen passage in about 200-500 words.  
A student should get acquainted with sub-skills of reading for the purpose of:  
Skimming the gist  
Scanning for necessary information  
Close reading for inference and evaluation  
Main idea and supporting points  
Guessing the meaning of un-familiar words  
Note-making
- B. The following chapters from **“Invitation to English”, Book-1** for +2 students of CHSE, Odisha, **2012 edition** is to be covered in the class room:  
**The Legend behind a Legend** by Hariharan Balkrishnan  
**The Portrait of a Lady** by Khuswant Singh  
**To My True Friend** by Elizabeth Tinarad  
**Daffodils** by William Wordsworth

[Pre-reading (**Self- study**)

The student is to make self-study for understanding the meaning of new words from the text and for identifying part of speech of the above mentioned texts.

The student is to answer two / three general questions in about 100-120 words from these chapters in the end examination.

**2. APPLICATION OF GRAMMAR**

Articles and Determiners

Verbs, Modals

Tenses

Voice-change

Subject-verb Agreement

**3. PARAGRAPH WRITING**

The student should be able to excel in the area of written communication

Paragraph writing Definition, meaning and method

To write coherent, logical and unified paragraphs constructed on the following

Patterns:

General- Specific

Process- Description

**4. VOCABULARY BUILDING**

Word formation

Technical Jargon

Use of synonyms, antonyms and homonyms.

One word substitute

**ASSIGNMENTS (10 Marks)**

The Teachers Assessment will consist of 05 (five) assignments

**List of Assignments:**

**1. Building Vocabulary** (01 assignment)

- a. Taking words from glossary given in the text book (i.e. "Invitation to English", Book-1) at the end of each chapter
- b. Technical Jargons: Identifying technical words from subject books and using them in sentences.

**2. Grammar** (01 assignment)

- a. Inserting correct parts of speech on the sentences given by the teacher
- b. Punctuating the sentences given by the teacher

**3. Paragraph Writing** (01 assignment)

**4. News Paper Report Writing** (01 assignment)

Writing any 02 events from the news paper as it is / narrating events on situations given by the teacher

**5. Error in English** (01 assignment)

Finding out error and re-writing sentences given by the teacher.

Use of Synonyms, Antonyms, Homonyms

One word substitute

**Books Recommended**

1. Communication Skills by Sanjay Kumar and Puspalata, Oxford University Press
2. Invitation to English, Book-1, (for +2 students), (2012 edition), CSHE, Odisha
3. Communicative English by Abhisek Arora, Kalyani Publishers

# BSP101 ENGINEERING PHYSICS PRACTICAL

Semester & Branch: First / Second sem Diploma in Engg.

Practical: 4 Periods per Week

Total Periods: 60 Periods per Semester

Examination: 4 Hours

Practical Exam : 25 Marks

Term Work : 25 Marks

TOTAL MARKS : 50 Marks

## **A student should complete at least 8 (Eight) experiments in a Semester**

1. Measurement of volume of a solid/hollow cylinder by VERNIER CALIPERS.
2. Measurement of cross-sectional area of a wire by Screw Gauge.
3. Measurement of radius of curvature of a spherical surface by a Spherometer.
4. Determination of Specific gravity of insoluble solid heavier than water by physical balance by equal oscillation method.
5. Determine the refractive Index of a prism by drawing i-D curve.
6. Tracing of Lines of force due to a bar magnet with N-pole pointing North & N-pole pointing South and locate the neutral points.
7. Determination of g by simple pendulum.
8. Verification the laws of resistance by connecting two given standard resistances in series & in parallel using Ohm's Law.
9. Measurement of specific resistance of wire by a Meter Bridge.
10. Determination of focal length of convex lens by u-v method.
11. Determination of co-efficient of Friction by inclined Plane Method

## **Books Recommended:**

1. Engineering Practical Physics by S. Panigrahi, B. Mallick, S. Publisher

# BSP102 ENGINEERING CHEMISTRY PRACTICAL

Semester & Branch: First / Second sem Diploma in Engg.

Practical: 4 Periods per Week

Total Periods: 60 Periods per Semester

Examination: 4 Hours

Practical Exam : 25 Marks

Term Work : 25 Marks

TOTAL MARKS : 50 Marks

1. Preparation and study of properties of CO<sub>2</sub> gas (Carbon Dioxide) (Gas causing Greenhouse Effect)
2. Preparation and study of properties of O<sub>2</sub> gas (Oxygen) (Life saving Gas)
3. Crystallization of Copper Sulphate from Copper Carbonate
4. Identification of unknown salt (One acid radical, One basic radical)

## A) Acid Radicals

- i. Carbonate
- ii. Sulphide
- iii. Chloride
- iv. Nitrate
- v. Sulphate

## B) Basic Radicals

- i. Ammonium
- ii. Copper
- iii. Zinc
- iv. Magnesium
- v. Aluminium
- vi. Calcium
- vii. Sodium
- viii. Potassium

## 5. Simple Acid-Base Titration

- i. Acidimetry
- ii. Alkalimetry

## Books Recommended

1. Practical Intermediate Chemistry by Dr. Bichitrananda Nanda
2. Elementary Experimental Chemistry by Y.R. Sharma and A.K. Das Kalyani Publishers

# BEP101 BASIC ELECTRICAL ENGINEERING PRACTICAL

Semester & Branch: First / Second sem Diploma in Engg.  
Practical: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 4 Hours

Term Work : 25 Marks  
TOTAL MARKS : 25 Marks

**Important:** The demonstration plan should be prepared and thoroughly explained (both theory and steps of practice). Five to ten questions should be assigned to the students to assess the overall gain of the objectives. The following experiments are to be conducted in the laboratory.

1. Calculate equivalent resistance in series and parallel combinations and find relation between V.I & R.
2. Determine the resistance, impedance and inductance of a choke coil.
3. Determine the capacitance and capacitive reactance ( $X_c$ ) of a unknown Capacitor.
4. Determine the power factor by direct and indirect methods in a AC single phase RLC series circuit.
5. Measure Energy of a single phase – A.C. circuit by help of ammeter, voltmeter and power factor meter.
6. Measure Energy of a single phase – A.C circuit by help of an energy meter.
7. Start & run a D.C. Motors. (Shunt & Series & Compound).
8. Connect and run the 3 – Phase Induction motor. (Sq. cage & Slipring).
9. Polarity Test & Transformation ratio of single phase Transformer.
10. Prepare an electrical switch board to control two light points, one plug point, one fan point and fuse.
11. Connect and test a fluorescent lamp.
12. Measure the Earth Resistance of a pipe Earthling.



# BEP102 BASIC ELECTRONICS ENGINEERING PRACTICAL

Semester & Branch: First / Second sem Diploma in Engg.  
Practical: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 4 Hours

Term Work : 25 Marks  
TOTAL MARKS : 25 Marks

## Skills to be developed:

1. Draw the symbols of components
2. Identification & selection of components.
3. Interpretation of circuits.
4. Understand working of Regulated dc power supply.
5. Measure Current, voltage using Instrument

## List of Practicals

1. Identify different types of tools and essential equipment in Electronics Laboratory (Sl no 1 to 16 of Tool list)
2. Draw the symbols of different Electronic Components
3. Study of Analog & Digital Multimeter (Front Panel) & Measurement of voltage, current and resistance using Multimeter
4. Identify & test the different Active & Passive components, Switches, Cables, Connector & perform Soldering practice & its testing.
5. Study of Front Panel Control of Oscilloscope (Analog & Storage) & measurement of Frequency & Amplitude of wave forms
6. To plot Forward & Reverse basic characteristics of diode.
7. To plot forward & reverse basic characteristics of Zener diode.
8. To study the Rectifier a) Half wave and b) Full wave (draw I/p & o/p wave forms.)
9. To study the Filter circuits. a) Capacitors Filter b)  $\pi$  filter & draw its wave forms.
10. To Plot Input & Output characteristics of transistor in CE mode.
11. To study the Zener Diode as Regulator & calculate load regulation.
12. To study Single stage common emitter amplifier.
13. Project Work - Construct of IC regulated Power Supply using 78xx, 79xx, LM317 as fixed / variable which include rectifier circuit – **(Any one)**

# **BEP103 ENGINEERING MECHANICS PRACTICAL**

Semester & Branch: First / Second sem Diploma in Engg.  
Practical: 4 Periods per Week  
Total Periods: 60 Periods per Semester  
Examination: 4 Hours

Term Work : 25 Marks  
TOTAL MARKS : 25 Marks

## **List of Practicals**

A student has to perform any five experiments out of the following:

1. Verify Law of Polygon of Forces.
2. Verify Law of Moments.
3. Verify Lami's Theorem.
4. To determine Angle of Repose.
5. To find MA., V.R & Efficiency of Simple Wheel & Axle.
6. To find M.A, V.R. & Efficiency of Single purchase Crab.
7. To find M.A, V.R & Efficiency of Double Purchase Crab.
8. To find M.A, V.R & Efficiency of Worm & Worm Wheel.
9. To find M.A, V.R & Efficiency of Simple Screw Jack.
10. Graphical solution for concurrent force System using Drawing sheets.

# BEP104 COMPUTER APPLICATION PRACTICAL

Semester & Branch: First / Second sem Diploma in Engg.

Term Work : 25 Marks

Practical: 4 Periods per Week

TOTAL MARKS : 25 Marks

Total Periods: 60 Periods per Semester

Examination: 4 Hours

## 1. BASIC COMPUTER OPERATION

2 periods

Identification of different components of Computer

Switch on and Booting Process

Shut down, Restart of compute

## 2. OPERATING SYSTEM

13 periods

Basic DOS commands (CLS, DIR, DATE, TIME, VERSION, MD, CD, RD, DEL, COPY, REN, USE OF WILD CARDS, PATH)

Basic Windows OS operations (DESKTOP, ICONS,, START BUTTON, TASK BAR)

MOUSE OPERATIONS- SINGLE CLICK, DOUBLE CLICK, DRAG

MAXIMIZE, MINIMIZE, RESTORE

Windows Explorer, My Computer

Files and Folders, Copy, Cut, Paste

Utilities: Word, notepad, paint, calculator etc

## 3. WORKING WITH MS-OFFICE

20 periods

Basic operations of Word Processing Package. (MS-Word / Apache Open Office Writer)

Basic operations of Electronic Spread Sheet Package. (MS-Excel / Apache Open Office Calc)

Basic operations of Presentation Package (MS- Power point / Apache Open Office Impress)  
(Create , Edit, Format, Save, Print/View in the above three packages)

## 4. WORKING WITH INTERNET

10 periods

Getting acquainted with Internet connection, Browser, website

URL, webpage, http, WWW, net browsing

Creating E-Mail Id, sending and receiving E-mail Chatting

## 5. C PROGRAMMING

15 periods

1. Write a Program in C to find the greatest number among three integers.

2. Write a Program in C to find the average of n numbers by using for loop.

3. Write a Program in C to compute  $(a + b)^3$

4. Write a Program in C to convert time in seconds to time in hours, minutes and seconds.

5. Write a program in C to find the sum of the following series.  $1+1/x+1/x^2+.....+1/x^n$

6. Write a program in C to determine whether a number is prime or not?

7. Write a program in C to compute simple interest and compound interest of a given principal, rate of interest and time period.

8. Write a program in C to check whether a given number is palindrome or not?

9. Write a program in C to compute the sine series.

10. Write a program in C to accept row wise and column wise element in a two dimensional array and print them.

11. Write a program in C to find the number of times an element occurs in an array.

12. Write a program in C to find the vowels in a given string.

13. Write a program in C to find the factorial of a number, by using recursion.

14. Write a program in C to find the sum of Fibonacci series, by using function.

15. Write a program in C to accept a number from keyboard and print it in reverse order of entry, by using function.

# BEP105 ENGINEERING DRAWING

Semester & Branch: First / Second sem Diploma in Engg.  
Practical: 6 Periods per Week  
Total Periods: 90 Periods per Semester  
Examination: 4 Hours

Practical Exam : 100 Marks  
Term Work : 25 Marks  
TOTAL MARKS : 125 Marks

## Objective

After completion of the study of Engg. Drawing the student should be able to

1. Understand the importance of Engineering Drawing.
2. Demonstrate the use of different drawing instrument.
3. Make free hand lettering and numbering.
4. Practice of dimensioning of drawing.
5. Undertake different geometric constructions, projections of straight line, planes and solids.
6. Take up different orthographic projections.
7. Draw sectional views, development of surface of different solids.
8. Develop the concept of building drawing.
9. Prepare 2D engineering drawing using Auto CAD software.

## Topic wise distribution of periods.

Sl. No.	Topics	Periods
1	Introduction and Demonstration	03
2	Types of Lines, Lettering & Dimensioning	03
3	Scales	03
4	Curves	06
5	Orthographic Projections	21
6	Section and Developments	21
7	Isometric Projections	06
8	Building Drawing	12
9	Practices on Auto CAD	15
	<b>TOTAL</b>	<b>90</b>

(All drawings are to be made in First Angle Projection)

## 1. INTRODUCTION & DEMONSTRATION

- 1.1 Identify various sizes of drawing boards, drawing sheets as pr BIS.
- 1.2 List the types of pencils, instruments, and scales (RF).
- 1.3 Demonstrate lying of drawing sheet, margin, standard layout and title block as per BIS, folding principle of drawings (blue prints, print outs etc).

## 2. TYPES OF LINES, LETTERING & DIMENSIONING

- 2.1 Demonstrate and explain the use of various types of lines.
- 2.2 Demonstrate the principle of single stroke, gothic lettering & numerals as per BIS.

## 3. SALES

- 3.1 Significance of scales in drawing; different scales.
- 3.2 Define and draw plain sale and diagonal sale.

#### **4. CURVES**

- 4.1 Explain Conic sections with illustration, Explain terms like focus, vertex, directrix and eccentricity.
- 4.2 Draw conics sections by eccentricity method – Ellipse, Parabola and Hyperbola.
- 4.3 Draw Ellipse by concentric circle method and arc of circle method.
- 4.4 Draw parabola by Rectangle Method and Tangent Method.

#### **5. ORTHOGRAPHIC PROJECTIONS**

- 5.1 Demonstrate the principles of 1<sup>st</sup> angle and 3<sup>rd</sup> angle projections with the help of models and draw symbols.
- 5.2 Draw projection of points.
- 5.3 Draw projection of straight line (parallel to both planes, parallel to one and perpendicular to other, parallel to one and inclined to other and inclined to both reference planes).
- 5.4 Draw plane figure such as squares, rectangles, triangles, circle, Pentagon and hexagon (perpendicular to one plane and inclined to other).
- 5.5 Draw projections of solids such as prism, cylinder, cone, tetrahedron and pyramid in simple position (with axis parallel to one reference plane and perpendicular to other reference plane).

#### **6. SECTION & DEVELOPMENTS**

- 6.1 Draw the sectional projection & development of prism, cylinder, cone and pyramid in simple position by a cutting plane perpendicular to one reference plane and inclined to other reference plane.
- 6.2 Draw true shape of the cutting sections.

#### **7. ISOMETRIC PROJECTIONS**

Draw isometric view & Isometric projection of prism, pyramid, cone & cylinder with axis horizontal and vertical with construction of isometric scales.

#### **8. BUILDING DRAWING**

- 8.1 Explain terms related to building drawing.
- 8.2 Draw plan, elevation of single room building with verandah (Flat roof according to given line plan and specification).

#### **9. PRACTICES ON AUTO CAD**

- 9.1 Introduction-Settings, Limits etc.
- 9.2 Auto CAD commands-  
Draw commands (Line, circle, arc, polygon, ellipse, rectangle).  
Edit command, Dimension commands and Modify Commands for two dimensional drafting only.
- 9.3 Exercise for practice using Auto CAD.
  - 9.3.1 Orthographic projections of lines, planes and solids as per chapter 5.0.
  - 9.3.2 Isometric projection as per Chapter 7.0.

#### **Books Recommended**

1. Machine Drawing by Basudeb Bhattacharya, Oxford University Press.
2. A Text Book of Engineering Drawing by Dr. R.K. Dhawan.
3. A Text Book of Engineering Graphics & Auto CAD by K Venugopal.

#### **Reference Books**

1. A Text book of Engineering Drawing by N.D. Bhatt.
2. Engineering Drawing by P.S. Gill.
3. A Introduction to Auto CAD – 2012 by George Omura, Willey India Publishers.

# BEP106 WORKSHOP PRACTICE

Semester & Branch: First / Second sem Diploma in Engg.  
Practical: 6 Periods per Week  
Total Periods: 90 Periods per Semester  
Examination: 4 Hours

Practical Exam : 100 Marks  
Term Work : 25 Marks  
TOTAL MARKS : 125 Marks

## Objective:

1. To demonstrate safely practice in various shops of the workshop.
2. To select suitable tools & equipment in the following shops.
  - (a) Fitting.
  - (b) Sheet Metal.
  - (c) Welding (Gas & Electrical).
  - (d) Turning.
3. To select suitable materials for different process in the above shops.
4. To demonstrate the different processes adopted in the above shops.
5. To finish the jobs within stipulated time and with accuracy as per specifications.

## Topic Wise distribution of periods

Sl. No.	Topics	Periods
1	Fitting Shop	24
2	Sheet Metal	18
3	Welding Shop	24
4	Turning Shop	21
5	Exposure to CNC Milling / Lathe Machine	03
	<b>TOTAL</b>	<b>90</b>

## 1. FITTING SHOP

- 1.1 Demonstrate safety practices in the fitting shop.
- 1.2 Select suitable holding & clamping devices for fitting jobs.
- 1.3 Select suitable tools like- files, vice, chisels, punch, scriber, hammers, surface plate, V-block, try square, caliper etc.
- 1.4 Demonstrate the following operations:  
Sawing, Chipping, Fitting, Craping, Grinding, Marking, Reaming, Tapping, Drilling & Angular cutting.
- 1.5 Introduction of chipping, demonstration on chipping and its applications.
- 1.6 Description, demonstration and practice of simple operation of hack saw straight and angular cutting.
- 1.7 Introduction and use of measuring tools used in fitting shop like steel rule, measuring tape, outside micrometer, vernier caliper and vernier height gauge.
- 1.8 Description and Demonstration and practice of thread cutting using taps and dies.  
Job: Cutting & fitting practice on a square of 50mm X 50mm X 8mm MS Flat.  
Job: Angular cutting practice of 45 degree (on the above job).  
Job: Preparation of stud (to cut external threads) with the help of dies (mm or BSW).  
Job: H-fitting in the mild steel (ms) square.  
Job: Prepare one job on male female fitting.

## **2. SHEET METAL**

- 2.1 Demonstrate safety practices in sheet metal shop.
- 2.2 Prepare surface development for the jobs according to the drawing.
- 2.3 Cut M.S and G.P. sheets according to the surface development / drawing using standard sheet metal cutting tools.
- 2.4 Select hand tools for sheet metal work.
- 2.5 Demonstrate the process of metal clamp joining and reveted joining of sheet metals.  
Job: Making of sheet metal joints.  
Job: Prepare a sheet metal tray or a funnel.  
Job: Prepare a sheet metal job involving rolling, shearing, creasing, bending & cornering.  
Job: Prepare a lap riveting joint.

## **3. WELDING SHOP**

- 3.1 Introduction.
- 3.2 Safety precautions in welding, safety equipments & its application in welding shop.
- 3.3 Introduction to welding, type of welding, common materials that can be welded, introduction to gas welding equipment, types of flame, adjustment of flame, applications of gas welding, Welding tools & safety precautions.
- 3.4 Introduction to electric arc welding (AC & DC), practice in setting current & voltage for striking proper arc, precautions while using electric arc welding. Applications of arc welding. Introduction to polarity & their use.
- 3.5 Demonstrate & use of the different tools used in the welding shop with sketches, Hand shield, helmet, clipping hammer, gloves, welding lead, connectors, aprons, goggles, etc.
- 3.6 Demonstrate of welding defects & various types of joints & end preparation.  
Job: Preparation of lap joint by arc welding rod.  
Job: Preparation of Tee joint by arc welding.  
Job: Preparation of single V or double V butt joint by electric arc welding.  
Job: Brazing practice. Use of Spelt or (on MS sheet pieces).  
Job: Gas welding practice on worn-out & broken parts.

## **4. TURNING SHOP**

- 4.1 Introduction.
- 4.2 Safety precaution & safety equipments.
- 4.3 Various marking, measuring, cutting & holding tools.
- 4.4 Demonstration of different parts of a lathe, demonstration on centering & turning operation in a group of 06 students.  
Job: plain turning, taper turning & grooving practices on round bar.

## **5. EXPOSURE TO C.N.C MILLING / LATHE MACHINE**

### **Reference Books**

1. Workshop Technology by S.K.Hajara Choudhary, Media Promoters Publishers, New Delhi.
2. Workshop Technology by B.S. Raghubanshi, Dhanpat Rai and Sons, New Delhi.
3. Workshop Technology by H.S. Bawa – TMH.
4. Workshop Familiarization by E Wilkinson.
5. Sheet metal shop practice by Bruce & Meyer.
6. Workshop Technology by R.S. Khurmi & J.K. Gupta, S.Chand.

### **Notes**

1. Work, Progress book should be maintained continuously.
2. The roll numbers of the students must be punched on each job.
3. The turning shop job should be done by students' maximum 06 students in a group.

# HMP101 COMMUNICATIVE ENGLISH-I PRACTICAL

Semester & Branch: First sem Diploma in Engg.  
Practical: 2 Periods per Week  
Total Periods: 30 Periods per Semester  
Examination: 4 Hours

Term Work : 25 Marks  
TOTAL MARKS : 25 Marks

## Topic Wise distribution of periods

Sl. No.	Topic	Periods
1	Listening Skill	10
2	Speaking Skill / Conversational Skill	20
	<b>TOTAL</b>	<b>30</b>

### 1. LISTENING SKILL

The student should be able to listen to a text read aloud in normal speed with focus on:  
Rhythm, stress and intonation  
Aural comprehension  
After listening the student can fill-in-blanks, choose a suitable title, make a summary, supply required information and be able to answer comprehension questions from the passage read aloud.

### 2. SPEAKING SKILL / CONVERSATIONAL SKILL

- 2.1 Reading aloud of dialogues, texts, poems, speeches focusing on rhythm, stress and intonation.
- 2.2 Self-introduction
- 2.3 Role-plays on any two- situations
- 2.4 Telephonic conversation
- 2.5 Group Discussion (GD)