MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : ELECTRONICS / MECHANICAL/ CIVIL/ COMPUTER/ ELECTRICAL / CHEMICAL ENGINEERING GROUPS

COURSE CODE : EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS/CD/ED/EI/CV/MH/FE/IU/MI

DURATION OF COURSE: 6 SEMESTERS for EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/CO/CM/IF/EE/EP/CH/CT/PS (8 SEMESTERS for CD / ED / EI / CV / MH / MI / FE / IU) **WITH EFFECT FROM 2009 - 10**

SEMESTER : FIRST **DURATION : 16 WEEKS**

PATTERN : FULL TIME - SEMESTER **SCHEME : E**

SR. NO.	SUBJECT TITLE	Abbre viation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									
				TH	TU	PR	PAPER HRS	TH (1)		PR (4)		OR (8)		TW (9)		SW (16001)
								MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
1	Basic Physics	PHY	12001	03	--	02	03	100	40	50@	20	--	--	--	--	50
2	Basic Chemistry	CHY	12002	03	--	02	03	100	40	50@	20	--	--	--	--	
3	Basic Mathematics	BMS	12003	04	01	--	03	100	40	--	--	--	--	--	--	
4	English	ENG	12004	03	--	02	03	100	40	--	--	--	--	25@	10	
5	Engineering Graphics	EGG	12005	02	--	04	--	--	--	50#	20	--	--	50@	20	
6	Computer Fundamentals	CMF	12006	--	--	04	--	--	--	50*#	20	--	--	25@	10	
7	Basic Workshop Practice (Civil Group)	WPC	12007	01	--	04	--	--	--	--	--	--	--	25@	10	
	Basic Workshop Practice (Electrical Group)	WPE	12008	01	--	04	--	--	--	--	--	--	--	25@	10	
	Basic Workshop Practice (Electronics Group)	WPX	12009	01	--	04	--	--	--	--	--	--	--	25@	10	
	Basic Workshop Practice (Mechanical & Chemical Group)	WPM	12010	01	--	04	--	--	--	--	--	--	--	25@	10	
	Basic Workshop Practice (Computer Group)	WPI	12011	01	--	04	--	--	--	--	--	--	--	25@	10	
			TOTAL	**16**	**01**	**18**	**--**	**400**	**--**	**200**	**--**	**--**	**--**	**125**	**--**	**50**

Student Contact Hours Per Week: **35 Hrs.**

Theory and practical periods of 60 minutes each.

Total Marks **: 775**

@ Internal Assessment, # External Assessment, * On Line Examination, [redacted]No Theory Examination.

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, ,OR-Oral, TW- Termwork, SW- Sessional Work

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms
- Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code as mentioned.

Course Name : All Branches of Diploma in Engineering / Technology.

Course Code : AE/CD/CE/CH/CM/CO/CR/CS/CV/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/ FC/FE/IC/IE/IF/IS/IU/ME/MH/MI/MU/PC/PG/PN/PS/PT

Semester : First

Subject Title : Basic Physics

Subject Code : 12001

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50@	--	--	150

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

RATIONALE:

Engineering is entirely meant for comfort of mankind. It includes varieties of disciplines like Mechanical Engg., Electrical Engg., Civil Engg., Electronics Engg., Computer Engg., etc. The overall growth of these disciplines is based on developments in fundamental sciences and their conceptual learning too.

For sustainable socio-economic development of the country, comprehensive research techniques in science and engineering are required. Regarding any problem to identify, understand and solve, the decision based on scientific facts and results is must.

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 like Optics, Acoustics, Dynamics, Semiconductor Physics, Surface Physics, Nuclear physics, Energy Studies, Materials Science, etc provide **Fundamental Facts, Principles, Laws, and Proper Sequence of Events** to streamline Engineering knowledge.

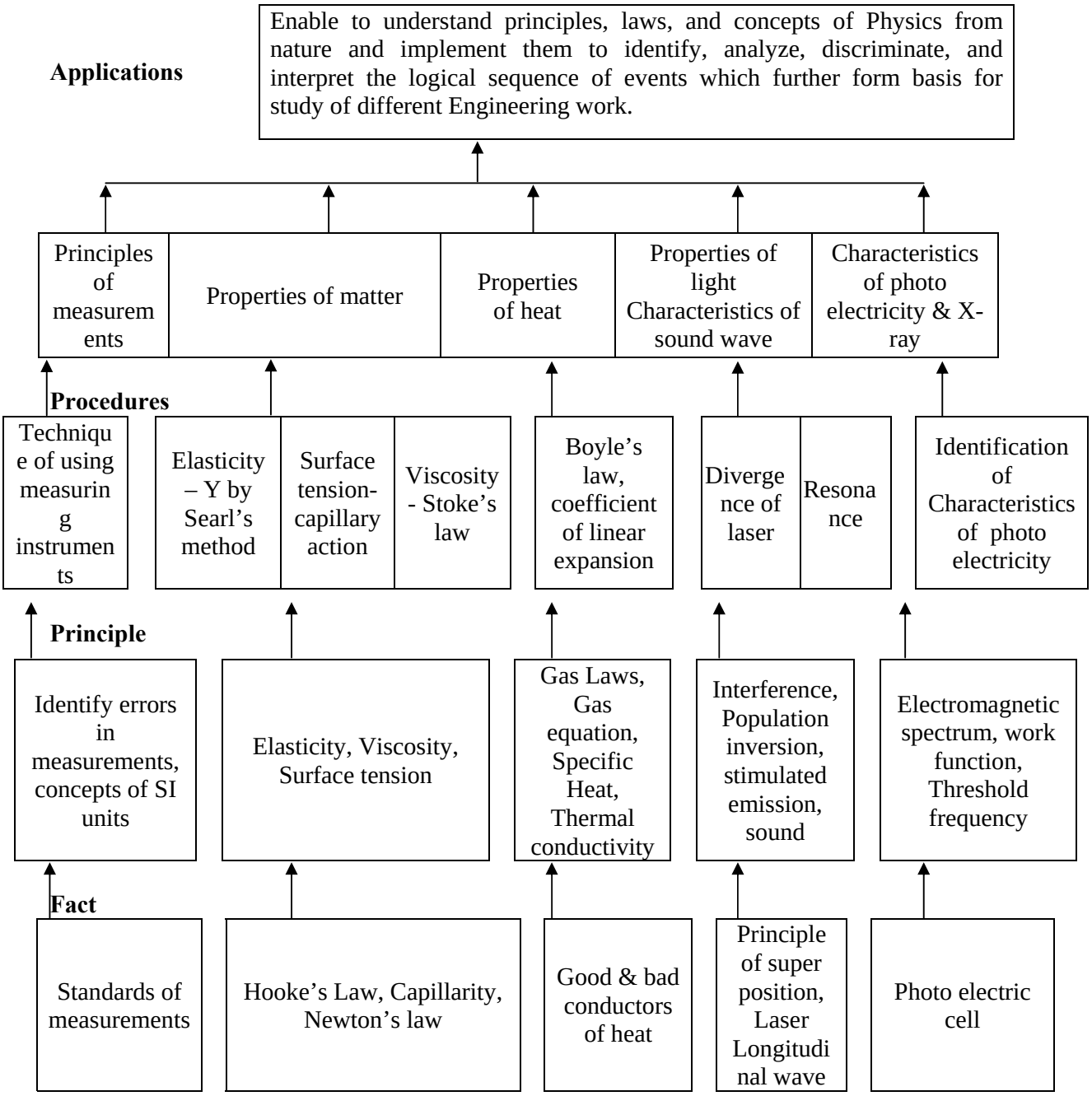
OBJECTIVES:

Student will be able to:

- Measure given dimensions by using appropriate instruments accurately.
- Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Select proper material for intended purpose by studying properties of materials.
- Identify good & bad conductors of heat.
- Analyze relation among pressure, volume and temperature of gas & to interpret the results
- Identify the effect of interference between light waves.

- Identify properties of laser light and photoelectric effect for engineering applications.
- Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

Learning Structure:



CONTENTS: Theory

CHAPTER	CONTENT	HOURS	MARKS
1.	**UNITS AND MEASUREMENTS** **1.1** Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units **1.2** Least count and range of instrument, least count of vernier caliper, micrometer screw gauge and sphereometer, **1.3** Definition of accuracy, precision and error, estisimation of errors -absolute error, relative error and percentage error, rules and identification of significant figures. **(Numericals on percentage error and significant figures)**	**04**	**08**
2.	**GENERAL PROPERTIES OF MATTER** **2.1 Elasticity** Deforming force, restoring force, elastic and plastic body, stress and strain with their types. elastic limit, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity and relation between them (no derivation), stress strain diagram. behavior of wire under continuously increasing load, yield point, ultimate stress, breaking stress, factor of safety. **(Numericals on stress, strain and Young's modulus)**	**05**	**10**
	2.2 Surface Tension. Molecular force, cohesive and adhesive force, Molecular range , sphere of influence, Laplace's molecular theory, Definition of surface tension and its S.I.unit,angle of contact, capillary action with examples, shape of meniscus for water and mercury, relation between surface tension , capillary rise and radius of capillary (no derivation),effect of impurity and temperature on surface tension **(Numericals on relation between surface tension, capillary rise and radius)**	**05**	**10**
	2.3 Viscosity Fluid friction, viscous force, Definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its S.I. unit, streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance, free fall of spherical body through viscous medium (no derivation), up thrust force, terminal velocity, Stokes law (statement and formula). **(Numericals on coefficient of viscosity, Reynolds number and Stoke's formula)**	**05**	**10**

CHAPTER	CONTENT	HOURS	MARKS
3	**HEAT** **3.1 Transmission of heat and expansion of solids** Three modes of transmission of heat -conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit, Definition of linear, aerial and cubical expansion and relation between them.(no derivation) (Numericals on law of thermal conductivity, and coefficients of expansions)	**04**	**08**
	3.2 Gas laws and specific heats of gases Boyle's law, Charle's law, Gay Lussac's law, absolute zero temperature, Kelvin scale of temperature, general gas equation (statement only), specific and universal gas constant, Two specific heats of gas and relation between them(no derivation),Isothermal and adiabatic expansion of gas. **(Numericals on gas laws and specific heats)**	**04**	**08**
4	**LIGHT, LASER and SOUND** **4.1 Properties of light** Reflection, refraction, snell's law, physical significance of refractive index, definition of dispersion, polarization and diffraction of light along with ray diagram, principle of superposition of waves, interference of light, constructive and destructive interference. **(Numericals on refractive index)**	**04**	**10**
	4.2 LASER Properties of laser, spontaneous and stimulated emission, population inversion, optical pumping, construction and working of He-Ne laser.	**04**	**08**
	4.3 Sound Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength , equation of progressive wave (no derivation), longitudinal and transverse wave, definition of stationary wave , node and antinode, forced and free vibrations, definition of resonance with examples, formula for velocity of sound with end correction (no derivation) **(Numericals on relation $v = n\lambda$ and resonance)**	**05**	**10**

CHAPTER	CONTENT	HOURS	MARKS
5	**MODERN PHYSICS.** **5.1 Photo electricity** Concept of photon**,** Plank's hypothesis, properties of photon, photo electric effect, Characteristics of photoelectric effect, work function, Einstein's photoelectric equation(no derivation), photoelectric cell-construction ,working and applications. **(Numericals on Energy of photon, work function, photoelectric equation)**	**04**	**10**
	5.2 X-rays Introduction to x-rays, types of x-ray spectra-continuous and characteristics, production of x-rays using Coolidge tube, minimum wavelength of x-rays, properties of x-rays, engineering, medical and scientific applications. **(Numericals on minimum wavelength of x-rays)**	**04**	**08**
	TOTAL	**48**	**100**

Practical:

Skills to be developed

1) **Intellectual skills-**
   - Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
   - Analyze properties of matter & their use for the selection of material.
   - To verify the principles, laws, using given instruments under different conditions.
   - To read and interpret the graph.
   - To interpret the results from observations and calculations.
   - To use these results for parallel problems.

2) **Motor skills-**
   - Proper handling of instruments.
   - Measuring physical quantities accurately.
   - To observe the phenomenon and to list the observations in proper tabular form.
   - To adopt proper procedure while performing the experiment.
   - To plot the graphs.

List of Experiments:

1. To know your Physics Laboratory.
2. To use Vernier Caliper for the measurement of dimensions of given object.
3. To use Micrometer Screw Gauge for the measurement of dimensions (Length, Thickness, Diameter) of given object.
4. To verify Hooke's Law by Searle's method and to calculate Young's modulus of elasticity of steel wire.
5. To study capillarity phenomenon and to verify that the height of liquid in capillary is inversely proportional to the radius of capillary.

6. To determine coefficient of viscosity of given fluid (Glycerin) using Stoke's Method.
7. To calculate the Linear Thermal coefficient of expansion for copper by using Pullinger's apparatus.
8. To Verify Boyle's law and to find out atmospheric pressure in the laboratory using graph.
9. To determine the velocity of sound by using resonance tube.
10. To verify characteristics of photoelectric cell.
11. Use of Thermocouple as a thermometer for the measurement of unknown temperature(Boiling Point of Water)
12. To determine the divergence of He-Ne laser beam.

Reference Books:

Sr. No.	Name of book	Author	Publisher & Address
1.	Physics-I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
2.	Applied physics	Arthur Beiser	Tata McGraw- Hill raw- Hill Publication, New Delhi
3.	Engineering Physics	by R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.
4.	Fundamentals of Physics	Resnick ,Halliday & Walker	Wiley India Pvt. Ltd.

Course Name : All Branches of Diploma in Engineering and Technology

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Semester : First

Subject Title : Basic Chemistry

Subject Code : 12002

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50@	--	--	150

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

RATIONALE:

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering materials, their properties, related applications & selection of materials for engineering applications.

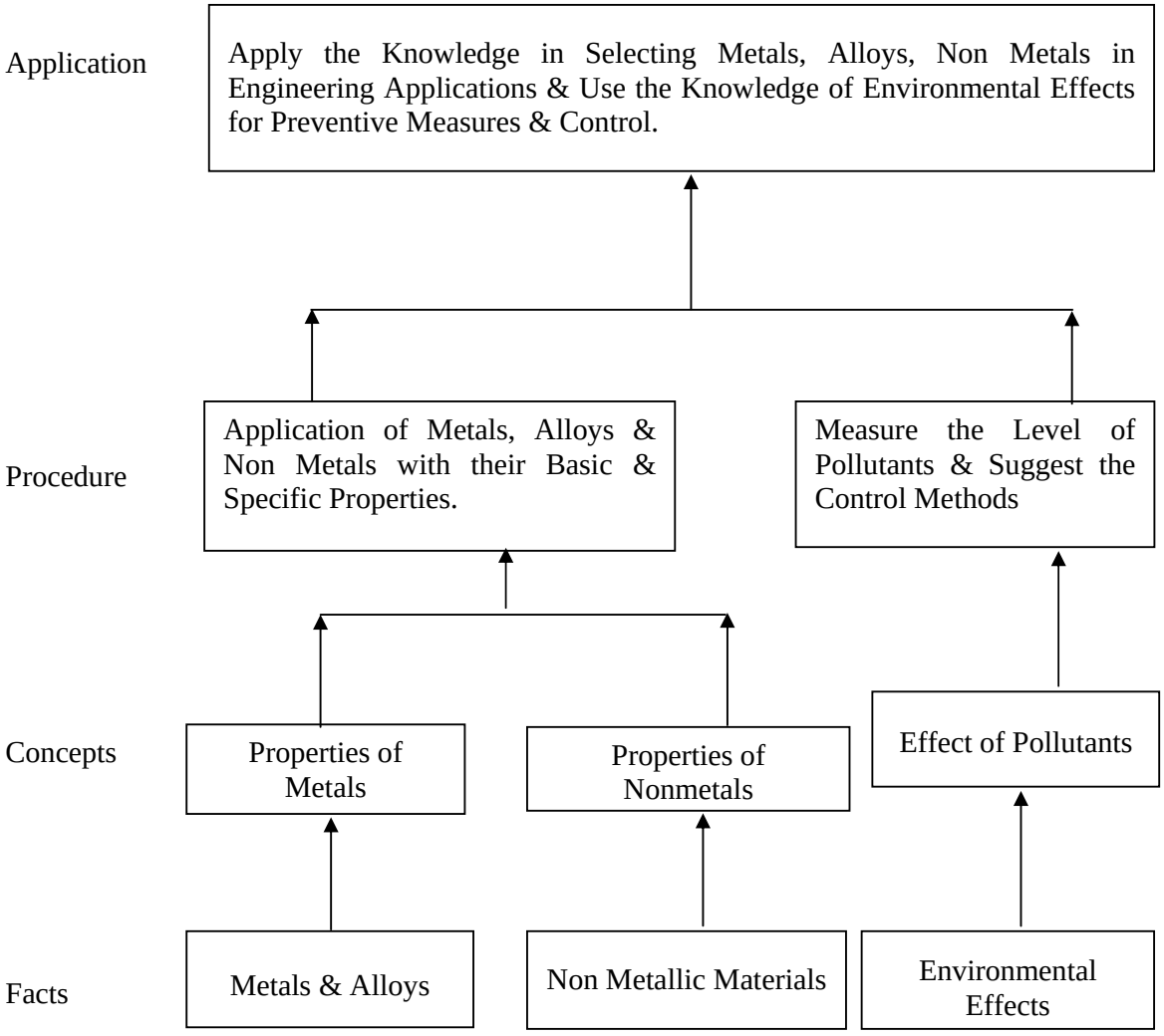
Due to technological progress there are hazardous effects on environment & human life. The core knowledge of environmental effects will bring awareness in students about the precautions & preventions to be taken to reduce the ill effects.

This subject will generate curiosity of carrying out further development in engineering fields.

OBJECTIVES: The student will be able to:

1. Draw the orbital configuration of different elements.
2. Represent the formation of molecules schematically.
3. Describe the mechanism of electrolysis.
4. Identify the properties of metals & alloys related to engineering applications.
5. Identify the properties of non metallic materials, related to engineering applications.
6. Compare the effects of pollutants on environments & to suggest preventive measures & safety.

LEARNING STRUCTURE:



Content: Theory

Chapter No.	Name of the Topic	Hours	Marks
01	**Atomic Structure** Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape of the orbitals & distinction between Orbits & Orbitals, Hund's Rule, Filling Up of the Orbitals by Aufbau's Principle (till Atomic no. 30), Definition & types of valency (Electrovalency & Covalency), Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, $CaCl_2$, MgO, $AlCl_3$, CO_2, H_2O, Cl_2, NH_3, C_2H_4, N_2, C_2H_2. Distinction between electrovalent & covalent compounds.	08	16
02	**Electrochemistry** Definition & differentiation of Atom, Ion. Definition of Ionisation & Electrolytic dissociation, Arrhenius Theory of Ionisation,Degree of Ionisation & factors affecting degree of ionization. Significance of the terms involved in Electrolysis- Such as Conductors, Insulators , Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes. Mechanism of Electrolysis – Primary & Secondary Reactions at Cathode & Anode, concept of electrode potential such as reduction potential & oxidation potential. Electrochemical Series for Cations & Anions, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaCl solution & fused NaCl by using carbon electrode, Faraday's first & second law of Electrolysis & Numericals, Electrochemical Cells & Batteries, Definition, types such as Primary & Secondary Cells & their examples.Construction, Working & Applications of Dry Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & Electrotyping	09	22
03	**Metals & Alloys** **3.1 Metals (Marks:12)** Occurrence of Metals, Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties of metals such as Hardness, Toughness, Ductility, Malleability, Tensile strength, Machinability, Weldability, Forging, Soldering, Castability. Stages of Extraction of Metals from its Ores in detail i.e. Crushing, Concentration, Reduction, Refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. **3.2 Alloys (Marks: 08)** Definition of Alloy, Purposes of Making alloy. Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous & their examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbittmetal.	11	20

04	**Non Metallic Materials** **4.1 Plastics (Marks: 06)** Definition of Plastic, Formation of Plastic by Addition & Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermosoftening & Thermosetting Plastic, with Definition, Distinction & e.g., Compounding of Plastics – Resins, Fillers, Plasticizers, Acceleraters, Pigments & their examples, Engineering Applications of Plastic based on their properties. **4.2 Rubber (Marks: 06)** Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, & e.g, Distinction Between natural & synthetic rubber. Properties of rubber such as elasticity, tack, abrasion resistant,stress & strain and related engg.application. **4.3 Thermal Insulating Materials(Marks: 06)** Definition & Characteristics of Thermal insulators. Preparation, Properties & Applications of Thermocole & glasswool. Properties & Applications of Asbestos, Cork.	07	18
05	**Environmental Effects (Awareness Level)** **5.1 Pollution & Air pollution (Marks 10)** Definition of pollution & pollutant, Causes of Pollution, Types of Pollution - Air & Water Pollution. **Air Pollution** Definition, Types of Air pollutants their Sources & Effects, Such as Gases, Particulates, , Radio Active Gases, Control of Air Pollution, Air Pollution due to Internal Combustion Engine & Its Control Methods, Deforestation their effects & control measures. Causes , Effects & control measures of Ozone Depletion & Green House Effects**.** **5.2 Water Pollution & Wastes (Marks 14)** Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, Concept & significance of BOD, COD, Biomedical Waste & E – Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.	13	24
	Total	**48**	**100**

Practical:

Intellectual Skills: 1. Analyse given solution
2. Interpret the results

Motor Skills : 1. Observe Chemical Reactions
2. Measure the quantities Accurately
3. Handle the apparatus carefully

List of Experiments:

01 – 07 Qualitative Analysis of **Seven Solutions,** Containing One Basic & One Acidic Radical Listed below

Basic Radicals:

Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K^{+}, NH_4^{+}.

Acidic Radicals:

Cl^{-}, Br^{-}, I^{-}, CO_3^{-2}, SO_4^{-2}, NO_3^{-}.

08 To Determine E.C.E. of Cu by Using $CuSO_4$ Solution & Copper Electrode

09 To Determine the % of Fe in the Given Ferrous Alloy by $KMnO_4$ Method.

10 To Prepare a Chart Showing Application of Metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co.

11 To Prepare Phenol Formaldehyde Resin (Backelite)

12 To Determine Carbon Monoxide Content in Emission from Petrol Vehicle.

13 To Determine Dissolved Oxygen in a Water Sample.

Learning Resources:

Reference Books:

Sr. No.	Author	Name of the book	Publisher
01	Jain & Jain	Engineering Chemistry	Dhanpat Rai and Sons
02	S. S. Dara	Engineering Chemistry	S. Chand Publication
03	B. K. Sharma	Industrial Chemistry	Goel Publication
04	S. S. Dara	Environmental Chemistry & Pollution Control	S. Chand Publication
05	Vedprakash Mehta	Polytechnic Chemistry	Jain brothers

Course Name : All Branches of Diploma in Engineering and Technology

Course Code : AE/CD/CE/CH/CM/CO/CR/CS/CV/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/ FC/FE/IC/IE/IF/IS/IU/ME/MH/MI/MU/PC/PG/PN/PS/PT

Semester : First

Subject Title : Basic Mathematics

Subject Code : 12003

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	01	--	03	100	--	--	--	100

Notes:

- **This subject is common for all courses.**
- **For smooth implementation and uniformity, the schedule for tutorial is given separately.**
- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

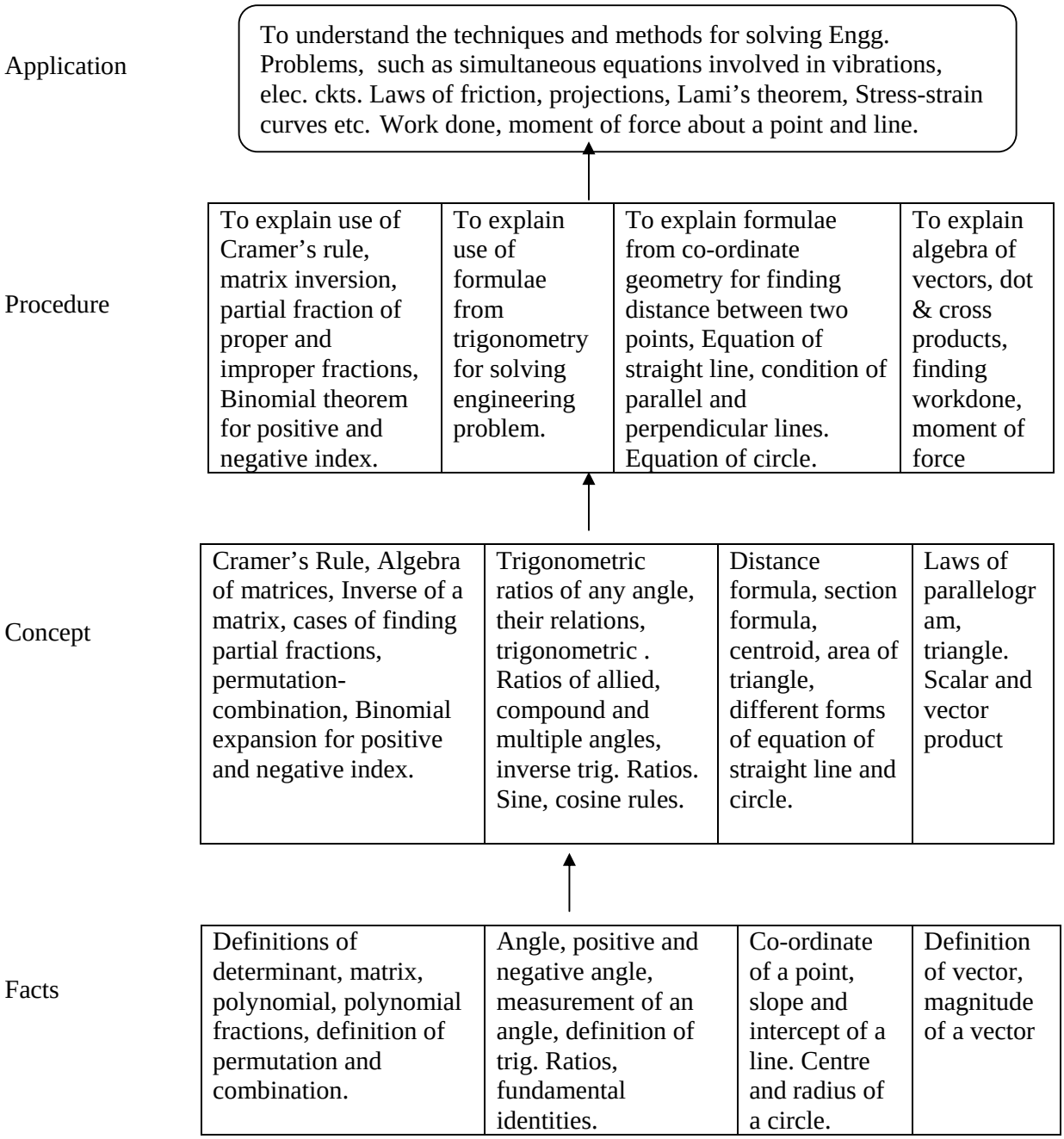
RATIONALE:

The subject is classified under basic sciences and intends to teach students basic facts, concepts and principles of mathematics as a tool to analyze Engineering problems. Mathematics lay down the foundation for understanding core technology subjects.

OBJECTIVE:

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

Learning Structure:



Contents: Theory

Chapter		Hours	Marks
1.	**ALGEBRA** **1.1 Logarithms:** 1.1.1 Definition of logarithm (Natural and Common logarithm.) 1.1.2 Laws of logarithm 1.1.3 Examples based on 1.1.1 to 1.1.2	**03**	**06**
	1.2 Partial Fraction 1.2.1 Definition of polynomial fraction proper & improper fractions and definition of partial fractions. 1.2.2 To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. 1.2.3 To resolve improper fraction into partial fraction.	**04**	**08**
	1.3 Determinant and matrices **Determinant ---------- 04 Marks** 1.3.1 Definition and expansion of determinants of order 2 and 3. 1.3.2 Cramer's rule to solve simultaneous equations in 2 and 3 unknowns. **Matrices---------- 16 Marks** 1.3.3 Definition of a matrix of order m X n and types of matrices. 1.3.4 Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. 1.3.5 Transpose of a matrix. 1.3.6 Minor, cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method. 1.3.7 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.	**13**	**20**
	1.4 Binomial Theorem 1.4.1 Definition of factorial notation, definition of permutation and combinations with formula. 1.4.2 Binomial theorem for positive index. 1.4.3 General term. 1.4.4 Binomial theorem for negative index. 1.4.5 Approximate value (only formula)	**04**	**06**

2	**TRIGONOMETRY.** **2.1 Trigonometric Ratios:** 2.1.1 Trigonometric ratios of any angle 2.1.2 Relation between degree and radian. 2.1.3 Fundamental identities. 2.1.4 Examples based on Fundamental Identities	**03**	**04**
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES (Questions based on numerical computations, which can also be done by calculators, need not be asked particularly for allied angles).	**08**	**12**
	2.3 FACTORIZATION AND DEFACTORIZATION FORMULAE	**03**	**04**
	2.4 INVERSE TRIGONOMETRIC RATIOS 2.4.1 Definition of inverse trigonometric, ratios, Principal values of inverse trigonometric ratios. 2.4.2 Relation between inverse trigonometric ratios.	**03**	**04**
3	**COORDINATE GEOMETRY**		
	3.1 POINT AND DISTANCES 3.1.1 Distance formula, Section formula, midpoint, centriod of triangle. 3.1.2 Area of triangle and condition of collinearity.	**04**	**08**
	3.2 STRAIGHT LINE 3.2.1 Slope and intercept of straight line. 3.2.2 Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. 3.2.3 Angle between two straight lines condition of parallel and perpendicular lines. 3.2.4 Intersection of two lines. 3.2.5 Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	**08**	**12**
	3.3 CIRCLE 3.3.1 Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. 3.3.2 General equation of circle, its centre and radius.	**04**	**08**
4	**VECTORS** 4.1 Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) 4.2 Dot (Scalar) product with properties. 4.3 Vector (Cross) product with properties.	**04**	**04**
	4.4 **Applications of Vectors** 4.4.1 Work done and moment of force about a point & line	**03**	**04**
	TOTAL	**64**	**100**

LEARNING RESOURCES:

Sr. No.	Title	Authors	Publications
1	Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha
2	Trigonometry	S. L. Loney	S. Chand Publication
3	Higher Algebra	H. S. Hall & S. R. Knight	Metric edition, Book Palace, New Delhi
4	College Algebra	Frc.G. Valles	Charotar Publication
5	Matrices	Ayres	Schuam series, McGraw hill
6	Higher Engineering Mathematics	B. S. Grewal	Khanna publications New Dehli
7	Engineering Mathematics	S. S. Sastry	Prentice Hall of India

Tutorial:

Tutorial	Topic on which tutorial is to be conducted
1	Logarithm
2	Partial fractions
3	Determinants
4	Matrices
5	Solution of simultaneous equation by Matrix inversion method.
6	Binomial theorem
7	Trigonometry- fundamental identities-revision only
8	Trigonometry-allied, compound and multiple angles
9	Trigonometry-factorization and defactorization formulae.
10	Trigonometry-inverse trigonometric ratios.
11	Point and distances
12	Straight line
13	Circle.
14.	Vectors
15.	Vectors' applications

Note:

Maximum 5 questions are to be given in each tutorial, in which two 2 marks questions (based on basic concept and formulae with one/two step calculations) and three 4 marks questions are expected.

Course Name : All Branches of Diploma in Engineering and Technology.

Course Code : AA/AE/CD/CE/CH/CM/CO/CR/CS/CV/DC/DE/ED/EE/EI/EJ/EN/EP/ET/EV/ EX/FC/FE/GT/IC/IE/IF/IS/IU/ME/MH/MI/ML/MU/PC/PG/PN/PS/PT/SC/ TC/TX

Semester : First

Subject Title : English

Subject Code : 12004

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

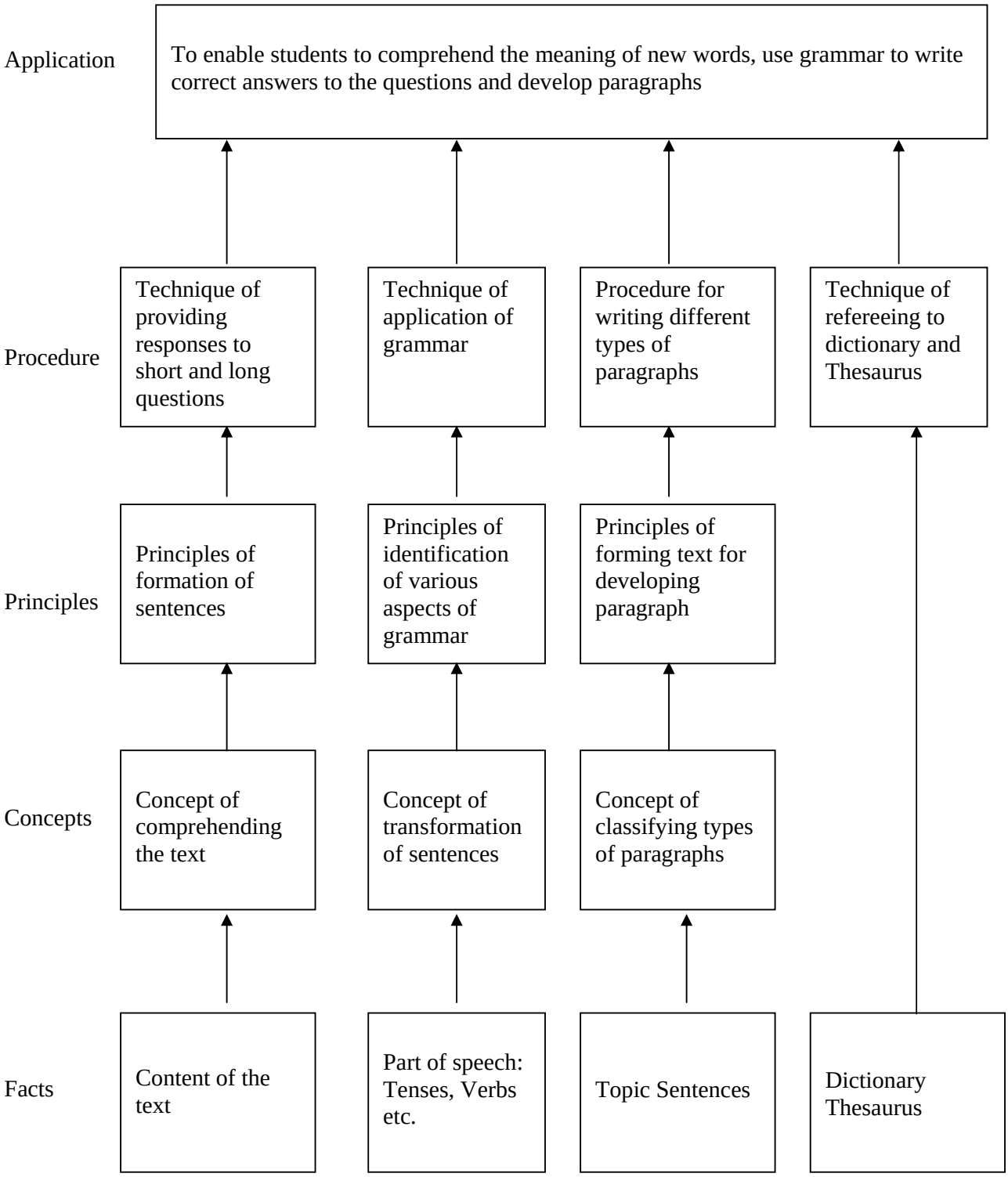
RATIONALE:

The snap study conducted for the role of technicians in industry revealed that diploma pass outs lack in grammatically correct written and oral communication. In order to develop the abilities in students a text has been introduced. The practical have been incorporated to provide practice to the students to develop writing skills. Further exercises have been included for improving oral communication.

OBJECTIVES:

1. Comprehend the given passage
2. Answer correctly the questions on seen and unseen passages
3. Increase the vocabulary
4. Apply rules of grammar for correct writing

Learning Structure:



CONTENTS: Theory

Name of Topic	Hours	Marks
PART I - TEXT • Comprehension – Responding to the questions from text (Spectrum) • Vocabulary - Understanding meaning of new words from text • Identifying parts of speech from the text.	22	44
PART II - Application of grammar • Verbs • Tenses Do as directed (active /passive, Direct/indirect, affirmative/negative/assertive, interrogative, question tag, remove too, use of article, preposition, conjunctions, interjections, punctuation) o Correct the errors from the sentences.	16	28
PART III - Paragraph writing • Types of paragraphs (Narrative, Descriptive, Technical) • Unseen Passage for Comprehension.	05	16
PART IV - Vocabulary building • Synonyms • Antonyms • Homophones • Use of Contextual words in a given paragraph.	05	12
Total	**48**	**100**

The text (Spectrum) consists of 10 Articles/Lessons out of which only eight articles/lessons will be considered and taught as a part of the Curriculum. The below mentioned articles, (two) have been deleted/scraped off from the curriculum.
Lesson No. 02 – What is Life? By J.B.S.Haldane
Lesson No. 06 – Role of Technology at Women's Work.

The term work will consist of 08 Assignments:

Skills to be developed in practicals:

Intellectual Skills:
1 Skills of speaking correct English.
2 Searching information.
3 Reporting skills.

Motor Skills:

1 Use of appropriate body language.
2 Use of appropriate phonetics.

List of Assignments:

01 **Building of Vocabulary (04 Hours)**
25 words from the glossary given at the end of each chapter, to be used to make sentences.

02 **Applied Grammar (02 Hours)**
Identify the various parts of speech and insert correct parts of speech in the sentences given by the teachers.

03 Punctuation (02 Hours)
Punctuate 20 sentences given by the teachers.

04 Tenses (04 Hours)
List 12 tenses and give two examples for each tense.

05 Dialogue Writing (04 Hours)
Write at least two dialogues on different situations. (Conversation between two friends, conversation between two politicians etc.)

06 Identifying the Errors (02 Hours)
Identify the errors in the sentences given by the teachers. (20 sentences)

07 Idioms and Phrases (02 hours)
Use of Idioms and Phrases in sentences. (20Examples)

08 **Biography (04 Hours)**
Write a short biography on your favorite role model approximately. (250 – 300 words with pictures)

ACTIVITIES TO BE CONDUCTED DURING PRACTICALS

01 Student should perform role-plays on the situations given by the teachers. (04 Hrs)

02 Student should listen to spoken English cassettes. (e.g. V. Sasikumar &Dhamija 2nd edition (04 Hrs) or Lingua Phone L-21 Multimedia (Desirable)

Learning Resources:
Books:

Sr. No.	Title	Author	Publisher
01	Spectrum – A Text Book on English	----	MSBTE
02	Contemporary English grammar, structures and composition	David Green	Macmillan
03	English for practical Purposes	Z. N. Patil et el	Macmillan

04	English grammar and composition	R. C. Jain	Macmillan
05	English at Workplace	Editor – Mukti Sanyal	Macmillan
06	Thesaurus	Rodgers	Oriental Longman
07	Dictionary	Oxford	Oxford University
08	Dictionary	Longman	Oriental Longman

Web Sites for Reference:

Sr. No.	Website Address
01	www.edufind.com
02	www.english_the_easy_eay.com
03	www.englishclub.com
04	www.english_grammar_lessons.com
05	www.wikipedia.org/wiki/english_grammar

Course Name : All Branches of Diploma in Engineering and Technology.

Course Code : AE/CD/CE/CH/CM/CO/CR/CS/CV/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/ FE/IC/IE/IF/IS/IU/ME/MH/MI/MU/PG/PS/PT

Semester : First

Subject Title : Engineering Graphics

Subject Code : 12005

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	04*	--	--	50#	--	50@	100

* - 1 hr per week for Computer Aided Drafting

Notes: - 1) Students should use the A3 size sketchbook for class works.
2) Use approximately 570mm×380mm size drawing sheet for term work.

RATIONALE:

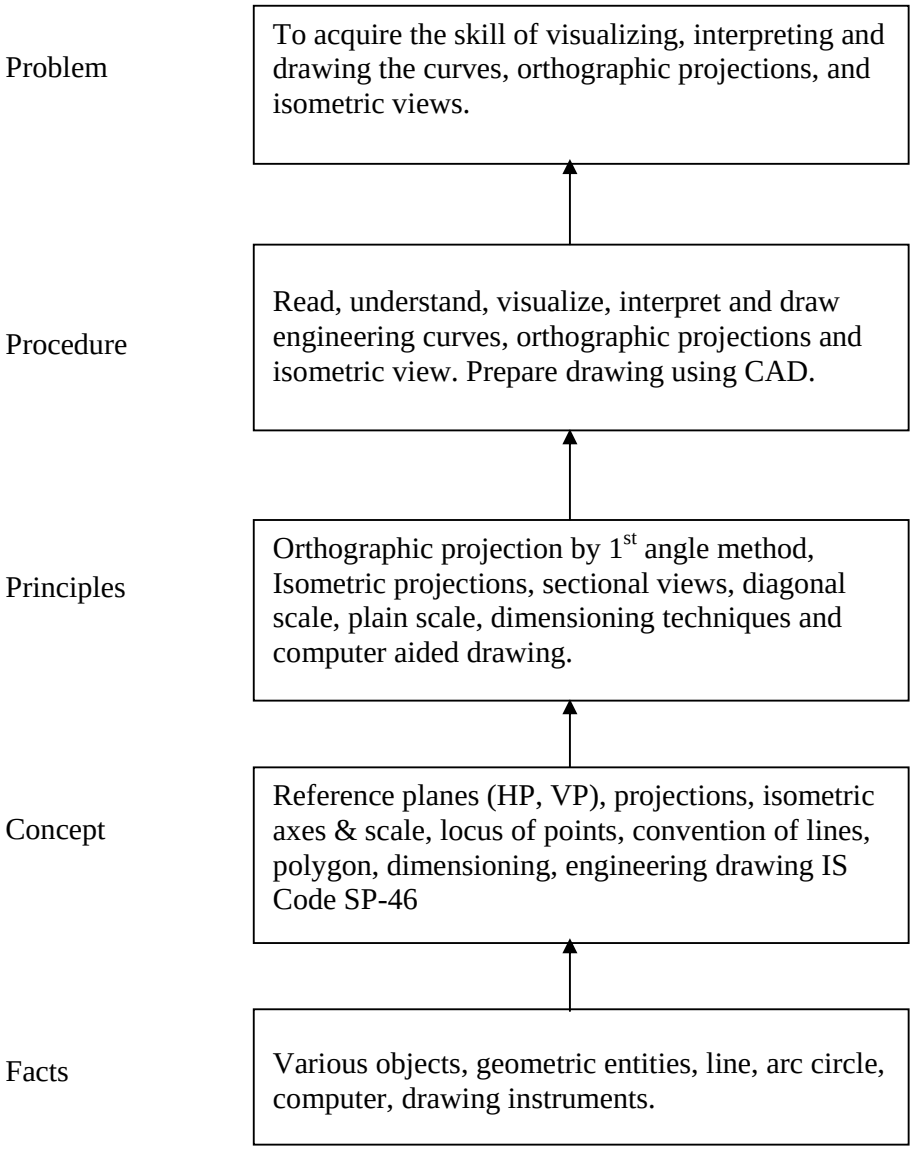
Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and conveying the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects.

OBJECTIVES:

The student should be able to:-

1) Draw different engineering curves and know their applications.
2) Draw orthographic projections of different objects.
3) Visualize three dimensional objects and draw Isometric Projections.
4) Use the techniques and able to interpret the drawing in Engineering field.
5) Use computer aided drafting packages.

Learning Structure:-



Contents: Theory

Chapter	Name of Topic	Hours
1.	Drawing Instruments and their uses 1.1 Letters and numbers (single stroke vertical) 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Sheet layout. 1.5 Introduction to CAD (Basic draw and modify Command). 1.6 Geometrical constructions.	05
2.	Engineering curves & Loci of Points. 1.2 To draw an ellipse by 2.1.1 Directrix and focus method 2.1.2 Arcs of circle method. 2.1.3 Concentric circles method. 2.2 To draw a parabola by: 2.2.1 Directrix and focus method 2.2.2 Rectangle method 2.3 To draw a hyperbola by: 2.3.1 Directrix and focus method 2.3.2 passing through given points with reference to asymptotes 2.3.3 Transverse Axis and focus method. 2.4 To draw involutes of circle & polygon (up to hexagon) 2.5 To draw a cycloid, epicycloid, hypocycloid 2.6 To draw Helix & spiral. 2.7 Loci of Points: 2.7.1 Loci of points with given conditions and examples related to simple mechanisms.	09
3.	Orthographic projections 3.1 Introduction to Orthographic projections. 3.2 Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only) 3.3 Dimensioning technique as per SP-46	06
4.	Isometric projection 4.1 Isometric scale 4.2 Conversion of orthographic views into isometric View / projection (Simple objects) Projection of Straight Lines and Planes. (First Angle Projection Method only)	05
05	5.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 5.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	07
	Total	**32**

PRACTICALS:

List of Practicals	Skills to be developed	
	Intellectual skills	**Motor Skills**
1.Introduction to graphics - (1 Sheet) Draw the following using CAD 1.1 Rectangle with given dimensions 1.2 Circle with given dimensions and hatch 1.3 Pentagon with line command 1.4 Hexagon with given dimensions 1.5 Draw one figure containing circle tangent, arc and dimensioning.	1.To develop ability to solve problems on geometrical constructions.	1.To develop ability to draw the geometrical constructions by computer.
2. Engineering curves & Loci of points - (1 Sheet) i) Three different curves are to be draw using any one method. ii) Draw locus of point on any one mechanism	1) To develop ability to differentiate between conic and curves. 2) To develop ability to identify the type of locus from the nature of surface and the position of generating circle. 3) Able to interpret the given mechanisms and locus of points.	1. To develop ability to draw different types of curves.
3. Orthographic projections - (Total 2 Sheets) Two objects by first angle projection method - (1 Sheet) Redraw the same sheet using CAD - (1 Sheet)	1) Develop ability to interpret first angle projection method. 2) To interpret and able to solve problem on orthographic projection of given object.	1. Develop ability to draw orthographic projections by first angle projection method
4. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale. (simple objects) - (1 sheet) Redraw the same sheet using CAD - (1 sheet)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	1. Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
5. Projections of line and planes. - (1 Sheet) Two problems on Projection of lines and two problems on Projection of Planes.	1) To develop ability to differentiate between true length and apparent length. 2) To interpret the position lines and plane with reference plane.	1) Able to draw Orthographic Projections of line and planes.

List of Practice Oriented Projects: -

1) To draw layout of visited Industry, College using CAD
2) To draw orthographic projection of given machine element using CAD

Learning Resources: -

A) Books: -

Sr. No	Author	Title	Publication
1	N. D. Bhatt	Engineering Drawing	Charotar Publishing House
2	K. Venugopal	Engineering Drawing and Graphics+ AutoCAD	New Age Publication
3	R. K. Dhawan	Engineering Drawing	S. Chand Co.
4	P. J. Shah	Engineering Drawing	---
5	K. R. Mohan	Engineering Graphics	Dhanpat Rai and Publication Co.

B) Video Cassettes / CD's

1. Instructional / Learning CD developed by ARTADDICT.

C) IS Code

SP – 46. Engineering Drawing practice for schools and colleges.

Course Name : All Branches of Diploma in Engineering and Technology.

Course Code : AE/CD/CE/CH/CM/CO/CR/CS/CV/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/ FE/IC/IE/IF/IS/IU/ME/MH/MI/MU/PG/PS/PT/SC/TC/TX

Semester : First

Subject Title : Computer Fundamentals

Subject Code : 12006

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	4	--	--	50* #	--	25@	75

*** On line examination**

RATIONALE:

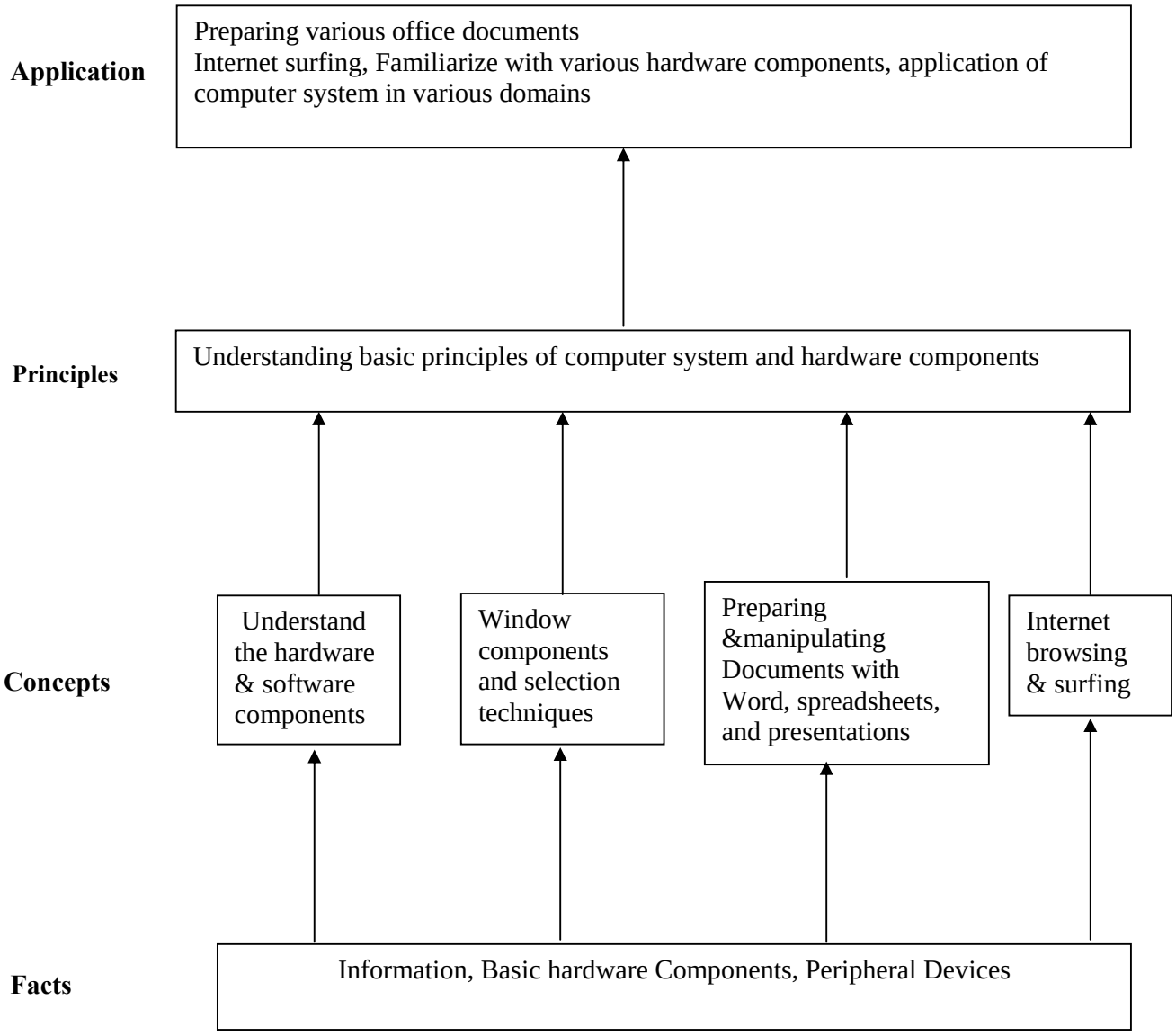
Computer plays an important role in human lives. The primary purpose of using a computer is to make life easier. It is a gateway to a wonderful world of information and various applications. Computers have established an indispensable part in a business, academics, defense, budgeting, research, engineering, medicine, space. This subject introduces the fundamentals of computer system focusing various hardware and software components. It also provides biblical worldview regarding computer ethics by means of Internet.

OBJECTIVES:

Students will be able to:

1. Understand a computer system that has hardware and software components, which controls and makes them useful.
2. Understand the operating system as the interface to the computer system.
3. Use the basic functions of an operating system.
4. Set the parameter required for effective use of hardware combined with and application software's
5. Compare major OS like Linux and MS-Windows
6. Use file mangers, word processors, spreadsheets, presentation software's and Internet.
7. Have hands on experience on operating system and different application software
8. Use the Internet to send mail and surf the World Wide Web.

Learning Structure:



CONTENTS: Theory

Note: Contents of theory are to be taught in Practical Period

Chapter	Name of the Topic
1	**Fundamentals Of Computer** Introduction Components of PC The system Unit Front part of system Unit Back part of system Unit CPU Memory of computer Monitor Mouse, Keyboard, Disk, Printer, Scanner, Modem, Video, Sound cards, Speakers
2	**Introduction To Windows 2000/Xp** Working with window Desktop Components of window Menu bar option Starting window Getting familiar with desktop Moving from one window to another Reverting windows to its previous size Opening task bar buttons into a windows Creating shortcut of program Quitting windows
3	**GUI Based Editing, Spreadsheets, Tables & Presentation** Application Using MS Office 2000 & Open Office.Org Menus Opening of menus, Toolbars: standard toolbars, formatting toolbars & closing of menus Quitting Document, Editing & designing your document Spreadsheets Working & Manipulating data with Excel Changing the layout Working with simple graphs & Presentation Working With PowerPoint and Presentation
4	**Introduction To Internet** What is Internet Equipment Required for Internet connection Sending &receiving Emails Browsing the WWW Creating own Email Account Internet chatting
5	**Usage of Computer System in various Domains** Computer application in Offices, books publication, data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and research work, real-time, point of sale terminals, financial transaction terminals.

Chapter	Name of the Topic
6	**Information technology for benefits of community** Impact of computer on society Social responsibilities Applications of IT Impact of IT Ethics and information technology Future with information technology

Sr. No	List of Practicals
1.	Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop
2.	The Windows 2000 accessories WordPad – editing an existing document Use of Paint – drawing tools The Calculator, Clock
3.	The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation Moving or copying files, Renaming, Deleting files ,and folders
4.	Printing Installing a printer driver Setting up a printer Default and installed printers Controlling print queues Viewing installed fonts
	The clipboard and 'drag and drop' Basic clipboard concepts Linking vs. embedding
5.	Moving through a Word document menu bar and drop down menus toolbars
6.	Entering text into a Word 2000 document, selection techniques Deleting text
7.	Font formatting keyboard shortcuts
8.	* Paragraph formatting Bullets and numbering
9.	* Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers
10.	Introducing tables and columns
11.	Printing within Word 2000 Print setup Printing options Print preview
12.	* Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter
13.	Creating and using macros in a document
14.	* Creating and opening workbooks Entering data
15.	Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook
16.	Formatting and customizing data
17.	Formulas, functions and named ranges
18.	Creating, manipulating & changing the chart type

19.	Printing, Page setup, Margins Sheet printing options, Printing a worksheet
20.	* Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation
21.	Using the AutoContent wizard ,Starting the AutoContent wizard Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number
22.	* Creating a simple text slide Selecting a slide layout Manipulating slide information within normal and outline view Formatting and proofing text Pictures and backgrounds drawing toolbar AutoShapes Using clipart Selecting objects Grouping and un-grouping objects The format painter
23.	* Creating and running a slide show Navigating through a slide show Slide show transitions Slide show timings Animation effects
24.	* Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window The on-line web tutorial Using hyper links Responding to an email link on a web page
25.	Searching the Internet Searching the web via Microsoft Internet Explorer Searching the Internet using Web Crawler Searching the Internet using Yahoo Commonly used search engines
26.	Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced
27.	* Using the Address Book Adding a new contact Creating a mailing group Addressing a message Finding an e-mail address
28.	Using electronic mail Starting Outlook Express Using the Outlook Express window Changing the window layout Reading file attachment Taking action on message-deleting, forwarding, replying

29.	* Email & newsgroups Creating and sending emails Attached files Receiving emails Locating and subscribing to newsgroups Posting a message to a newsgroup
30.	Chatting on internet Understating Microsoft chat environment Chat toolbar

Note : Term work will include printout of Exercises of practicals marked with asterisks (*)

Learning Resources
Books:

Sr. No.	Author	Title	Edition	Publisher
01	Vikas Gupta	Comdex Computer Course Kit	First	Dreamtech
02	Henry Lucas	Information Technology for management	7^{Th}	Tata Mc-Graw Hills
03	B.Ram	Computer Fundamentals Architecture and Organisation	Revised 3^{rd}	New Age International Publisher

Course Name : Civil Engineering Group

Course Code : CE/CR/CS/CV

Semester : First

Subject Title : Basic Workshop Practice (Civil)

Subject Code : 12007

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	04	--	--	--	--	25@	25

Rationale:

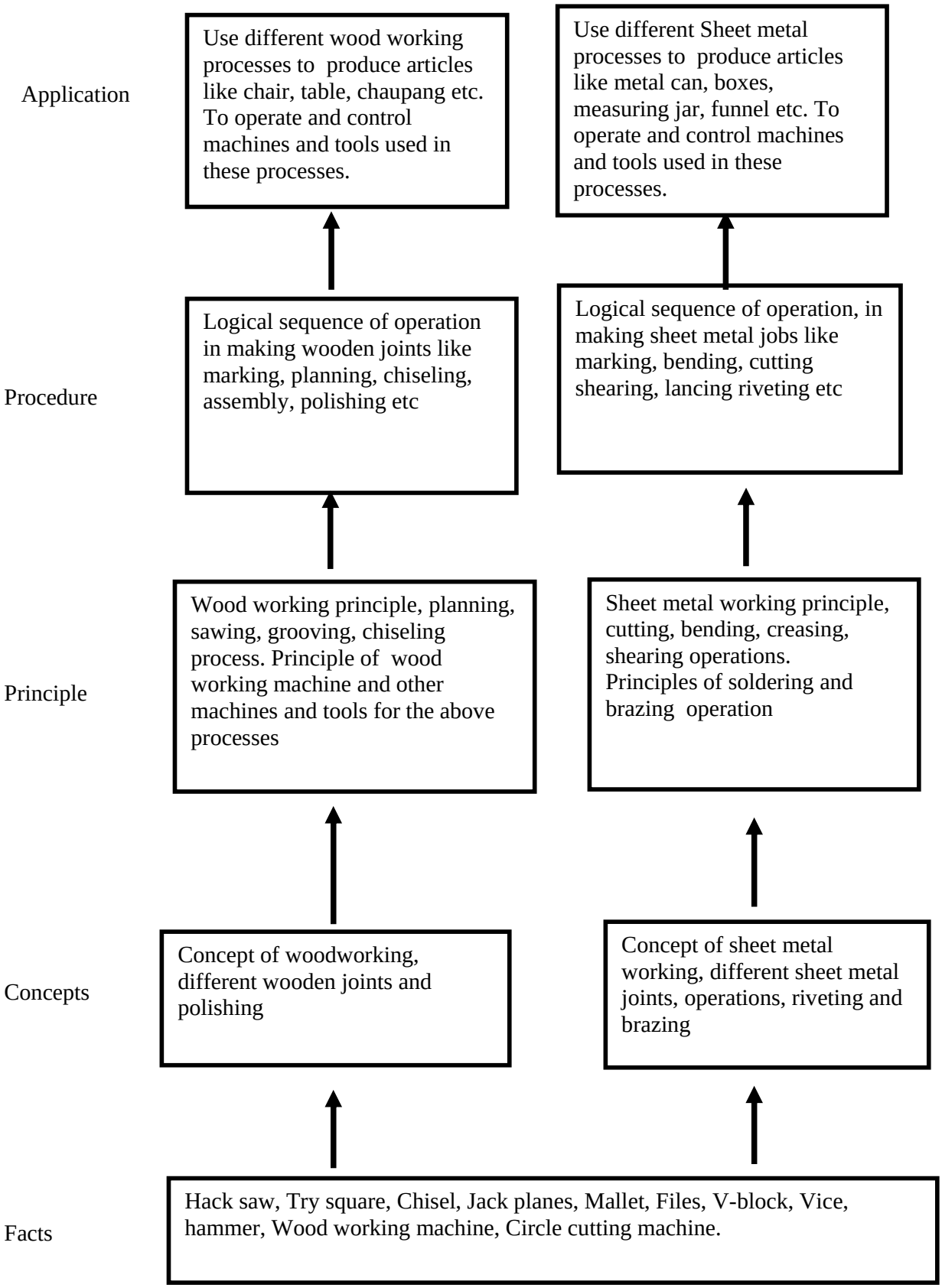
Civil diploma technician is expected to know basic workshop practice like, Gas Welding gas cutting. Fitting, Drilling, Tapping, plumbing and sheet metal processes. The students are required to identify operate and control various machines. The students are required to select and use various tools and equipments for welding, fitting, tapping drilling, plumbing and sheet Metal operations.

Objectives:

At the end of this course, the student will able to

- Know basic workshop processes.
- Read and interpret job drawings.
- Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments wood working and sheet metal shops.
- Operate, control different machines and equipments.
- Select proper welding rods and fluxes.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

LEARNING STRUCTURE:-



CONTENTS:

Sr.No.	Details of Theory Contents	Period
01	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	03
02	**WELDING SHOP** 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	04
03	**FITTING SHOP** 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	04
04	**PLUMBING SHOP** 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different G.I. pipes, PVC pipes, flexible pipes used in practice. 4. G. I. pipes and PVC pipes fittings and accessories, Adhesive solvents-chemical action, Piping layout.	03
05	**SHEET METAL SHOP** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	02
	Total	**16**

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience

Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.
2] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

Sr. No.	Details Of Practical Contents
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
02	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint.
03	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
04	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
05	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing , soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.

Books:

- S.K. Hajara Chaudhary- Workshop Technology-Media Promotors and Publishers,New Delhi
- B.S. Raghuwanshi- Workshop Technology- Dhanpat Rai and sons, New Delhi
- R K Jain- Production Technology- Khanna Publishers, New Delhi
- H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi
- Kent's Mechanical Engineering Hand book- John Wiley and Sons, New York

Video Cassettes and CDs:

- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021
  Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

Course Name : Electrical Engineering/ Electrical Power System.

Course Code : EE/EP

Semester : First

Subject Title : Basic Workshop Practice (Electrical)

Subject Code : 12008

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPERS HRS.	TH	PR	OR	TW	TOTAL
01	--	04	--	--	--	--	25@	25

Note: 1. Theory related to the practical will be taught during the practical periods

RATIONALE:

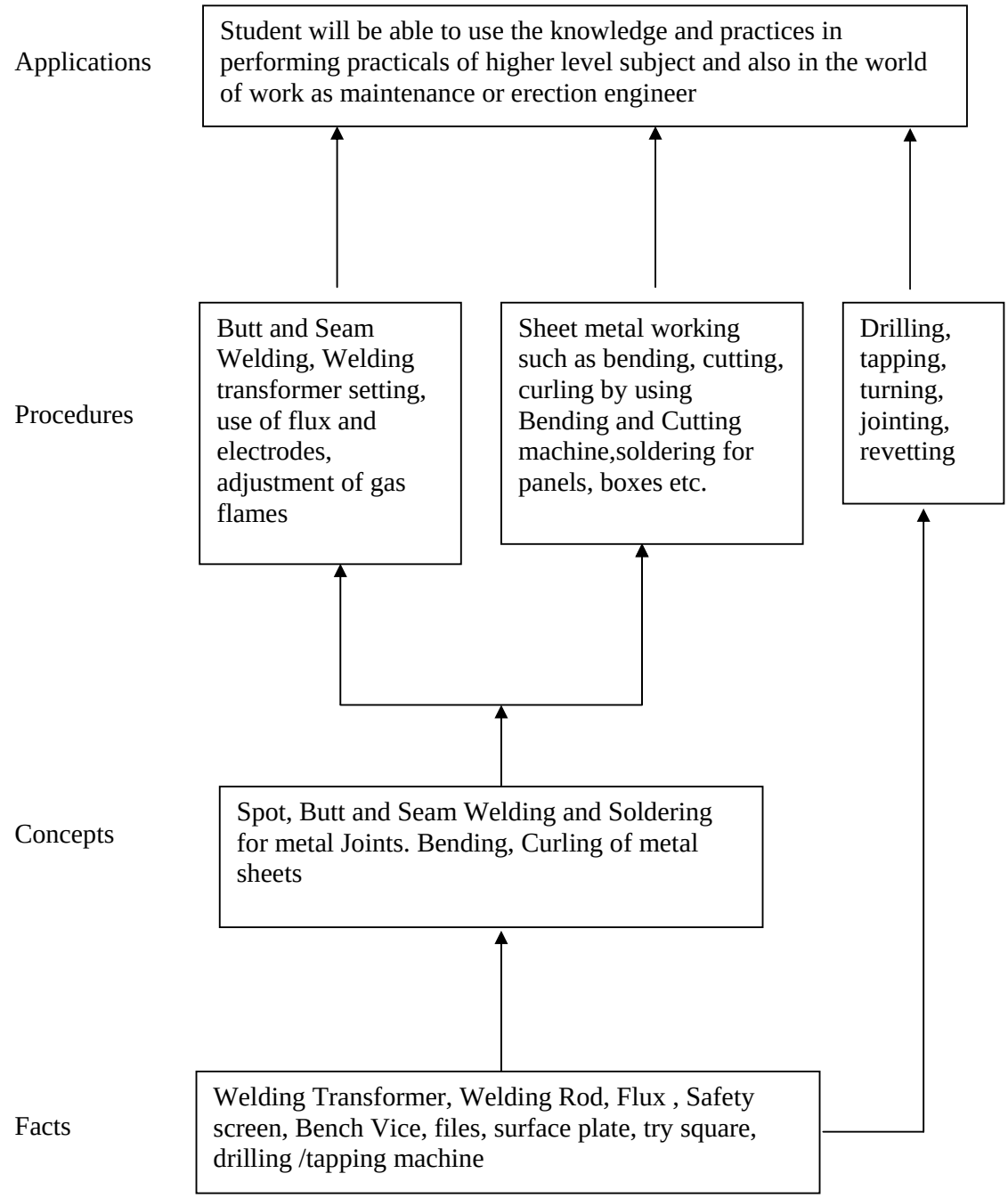
For a diploma folder in Electrical Engineering, it is essential to know some basic workshop skills. In the world of work students are required to supervise maintenance of equipment, where he needs the knowledge of basic workshop skills such as Welding, Soldering, Sheet Metal Working, Drilling, Tapping etc.

OBJECTIVES:

The student will be able to

1. Use the knowledge of sheet metal working and welding for preparing panels, switch boxes etc.
2. Use various drills for electrical wiring and installation
3. Make joints for various types of wirings such as casing capping, Batten wiring and mounting of accessories

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours
1.	**WELDING SHOP** : 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. Different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	04
2.	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and rivetting. 5. Safety precautions.	04
3.	**TURNING SHOP** 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Working Principle of Drilling machine, Tapping dies its use. 4. Drilling and Tapping 5. Turning: Plain, taper 6. Threading and Knurling 7. Safety precautions and safety equipments.	04
4	**PLUMBING SHOP** 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different types of PVC pipes, flexible pipes used in practice. 4. PVC pipes fittings and accessories, Adhesive solvents-chemical action, 5. Piping layout.	04
	Total	**16**

Practical: Skills to be developed:

1. Intellectual Skills:

a) Ability to read job drawings.

b) Ability to identify and select proper material, tools and equipments and machines.

c) Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

2. Motor Skills :

a) Ability to set tools, work piece, and machines for desired operations.

b) Ability to complete job as per job drawing in allotted time.

c) Ability to use safety equipment and follow safety procedures during operations.
d) Ability to inspect the job for confirming desired dimensions and shape.
e) Ability to acquire hands-on experience.

Sr. No	DETAILS OF PRACTICAL CONTENTS
01	**WELDING SHOP** • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type), Kitchan Trolley, Centering Plate, supporting frames **Note:**1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.
02	**PLUMBING SHOP** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for PVC pipe. Preparing actual drawing and bill of material.
03	**SHEET METAL SHOP** • One composite job of Water-draining Channel, display boards, Panel Board, Switch Box, Glass Panelling items etc. Note:1]One job of standard size(Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.
04	**TURNING SHOP** Note:1] One job related to Plane and Taper turning, threading and knurling 2] One job related to Drilling and tapping 3] Batch size should be selected depending on volume of work. 4]Job allotted should comprise of 6-8 hours of actual working 5] Student shall calculate the cost of material and labor cost for their job from the drawing.
05	**Demonstration of power tools and practice of utility items.** • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Tools for Cutting and drilling,

Learning Resources:
Books:

Sr. No.	Name of the Auther	Name of the Book	Publisher
01	S.K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers,New Delhi
02	B.S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
03	R K Jain	Production Technology	Khanna Publishers, New Delhi
04	H.S.Bawa	Workshop Technology	Tata McGraw Hill Publishers,New Delhi
05	--	Kent's Mechanical Engineering Hand book	John Wiley and Sons, New York

Video Cassettes / CDS

- Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal.

Course Name : Electronics Engineering Group

Course Code : DE/ED/EI/EJ/EN/ET/EV/EX/IC/IE/IS/IU/MU

Semester : First

Subject Title : Basic Workshop Practice (Electronics Group)

Subject Code : 12009

Teaching & Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
1	--	4	--	--	--	--	25@	25

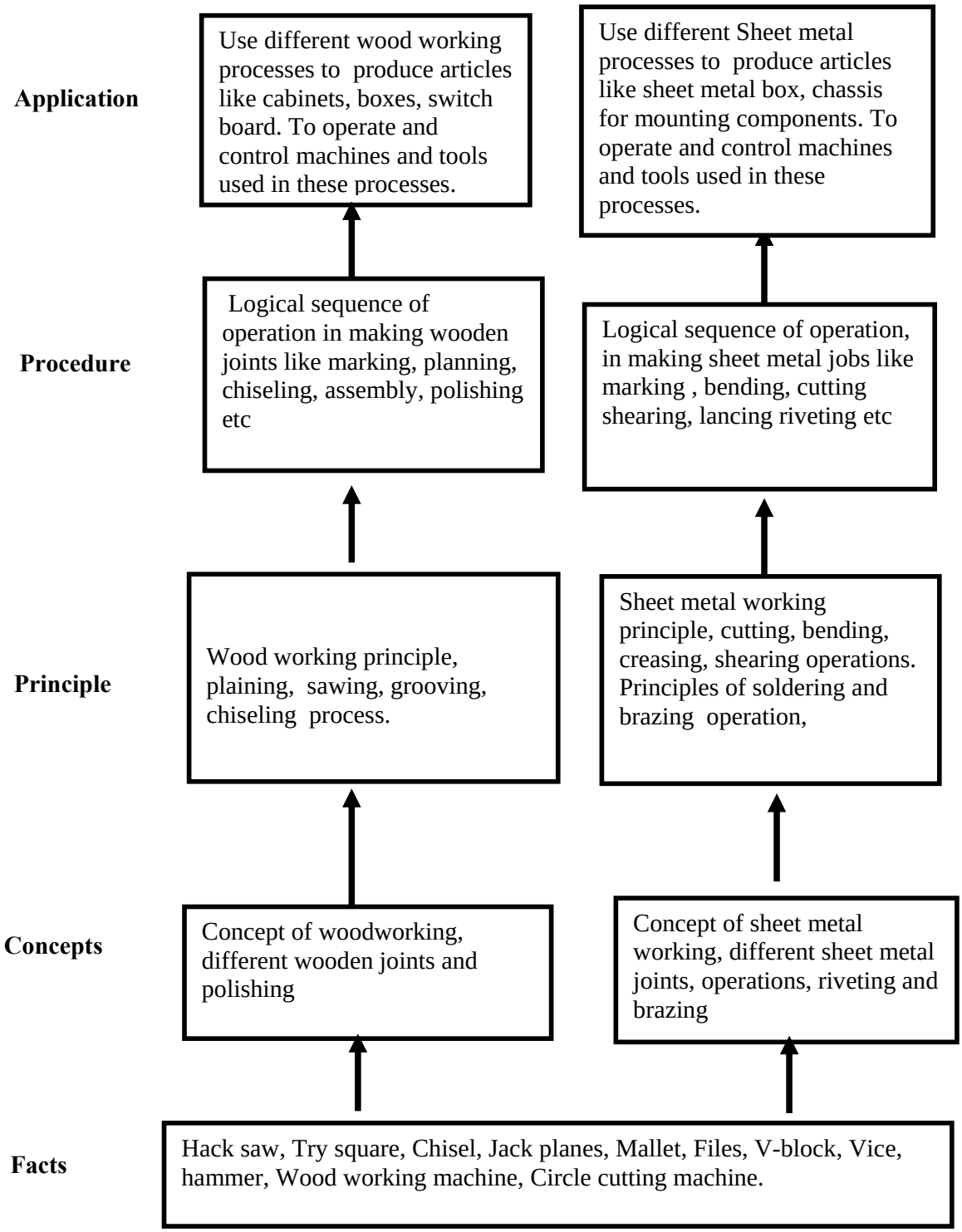
RATIONAL:

Electronics diploma technician is expected to know basic workshop practice like Wood working, Sheet metal and Fitting. The students are required to identify, operate and control various machines. The students are required to select and use various tools and equipments related to Wood working and sheet metal processes.

OBJECTIVES:

1. Read and interpret the drawing.
2. Draw sketch for given job.
3. Use manufacturers Catalog to prepare estimation of material required.
4. Use specification tables.
5. Decide Sequence of procedure.

LEARNING STRUCTURE:



Contents: Theory

Sr.No.	Topic	Period
01	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	05
02	**FITTING SHOP**: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	05
03	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	06
	Total	16

Skills to be developed developed:

Intellectual Skills:

1. Ability to read job drawing.
2. Ability to identify and select proper material, tools, equipments and machine.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

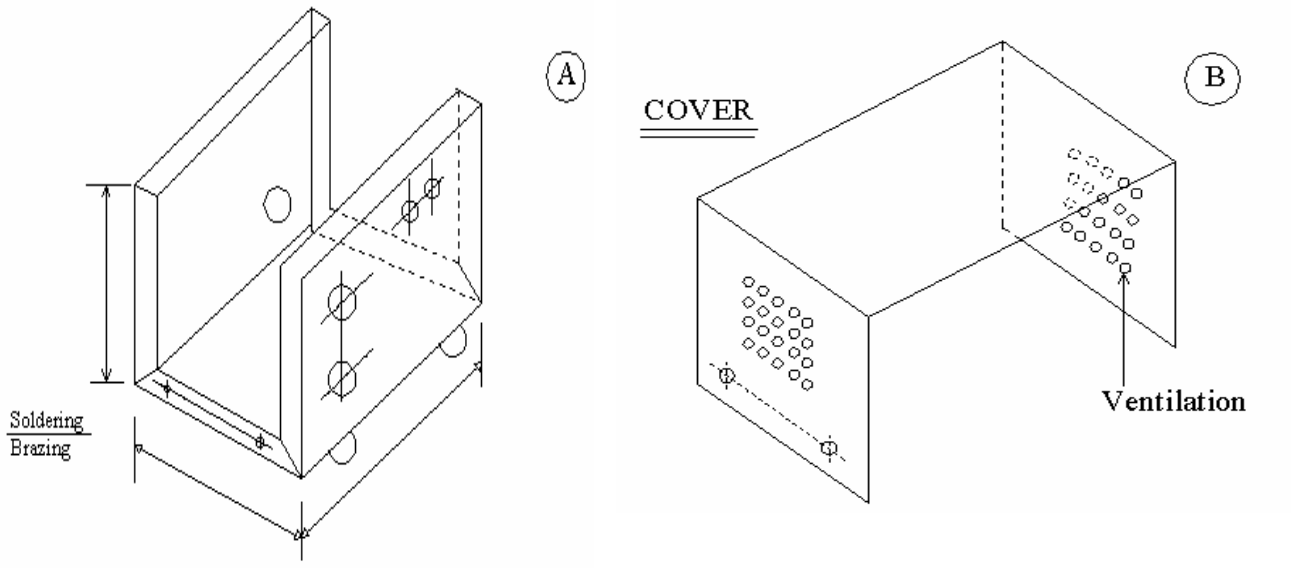
1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

Note: Details of on example job for each shop is given below:

Sr. No.	Details Of Practical Contents
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like planning, marking, chiseling, grooving, turning of wood etc. • One simple job of preparing switch board or any other similar job
02	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of filing, drilling, tapping, cutting etc. Such as Transistor Heat Sink or any other similar job
03	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing , soldering and riveting. • One simple job involving sheet metal operations and soldering and rivetting. Such as Battery Eliminator Box or any other similar job

1) SHEET METAL WORK : BATTERY ELIMINATOR BOX

CHASSIS



MATERIAL : C R C A sheet 22/24 SWG

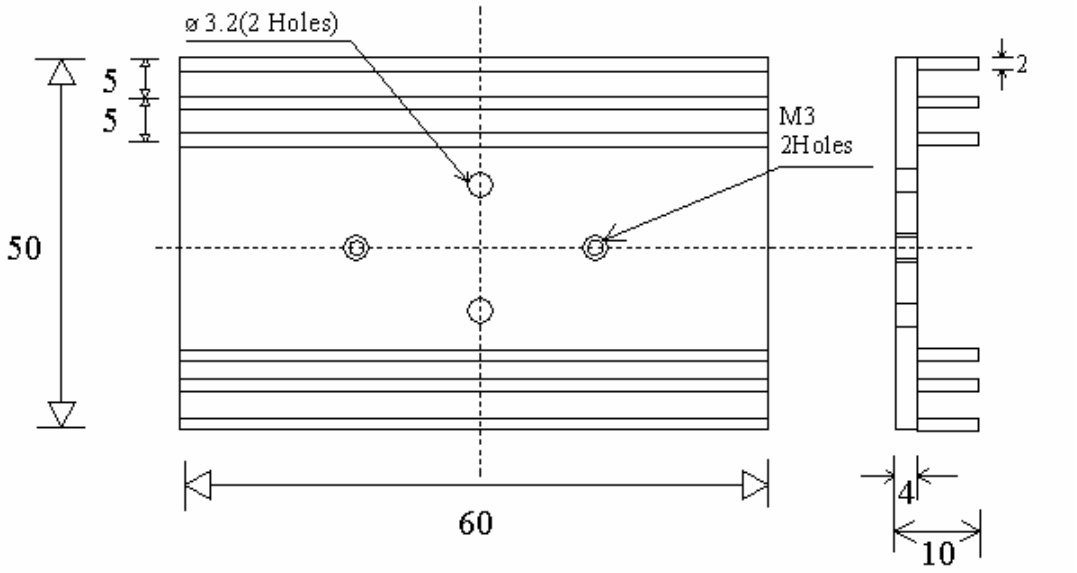
*** TOOLS & EQUIPMENT:**

1) Steel Rule
2) Try square
3) Scriber
4) Spring Divider / Center Punch
5) Files
6) Shearing Machine / ship
7) Drilling Machine
8) Mallet
9) Hammer
10) Chisels
11) Hollow or solid punch
12) Hand Drill M/c
13) Drills in various sizes
14) Taps M3 & tap wrench
15) Bending M/c
16) Bench vice
17) Use various stakes
18) Number Punch
19) Blow lamp
20) Soldering iron

SEQUENCE OF OPERATIONS :

1) Development
2) Marking
3) Checking
4) Cutting
5) Debuting
6) Corner cutting
7) Drilling
8) Punching
9) Bending
10) Topping
11) Numbering
12) Finishing
13) Soldering / Brazing

2) <u>Fitting Work</u>: Transistor Heat Sink



MAT : ALUMINIUM FLAT SIZE : 50 X 65 X 10 mm

NOTE : ALL DIMENSIONS ARE IN MM
TOLERANCE : ± 0.3 mm

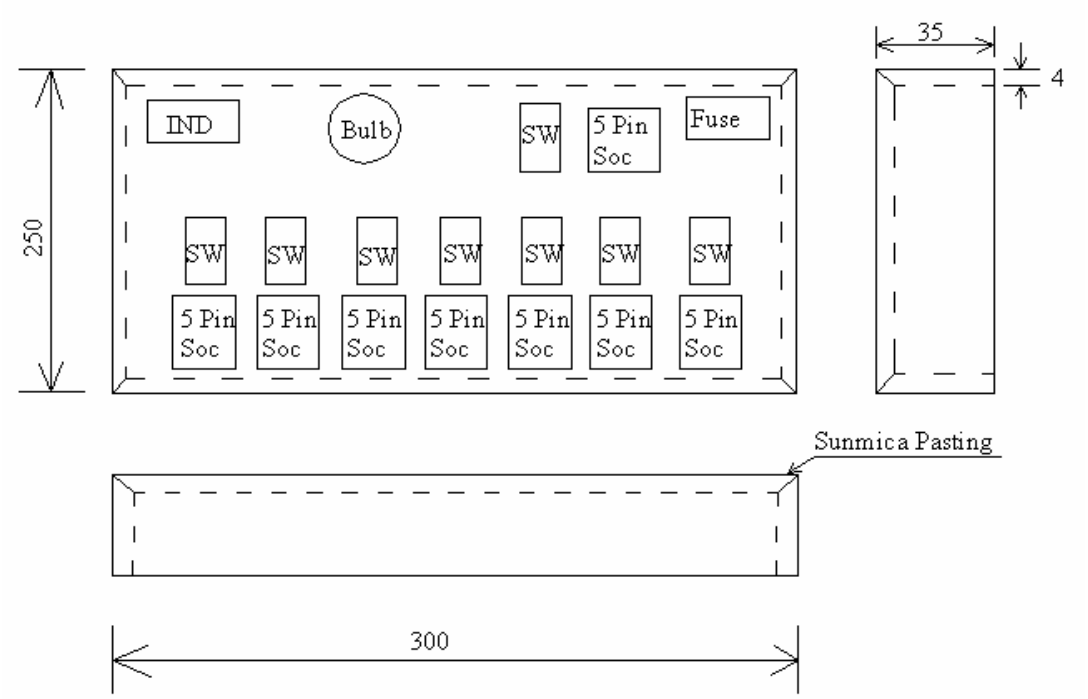
TOOLS & EQUIPMENT

1) Steel Rule / Vernier caliper
2) Try square
3) Scriber
4) Bench Vice
5) Surface plate / with magnet block
6) Files, flat, square, Niddles
7) Marking Gauge
8) Marking Block / Height Gauge
9) Hacksaw frame
10) Center Punch
11) Hammer
12) Chisels Hat
13) Table Drill Machine (Bench)
14) Drills
15) Tap & Tap wrenches
16) Number Punch

SEQUENCE OF OPERATIONS

1) Marking
2) Checking
3) Cutting
4) Square ness fitting (90')
5) Saw cutting
6) Chiseling / chipping
7) Slot filing
8) Drill Marking
9) Drilling
10) Tapping
11) Finishing
12) Numbering

3) Carpentry Work: Switch Box



MATERIAL : TEAK WOOD AND SUNMICA, COMMERCIAL PLYWOOD

SIZE :
1) 40 X 260 X 10 mm — 02 Nos.
2) 40 X 310 X 10 mm — 02 Nos.
3) Sun-mica – 250 X 300 mm X 0.5 mm — 01 Nos.
4) Plywood – 250 X 300 mm X 5 mm — 01 Nos.
5) Fevicol
6) French Polish

TOOLS & EQUIPMENT

1) Steel Rule
2) Try square
3) Marking Gauge
4) Jack Plane
5) Hand Saw
6) Carpentry Vice
7) Wooden Mallet / Hammer
8) Firmer Chisel
9) Jig Saw Machine
10) Marfa file
11) Numbering

SEQUENCE OF OPERATIONS

1) Measuring
2) Planning
3) Marking
4) Cutting
5) Chiseling
6) Corner joint with nail
7) Sun mica Pasting (Fevicolor similar adhesive)
8) Marking for slot cutting
9) Jig Saw cutting
10) Numbering
11) Polishing

Books:

Sr. No.	Name of the Auther	Name of the Book	Publisher
01	S.K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers,New Delhi
02	B.S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
03	R K Jain	Production Technology	Khanna Publishers, New Delhi
04	H.S.Bawa	Workshop Technology	Tata McGraw Hill Publishers,New Delhi
05	--	Kent's Mechanical Engineering Hand book	John Wiley and Sons, New York

Video Cassettes/ CDS

Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal

Course Name : Mechanical Engineering

Course Code : AE/CH/FE/ME/MH/MI/PG/PT

Semester : First

Subject Title : Basic Workshop Practice (Mechanical & Chemical Group)

Subject Code : 12010

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	04	--	--	--	--	25@	25

@ - Internal Assessment

Rationale:

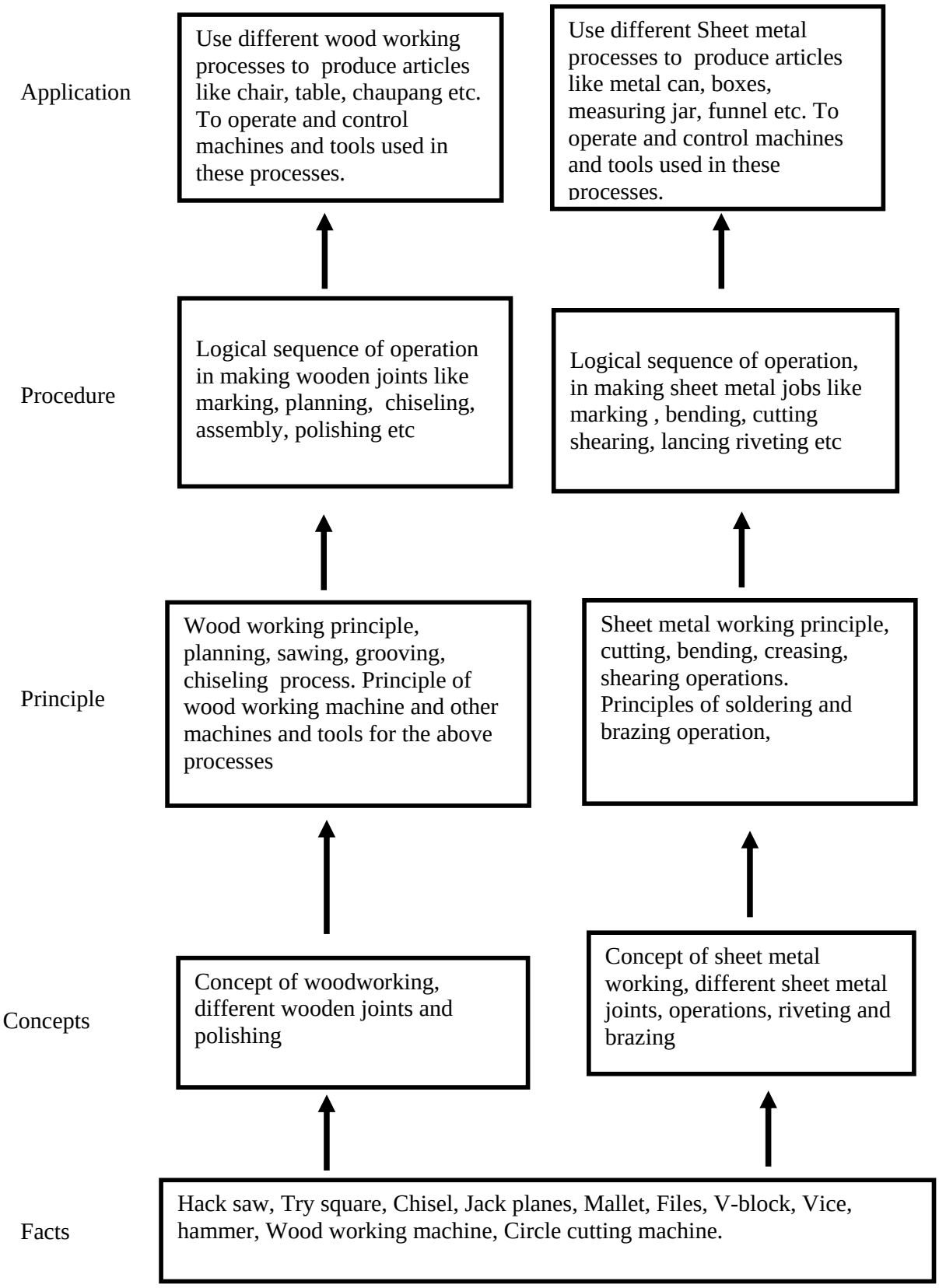
Mechanical and Chemical diploma technician is expected to know basic workshop practice like Wood working, Sheet metal. The students are required to identify, operate and control various machines. The students are required to select and use various tools and equipments related to Wood working and sheet metal processes.

Objectives:

The student will able to

- Know basic workshop processes.
- Read and interpret job drawing.
- Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
- Operate, control different machines and equipments.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

LEARNING STRUCTURE:



CONTENTS:

Sr.No.	Details Of Theory Contents	Period
01	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	03
02	**WELDING SHOP** : 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	04
03	**FITTING SHOP**: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	04
04	**PLUMBING SHOP**: 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different G.I. pipes, PVC pipes, flexible pipes used in practice. 4. G. I. pipes and PVC pipes fittings and accessories, Adhesive solvents-chemical action, Piping layout.	03
05	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	02
	Total	16

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.

4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

List of Practical:

SR. NO.	Details of Practical Contets
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
02	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint.
03	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools. • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
04	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
05	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.

Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

Books:

- S.K. Hajara Chaudhary- Workshop Technology-Media Promotors and Publishers, New Delhi
- B.S. Raghuwanshi- Workshop Technology- Dhanpat Rai and sons, New Delhi
- R K Jain- Production Technology- Khanna Publishers, New Delhi
- H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi
- Kent's Mechanical Engineering Hand book- John Wiley and Sons, New York
- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021
- Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

Course Name : Computer Engineering Group

Course Code : CD/CM/CO/IF

Semester : First

Subject Title : Basic Workshop Practice (Computer)

Subject Code : 12011

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	04	--	--	--	--	25@	25

RATIONALE:

This subject is essential for creating awareness of computers for the students. It gives handling experience of computers to the students. It introduces basic components of computers and connecting them to the system.

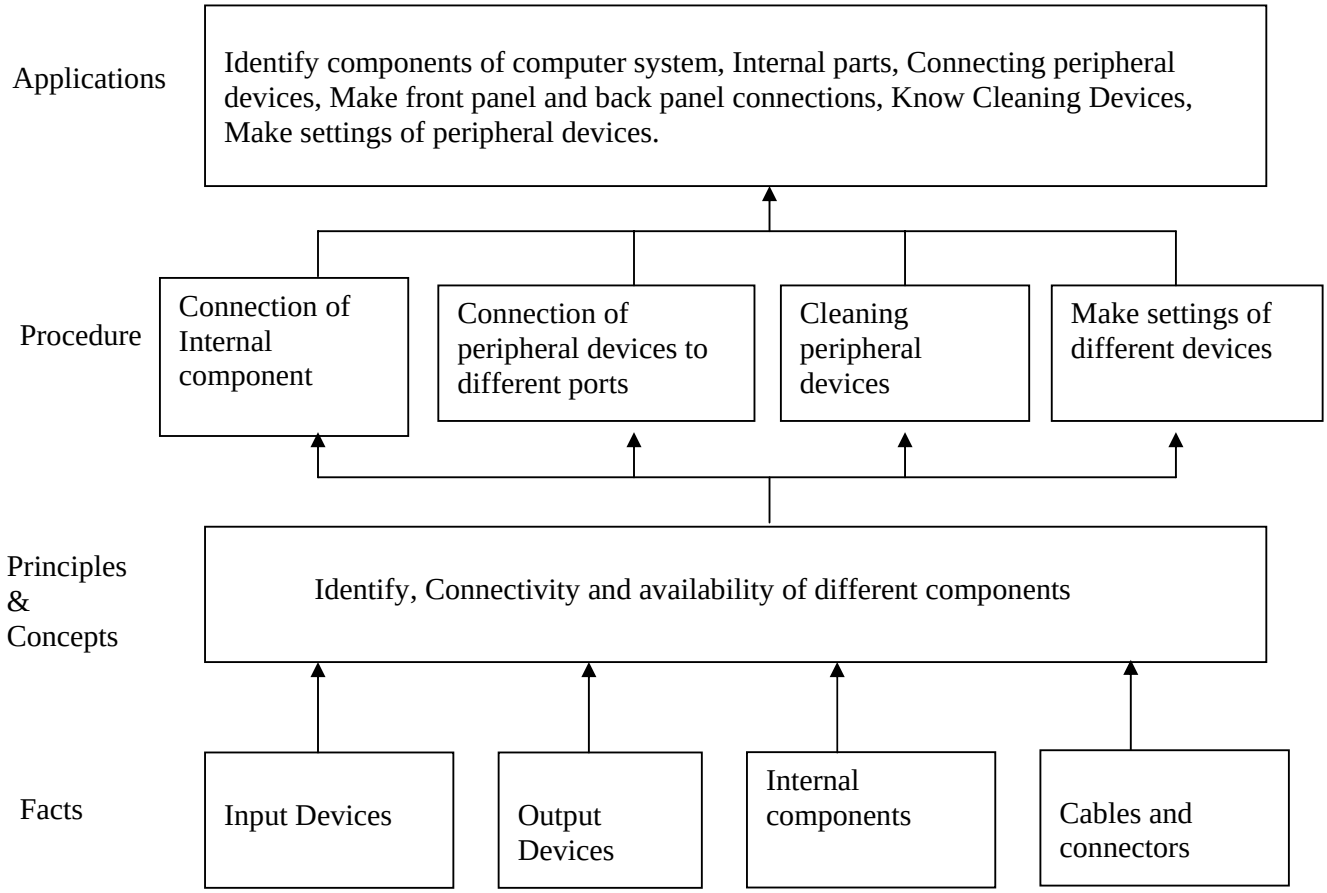
Since the dirt can affect reliability and Performance of various components, cleaning of components become one of the essential activity of basic maintenance. This subject demonstrates steps in cleaning and handling various components, handling problems with component connections. This subject gives the basic knowledge required for Pc architecture and maintenance.

Objectives:

After studying this subject, the student will be able to -

- Understand basic components of computers.
- Connect peripheral devices.
- Clean various devices like Keyboard, mouse, printers, motherboard.
- Park and eject the papers over the printer.
- Write Data on the CD.
- Scan documents and images.
- Understand front panel and back panel connections.
- Connection of Pen drives and DVD's

LEARNING STRUCTURE



CONTENTS: Theory

Sr. No	Topic/Subtopic	Hours
1.	**Introduction to Various External Peripheral Devices** 1.1 Different types of keyboards 1.2 Different types of Mouse 1.3 Different types of Scanners 1.4 Different types of Modems 1.5 Different types of printers 1.6 CD writers, speakers, CD read /write drive 1.7 Microphones, LCD projectors, Pen drives, DVD drive 1.8 Different types of Monitors	**04**
2.	**Introduction to Various Internal Devices** 2.1 Different makes of hard disks 2.2 Different types of network Interface cards 2.3 Different types of cables such as data cables, printer cables ,network cables ,power cables etc. 2.4 Different types of floppy disk 2.5 Motherboard connection 2.6 Graphics Card connection 2.7 Network Interface card connection	**05**
3.	**Physical Connections of different peripheral Devices** 3.1 Connection of Mouse to different ports 3.2 Connection of keyboards to different ports 3.3 Connection of Monitors 3.4 Connection of Printers 3.5 Different switch settings of printers 3.6 Printer's self test 3.7 Jumper settings of hard disks 3.8 Attaching FDD,HDD and CD drives 3.9 Attaching Pen Drives and DVDs 3.10 Attaching Scanners	**07**
	Total	**16**

ASSIGNMENTS:

1. Observe all the peripheral devices available in the lab. Describe them in detail.
2. Demonstration of system configuration using CMOS setup.
3. Study of different ports such as serial, parallel, PS/2,NIC ports.
4. Assignment on how to write data on CDs
5. Observe different printer settings on different types of printers available in your lab. Write down the function of each switch.
6. Demonstration of printer's self test.
7. Assignment on connection of speakers and microphones.
8. Assignment on different types of cables in your lab.
9. Assignment on cleaning procedures of Mouse, Keyboard and motherboard.
10. Assignment on how to connect scanner and scan document and pictures on the scanner available in your lab.
11. Assignment on making jumper settings on hard disk.

12. Assignment on different types of cards such as graphics card, LAN card, multimedia cards etc.

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01	Mr. David Stone & Alfred Poor	Troubleshooting Your PC	Prentice Hall India
02	David Groth	A+ Complete	BPB Publication
03	Balasubramaniam	Computer Installation snd servicing	Tata McGraw Hill
04	Manuals	Reference Manuals of PC troubleshooting and maintenance	--