



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : DIPLOMA IN CHEMICAL ENGINEERING

COURSE CODE : CH

DURATION OF COURSE : SIX SEMESTERS

WITH EFFECT FROM 2009-10

SEMESTER : SECOND

DURATION : 16 WEEKS

FULL TIME / PART TIME : FULL TIME

SCHEME : E

SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (16002)					
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)								
								Max	Min	Max	Min	Max	Min	Max	Min							
1	Communication Skill	CMS	12012	02	--	02	3	100	40	--	--	25#	--	25@	10	50						
2	Engineering Mathematics	EMS	12013	03	01	--	3	100	40	--	--	--	--	--	--		50					
3	Engineering Mechanics	EGM	12015	03	--	02	3	100	40	--	--	--	--	25@	10			50				
4	Engineering Drawing	EDG	12016	01	--	04	4	100	40	--	--	--	--	50@	20				50			
5	Fundamentals of Chemical Engineering	FCE	12030	04		02	3	100	40	50#	20	--	--	25@	10					50		
6	Workshop Practices	WPS	12017	--	--	04	--	--	--	--	--	--	--	50@	20						50	
7	Development of Life Skills-I	DLS	12018	01		02	--	--	--	--	--	25#	10	25@	10							50
8	Professional Practice-II	PPS	12019	--	--	02	--	--	--	--	--	--	--	50@	20							
Total				14	01	18	--	500	--	50	--	50	--	250	--	50						

Student Contact Hours Per Week: **33 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks : **900**

@ Internal Assessment, # External Assessment, 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.

Course Name : All Branches of Diploma in Engineering & Technology

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

Semester : Second

Subject Title : Communication Skills

Subject Code : 12012

Teaching and examination scheme:

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

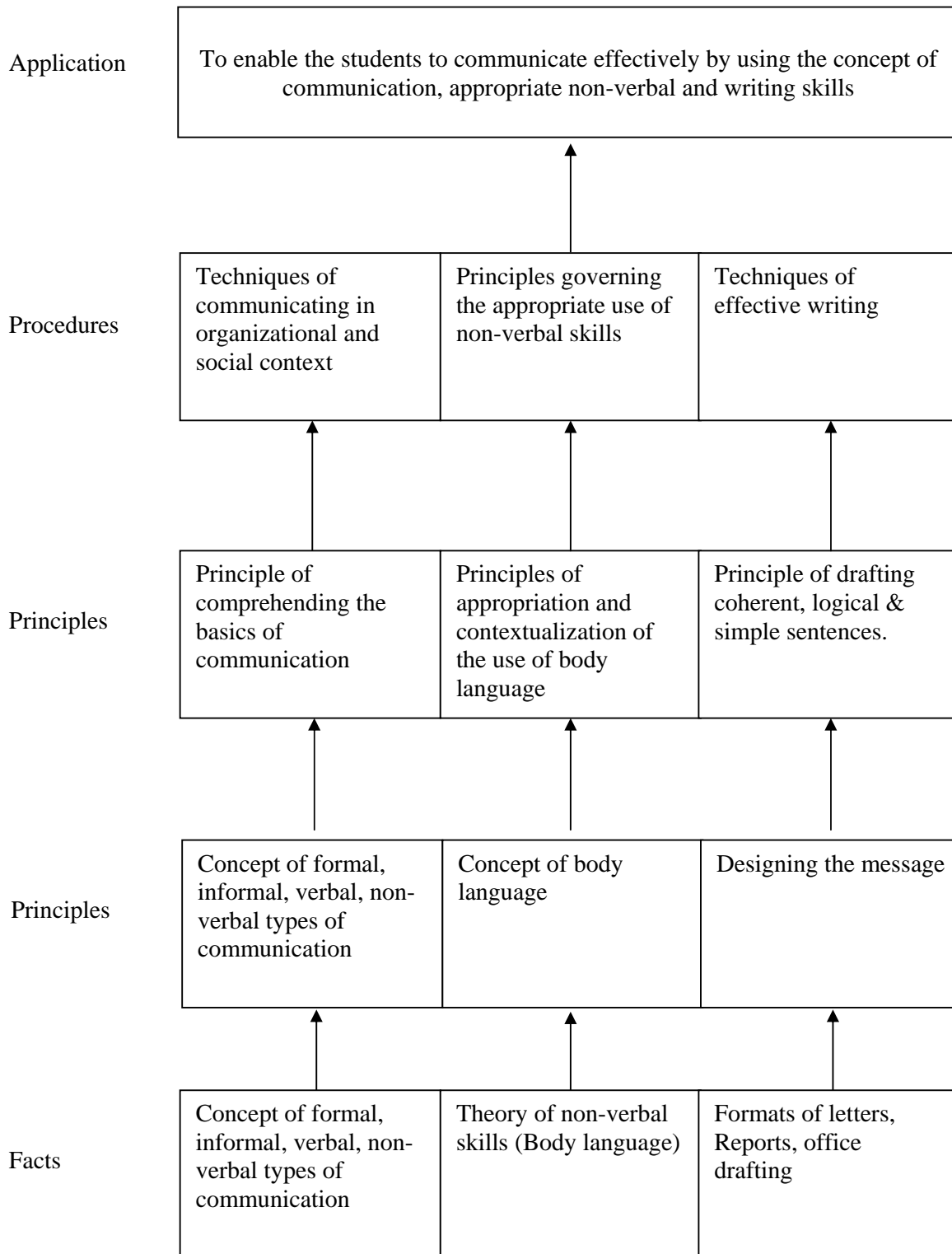
The Students have been already been exposed to the Language Skills pertaining to English, leading to a better understanding of English & use of grammar, developing a base for the language. Now with a view to achieve some mastery over the language & to develop Communication Skills, which is the main objective of this subject, the basic concepts of communication, Non-verbal and written skills have been Introduced.

Objectives:

The Students will be able to:

- 1) Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.
- 2) Give a positive feedback in various situations, to use appropriate body language & to avoid barriers for effective communication.
- 3) Write the various types of letters, reports and office drafting with the appropriate format.

Learning Structure:



Assignments:

1. Communication Cycle (With the Help of Diagram) + Any two communication situations to be represented with the help of Communication Cycle. (Use Pictures)
2. Communication Situations (List of 5 Communication situations stating the type of communication viz; Vertical, Horizontal, Diagonal.
3. Barriers That Hinder a Particular Communication Situation. (State the type of barrier, and how to overcome them). (04 Caselets)
4. Writing articles (two) in keeping with the parameters of developing effective messages. (Collect samples from newspapers, articles, Internet and paste them in the assignment.)
5. Business Letters:
 - a) Job Application with Resume.
 - b) Enquiry Letter.
 - c) Order Letter.
 - d) Complaint Letter.
6. Non-Verbal Communication:
 - a) Body Language: Five Illustrations of appropriate use of Body Language used on the part of student in formal and Informal setups. (Example- formal setup- classroom)
 - b) Graphic Language: Five Illustrations of the use of Signs, Symbols, Colours, Maps, Graphs, Charts in day to day life.
7. Presentation Skills: Select topic (current issues) and ask students to give a class presentation as per the principles of effective communication and paste these topics as an assignment in the file.
8. Non-Verbal Codes: Kinesics, Physical Appearance, Haptics. (Collect five pictures per group of five students on the above mentioned non-verbal codes, analyse and discuss them in the class. Ask the students to paste these pictures along with explanation in their individual files.

GUIDELINES: Teachers can make use of group discussions, class presentations, role plays, simulations, caselets, listen and repeat drills with the help of cassettes etc to give a hand on experience for students.

Students should maintain the Institute Files to write all the eight assignments with proper Index and get it duly certified.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	MSBTE, Mumbai.	Text book of Communication Skills.	MSBTE, Mumbai.
02	M.Ashraf Rizvi	Effective Technical Communication	Tata McGraw Hill Companies.
03	Krushna Mohan, Meera Banerji	Developing Communication Skills	Macmillan
04	Joyeeta Bhattacharya	Communication Skills.	Reliable Series
05	Jayakaran	Every ones guide to effective writing.	Apple Publishing.
06	Website: www.mindtools.com/page8.html -99k		
07	Website: www.khake.com/page66htm/ -72k		
08	Website: www.BMConsultant India.Com		
09	Website: www.letstak.co.in		
10	Website: www.inc.com/guides/growth/23032.html -45k		

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

**Course Code : CE/ME/IE/EJ/DE/ET/EX/EE/EP/MU/EV/IS/CO/CM/IF/PG/PT/AE/
CV/MH/FE/CD/ED/EI**

Semester : Second

Subject Title : Engineering Mathematics

Subject Code: 12013

Teaching and examination Scheme

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

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:

In 21st century man has developed new disciplines like Information Technology Genetic Engineering, Biotechnology etc. on the basis of Mathematics. Thus the study of mathematics is necessary to develop in the student the skills essential for these new disciplines. The subject is extension of basic mathematics of First Semester and stepping into the prerequisites to learn applied mathematics. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects.

Objective: The student will be able to

Acquire knowledge of Mathematical terms, concepts, principles and different methods. Develop the ability to apply mathematical methods to solve technical problems, to execute management, plans with precision. Acquire sufficient mathematical techniques necessary for daily and practical problems.

Learning Structure:

Application:	Relationship between two quantities that vary, continuity of curves	Use of derivatives in applications. Slope of a curve	Analysis of experimental data for drawing valid conclusions and decision-making process.	To understand various physical quantities. Understanding signal processing, laws of impedance fluid flow, electricity.
Procedure:	To explain value of function & types of fun. Methods to evaluate limits of different functions.	To explain methods for finding derivative of different function. Second order derivative.	To explain measures of central tendency and dispersion addition and multiplication	Explain geometric meaning of deri., max, & mini, rates, radius of curvature. algebra of complex numbers Euler's forms, hyperbolic function.
Concept:	Dependent and independent variables. Standard formulae for Limits. Theorems on Limit	Derivatives of Standard functions. Rules of Differentiation	Classification of data, frequency, mean, mode and median. Sample space, event occurrence of event & types.	Slope of the curve, increasing decreasing functions. Real and imaginary parts of complex no. Euler's exponential forms.
Facts:	Concept of interval, neighborhood of a point, Definition of function and limit. Meaning of $X \rightarrow a$	Definition of derivative and notation, order of derivative	Concept of data, frequency distribution, attribute and variant.	First order and second order derivatives. Number system. Imaginary unit.

Contents: Theory**Note:**

1. Chapters 1 to 5 are common for all branches.
2. Chapter 6-For Civil, Electrical, Mechanical and Electronics groups
3. Chapter 7 & 8-For Computer Engineering Group.

Chapter	Name of the Topic	Hours	Marks
01	Function and Limit 1.1 Function 1.1.1 Definitions of variable, constant, intervals such as open, closed, semi-open etc. 1.1.2 Definition of Function, value of a function and types of functions, Simple Examples..	04	08
	Limits 2.1 Definition of neighborhood, concept and definition limit. 2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples		
02	Derivatives 3.1 Definition of Derivatives, notations. 3.2 Derivatives of Standard Functions 3.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 3.4 Derivatives of composite function (Chain rule) 3.5 Derivatives of inverse and inverse trigonometric functions. 3.6 Derivatives of Implicit Function 3.7 Logarithmic differentiation 3.8 Derivatives of parametric Functions. 3.9 Derivatives of one function w.r.t another function 3.10 Second order Differentiation.	14	24
	Applications Of Derivative 4.1.1 Geometrical meaning of Derivative, 4.1.2 Maxima and minima 4.1.3 Radius of Curvature		
4		06	12
05	Statistics 5.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. Marks 08 5.2 Graphical representation (Histogram and Ogive Curves) to find mode and median Marks 06 5.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. Marks 10	10	24
NOTE: Chapter 6 is for Civil, Electrical, Electronics and Mechanical Groups			
06	Complex number 6.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 6.2 Algebra of Complex number (Equality, addition, Subtraction, Multiplication and Division) 6.3 De-Moivre's theorem (without proof) Examples based on it,	06	16

	roots of complex numbers, roots of unity 6.4 Euler's form of Circular functions, hyperbolic functions and relations between circular & hyperbolic functions		
Note: Chapter 7 and 8 is for Computer Engineering Group Only			
07	Numerical Solution of Algebraic Equations Bisection method, Regula-Falsi method and Newton-Raphson method	03	08
08	Numerical Solution of Simultaneous Equations Gauss elimination method Iterative methods-Gauss Seidal and Jacobi's method	03	08
Total		48	100

Tutorial

Note: Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems to be solved.

Tutorial No.	Topic on which tutorial is to be conducted
1	Function
2	Limits
3	Derivative
4	Derivative
5	Derivative
6	Statistics
7	Statistics
8	Statistics
9	Application of derivative/numerical Solution of algebraic equations
10	Application of derivative/numerical Solution of algebraic equations
11	Complex Numbers/Numerical Solution of Simultaneous Equations
12	Complex Numbers/Numerical Solution of Simultaneous Equations

Learning Resources:**Books:**

Sr. No	Title	Authors	Publications
1	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune.
2	Calculus :Single Variable	Robert T Smith	Tata McGraw Hill
3	Advanced Engineering Mathematics	Dass H. K.	S. Chand Publication, New Delhi
4	Fundamentals of Mathematical Statistics	S.C Gupta and Kapoor	S. Chand Publications New Delhi.
5	Higher Engineering Mathematics	B.S Grewal	Khanna Publication, New Delhi
6	Applied mathematics	P. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune.

Course Name : Civil, Mechanical and Electrical Group

Course Code : CE/CS/CR/ME/PT/PG/AE/EE/EP/MH/FE/CV

Semester : Second

Subject Title : Engineering Mechanics

Subject Code : 12015

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:

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Rationale:

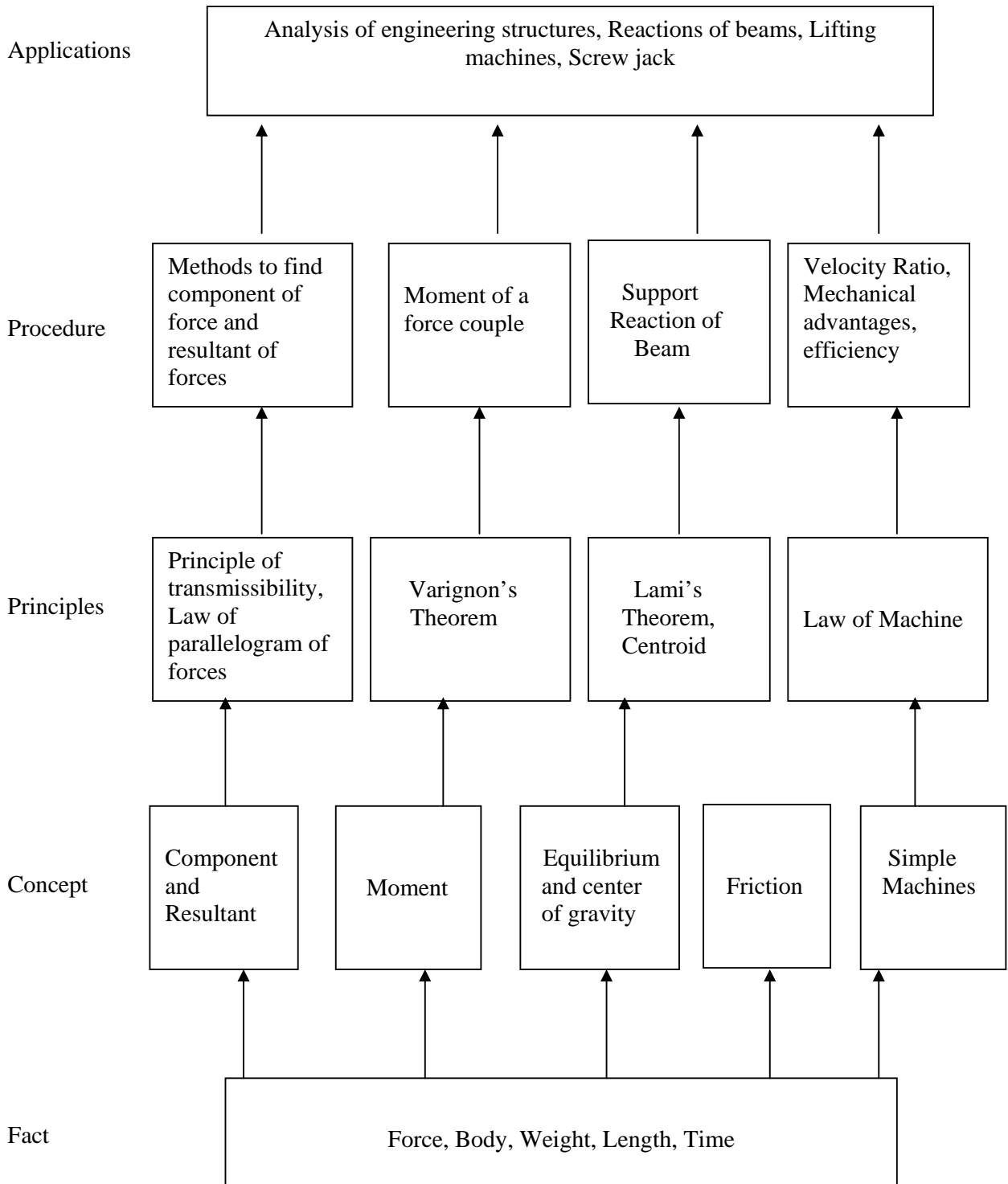
The Subject is grouped under basic engineering courses, which helps the students to understand facts, concepts, principles and techniques of scientific investigation in the field of Civil Engineering. The subject describes analysis of structure and mechanisms, principles which are commonly used in Civil Engineering Structures and also used in the machines and measuring instruments.

Objectives:

The students will able to:

1. Resolve the forces
2. Find the resultant of given force system
3. Find the reactions of beam
4. Find the center of gravity of composite solids.
5. Find M.A., V.R., Efficiency and establish law of machine

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<p>Force</p> <p>1.1 Fundamentals: - Definitions of mechanics, Engineering Mechanics, statics, dynamics, kinematics, kinetics, body, rigid body, mass, weight, length, time, scalar and vector, S.I. units.</p> <p>1.2 Force: - Definition of a force, S.I. unit of a force, representation of a force by vector and by Bow's notation method.</p> <p>1.3 Force system: - Definition, classification of force system according to plane and line of action Characteristics of a force, effects of a force, principle of transmissibility.</p> <p>1.4 Resolution of a force: Definition, Method of resolution, Types of Component of a force - Perpendicular component and Non-perpendicular component.</p> <p>1.5 Moment of a force: - Definition, measurement of moment of a force, S. I. Unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments, Varignon's theorem of moment and it's use. Couple – definition, S.I. unit, measurement of a couple, properties of couple.</p> <p>1.6 Composition of Forces: - Definition, Resultant force, methods of composition of forces, I - Analytical method – (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution) for calculation of resultant for all force systems. II - Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system.</p>	12	24
02	<p>Equilibrium:</p> <p>2.1 Definition, conditions of equilibrium- analytical and graphical conditions of equilibrium for concurrent,</p>	10	20

	<p>parallel force system, non-concurrent non parallel force system, free body and free body diagram.</p> <p>2.2 Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems having two unknowns only.</p> <p>2.3 Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system.</p> <p>2.4 Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller, fixed), classification of loads(point load, inclined point load, uniformly distributed load), Reactions of a simply supported and over hanging beam by analytical and graphical method.</p>		
03	<p>Friction:</p> <p>3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation among angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction.</p> <p>3.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined (Pull & Push)</p> <p>3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane.</p> <p>3.4 Ladder friction.</p>	08	20
04	<p>Centroid and Centre Of Gravity:</p> <p>4.1 Centroid: Definition of centroid. moment of an area about an axis. centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite geometrical figures.</p>	08	16

	4.2 Centre of gravity: Definition, centre of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. centre of gravity of composite solids.(No hollow solids shall be considered)		
05	<p>Simple Machines:</p> <p>5.1 Definitions of simple machine & compound machine, load , effort , mechanical advantage , velocity ratio, input of a machine, output of a machine, efficiency of a machine, relation among mechanical advantage, velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and load lost in friction.</p> <p>5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine (no derivation) and self-locking machine.</p> <p>5.3 Study of simple machines: Simple axle and wheel, differential axle and wheel, Weston’s differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, Two sheave & Three sheave pulley block.</p>	10	20
Total		48	100

Practical:

Skills to be developed:

Intellectual Skill:

1. Calculate the forces on given structure
2. Interpret the results

Motor Skills:

1. Handle the equipment carefully
2. Draw graph

The term work consists of any five experiments from Group A & any three experiments from group B and graphical solution of Group C.

Group A:

- 1) To verify law of polygon of forces.
- 2) To verify law of moments.
- 3) To verification of Lami's theorem.
- 4) To determine the forces in members of a jib crane.
- 5) Comparison of coefficient of friction of various pair of surfaces and determination of angle of repose.
- 6) To verify equilibrium of parallel forces – simply supported beam reactions.
- 7) Experimental location of center of gravity of plane plate of uniform thickness.

Group B: To find MA, VR, Efficiency, Ideal Effort, Effort lost in friction for various loads and establish law of machine and calculate maximum efficiency.

Also check the reversibility of a machine

- 1) Worm and worm wheel or Differential axle and wheel
- 2) Weston's differential pulley block or Geared pulley block
- 3) Single purchase crab or Double purchase crab
- 4) Simple screw jack.
- 5) Two sheave and three sheave pulley block

Group C: Graphical solutions on graph paper of the following :

- 1) Concurrent force system :Two problems
- 2) Parallel force system :Two problems
- 3) Reactions of a beam having vertical point loads & UDL :Two problems

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	Beer – Johnson	Engineering Mechanics	Tata McGraw Hill, Delhi
02	Basu	Engineering Mechanics	Tata McGraw Hill, Delhi
03	R. S. Khurmi	Applied Mechanics	Dhanpat Rai & sons, Delhi
04	Dhade, Jamdar & Walawalkar	Fundamental of Applied Mechanics	Pune Vidhyarthi Gruh Prakashion, Pune

Course Name : Mechanical Engineering Group

Course code : ME/PG/PT/AE/MH/FE

Semester : Second

Subject Title : Engineering Drawing

Subject code : 12016

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
01	--	04	04	100	--	---	50@	150

Notes: -

1. Students should use two separate A3 size sketchbooks, one for class work practice and another for assignment.
2. Students should solve assignment on each topic.
3. Use approximately 570mm×380mm Size Drawing Sheet for Term Work.

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)**

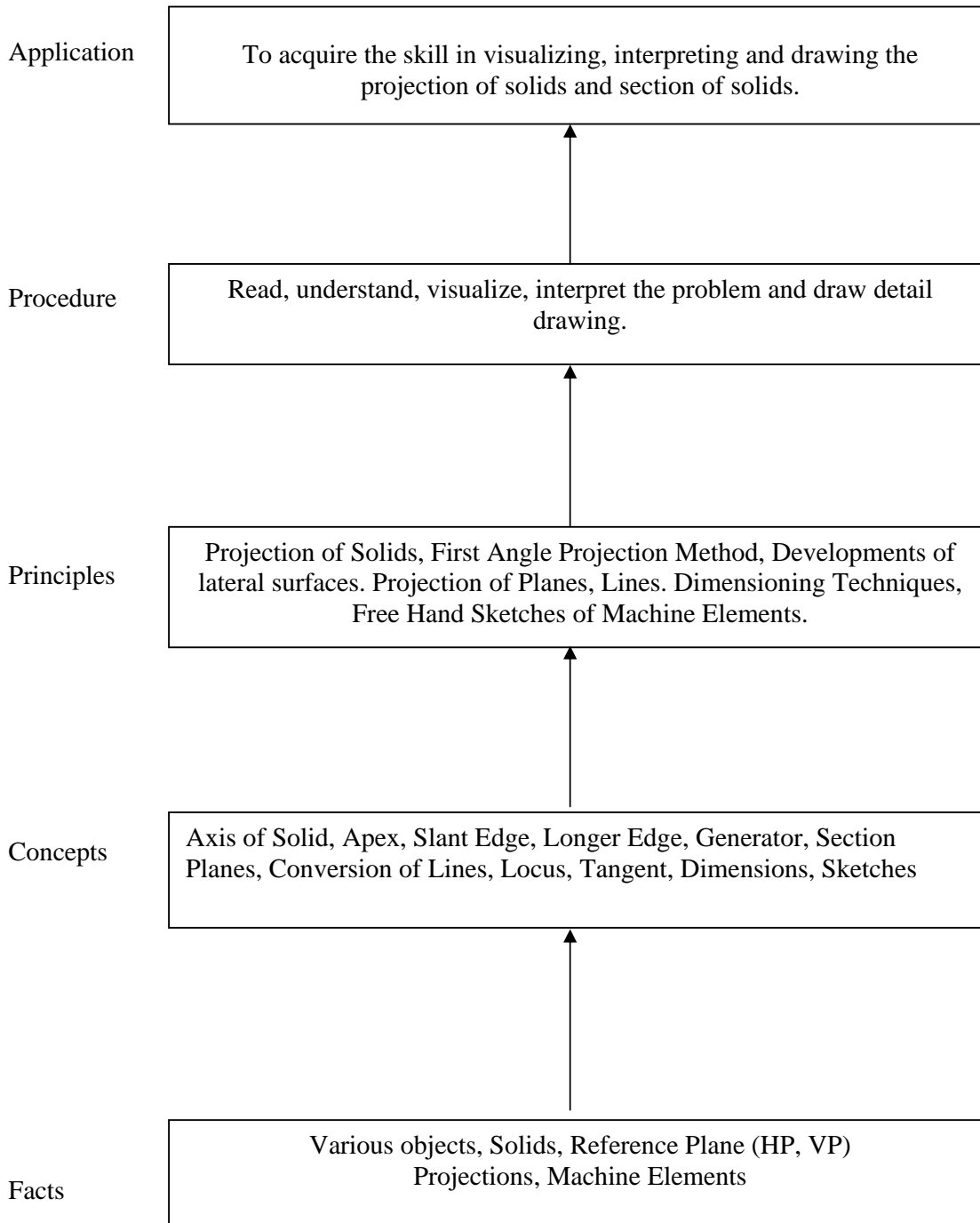
Rationale:

Engineering drawing is the graphical language of engineers. It describes the scientific facts, concepts, principles and techniques of drawing in any engineering field to express the ideas, conveying the instructions, which are used to carry out jobs in engineering field. This course aim for building a foundation for the further course in drawing and other allied subjects.

Objectives:

The students shall be able to:

1. Understand the basic concepts of engineering drawing.
2. Visualize the objects.
3. Draw different views in different positions of objects.
4. Draw the different views of machine elements.

Learning Structure:

Contents: Theory

Note: The teachers should use some of the practical hours for teaching basic theory during practicals as required.

Chapter	Name of the Topic	Hours	Marks
1.	Sectional Views. 1.1 Types of sections 1.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	03	16
2.	Missing Views. 2.1 Draw missing view from the given Orthographic views - simple components (First Angle Projection Method only)	01	08
3.	Isometric Projection 3.1 Conversion of Orthographic Views into Isometric view/projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces)	03	16
4.	Projections of Solids. 4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.	02	12
5.	Sections of Solids. 5.1 Solids: -Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube. 5.2 Cone, Pyramid and Tetrahedron resting on their base on Horizontal Plane. 5.3 Prism, Cylinder: -a)Axis parallel to both the reference plane b) Resting on their base on HP. 5.4 Section plane inclined to one reference plane and perpendicular to other.	03	16
6.	Developments of Surfaces. 6.1 Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	02	16
7.	Free Hand Sketches 7.1 Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts, keys and couplings.	02	16
Total		16	100

Practical:

List of Practical	Skills to be Developed	
	Intellectual skill	Motor Skill
1. Sectional View - (Total 2 Sheets) Two objects by First Angle Projection Method – (1 Sheet) Redraw the same sheet using CAD - (1 Sheet)	1) To interpret sectional views of given object.	Develop ability to draw sectional views Using computer.
2. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale - (1 sheet) Draw one sheet having two problems in each sheet using CAD - (Plot any one)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
3. Missing Views Two problems by first angle projection method - (1 Sheet)	1) To interpret the missing view from given orthographic views.	1) To develop ability to draw missing view from given orthographic views.
4. Projection of solids Two problems on two different solids, one by axis of solid inclined to HP and parallel to VP and another problem by axis of solid inclined to VP and parallel to HP. - (1 Sheet)	1) To interpret the different positions of solids with reference planes. 2) To develop ability to differentiate between true length of axis and apparent length of axis. 3) To develop ability to differentiate between true shape and apparent shape of solids.	1) To draw projections of different solids when axis is inclined or perpendicular to one of the reference plane.
5. Section of solids Two problems on different solids. One problem, section plane inclined to HP and perpendicular to VP and in another problem, section plane inclined to VP and Perpendicular to HP. - (1 Sheet)	1) To differentiate between true shape and apparent shape of section. 2) To interpret the positions of section plane with reference planes.	1) To develop ability to draw sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes. 2) Ability to draw true shape of section.
6. Development of surfaces Any two problems on development of surfaces of different objects. - (1 Sheet)	1) Able to interpret the development of surfaces of different solids.	1) Ability to draw the development of surfaces of different objects in different shapes.

7. Free Hand Sketches Any six figures on different topics. - (1 Sheet)	1) To differentiate between scale drawing and free hand drawing. 2) To differentiate between various parts of machine like nuts, bolts, screws, different threads, couplings etc.	1) Develop ability to draw orthographic views of different machine elements.
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List of Practice Oriented Projects:

To find out the total sheet metal required for a given object.

Learning Resources:

A. Books: -

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

B. Video Cassettes / CD's

1. CD's prepared by MSBTE for Engineering Drawing

C. IS Codes:

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

Course Name : Diploma in Chemical Engineering

Course Code : CH

Semester : Second

Subject Title : Fundamentals of Chemical Engineering

Subject Code : 12030

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	02	03	100	50#	--	25@	175

NOTE :

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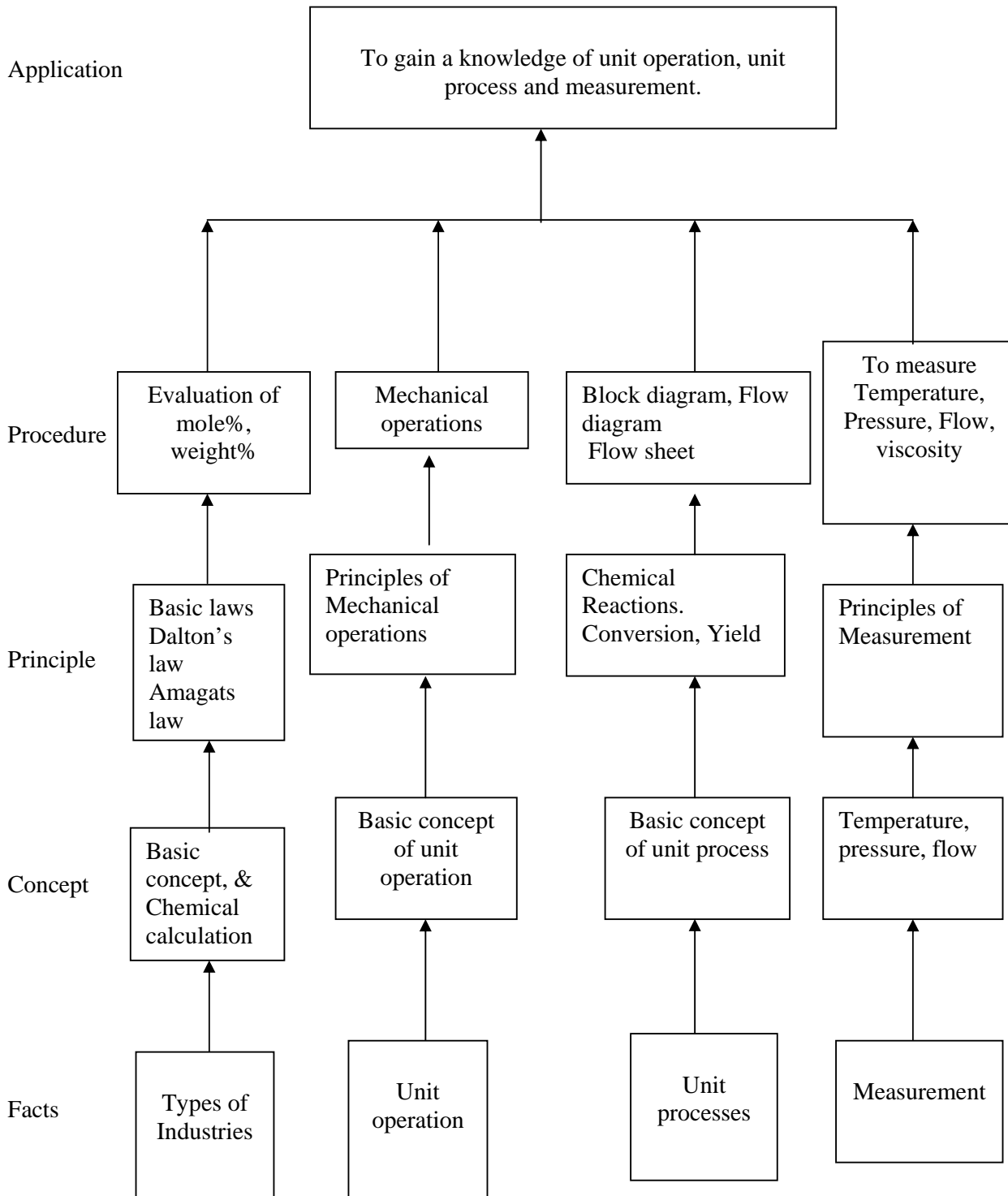
Rationale:

This subject intends to give knowledge to students about historical background of chemical engineering, Scope of chemical engineering and to make the students familiar with the fundamentals of chemical engineering. It will give a brief idea about the chemical engineering field, types of industries, nature of industries and processes carried out in plants. It will give a brief idea about storage, handling of fluids and solids It will also give an idea about other areas related with chemical engineering like process instrumentation.

Objective:

1. Understand the unit operation in chemical industries.
2. Know unit processes in chemical plants.
3. List chemical processes.
4. Understand instrumentation used in chemical processes.
5. Know safety precautions in chemical plants.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	Introduction to Chemical Engineering 1.1. Historical background, Scope of chemical engineering, Types of Industries, Nature of industries (Large, Medium, Small scale & e.g.). 4 Marks 1.2. Basic chemical calculations: Units, dimensions, conversions & Conversion factors. 4 Marks 1.3. Basic concepts: concept of mole, weight percentage, mole percentage, normality, Molarity, Molality, vapor pressure, partial pressure, Dalton's law, Amagat's law. (Only statements & elementary problems.) 16 Marks	14	24
02	Unit Operations 2.1 Definitions, symbols & examples of unit operations like 2.2 Mechanical Operation 08 Marks 2.2.1 Size reduction, 2.2.2 Size separation 2.2.3 Filtration 2.2.4 Sedimentation 2.2.5 Centrifugation 2.2.6 Mixing 2.3 Fluid Flow 06 Marks 2.3.1 Definition 2.3.2 Important properties 2.3.3 Fluid handling 2.3.4 Fluid storage 2.4 Mass Transfer 06 Marks 2.4.1 Gas absorption 2.4.2 Desorption 2.4.3 Extraction 2.4.4 Leaching 2.5 Mass and Heat transfer 06 Marks 2.5.1 Distillation 2.5.2 Drying 2.5.3 Crystallization 2.6 Heat Transfer 04 Marks 2.6.1 Definition of heat 2.6.2 Definition of temperature 2.6.3 Sensible heat 2.6.4 Modes of heat transfer 2.6.5 Types of heat 2.6.6 Exchange equipment	20	30
03	Unit Processes Introduction to unit processes with simple examples like sulphonation, polymerization, oxidation, reduction, hydrogenation, hydration, ammonolysis, saponification, dehydration, alkalization, esterification, nitration, chlorination, amination, calcinations, and cracking / pyrolysis.	08	12

04	Basic Concepts Of Chemical Processes 4.1 Conversion, yield, reaction efficiency, 4.2 Flow diagrams, flow sheets & block diagrams 4.3 Flow sheet, reaction, properties and uses of sulphuric acid, nitric acid	08	16
05	Process Instrumentation & Safety 5.1 Temperature scales, measurement of temperatures using bimetallic thermometer, mercury- expansion thermometer, gas/vapour filled thermometers. 4 Marks 5.2 Pressure scales & units, measurement of pressure using manometers, Bourdon tube. 4 Marks 5.3 Level measurement using direct methods like bob & tape, float & tape, sight glass. 2 Marks 5.4 Flow measurement-using rotameter. 2 Marks 5.5 Measurement of viscosity by using Redwood viscometer & density by using specific gravity bottle. 4 Marks 5.6 Personal protective devices. 2 Marks	14	18
Total		64	100

Practical:

Skills to be developed:

Intellectual skills:

1. List the Chemical Processes
2. Select appropriate safety measures as per the situation
3. Identify various unit operations and processes
4. Identify various chemical processes

Motor skills:

1. Accuracy in measurement
2. Calibrate chemical apparatus
3. Follow the given procedure rigorously

List of Practical:

1. To prepare the following solutions and standardize them: (Any two of the following)
 - (a) 1 normal, 1 molar & 1 molal solution of H_2SO_4
 - (b) 1 normal, 1 molar & 1 molal solution of NaOH
 - (c) 1 normal, 1 molar & 1 molal CH_3COOH
 - (d) 1 normal $\text{Al}_2(\text{SO}_4)_3$
 - (e) 1 normal KMnO_4

2. Screen analysis to determine weight percentage of solid mixture
3. Calibration of glass thermometer.
4. To measure differential pressure by using U tube manometer.
5. To find out volumetric flow rate using rotameter.
6. To determine viscosity of given liquid using Redwood viscometer
7. To determine density of given liquid by using specific gravity bottle.
8. Demonstration of personal protective devices.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	Walter. L. Badger Julius T. Banchero	Introduction to Chemical Engineering	McGraw Hill International
02	McCabe, W. L. Smith, Harriott	Unit Operations of Chemical Engineering	McGraw Hill Inc
03	Perry R.H, Green D.W	Perry's Chemical engineer's Handbook	McGraw Hill
04	Ghosal S.K, Shyamal.K.Sanyal, Datta.S	Introduction to Chemical Engineering	Tata McGraw Hill Publications
05	S.K.Singh	Industrial Instrumentation & Control	Tata McGraw Hill Publications 1

Course Name : Mechanical Engineering Group

Course Code : ME/PT/AE/MH/FE

Semester : Second

Subject Title : Workshop Practice

Subject Code : 12017

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	04	--	--	--	--	50@	50

Rationale:

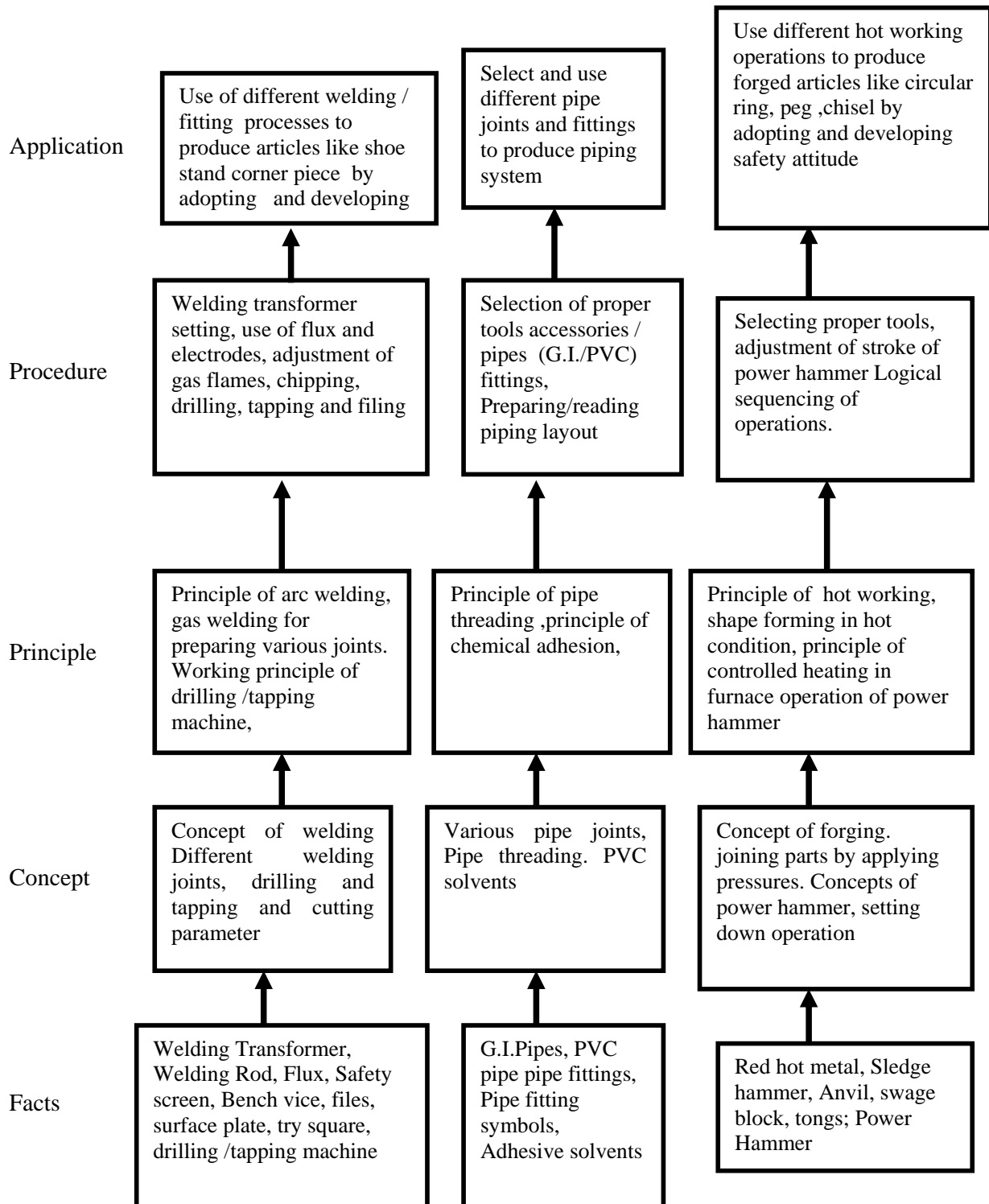
Mechanical diploma technician is expected to know basic workshop practice like, Gas Welding gas cutting. Fitting, Drilling, Tapping, plumbing and hot working processes. The students are required to identify operate and control various machines. The students are required to select and use various tools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

Objectives:

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:



- 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

CONTENTS: Subject practical content as shown in the table below:

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawings.
2. Ability to identify and select proper material, tools and equipments and machines.
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

Sr. No.	Details of Practical Contents
01	<p>CARPENTRY SHOP:</p> <ul style="list-style-type: none"> • Any one composite job from the following involving different joint, turning and planing, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. <p>Note:1] One job of standard size (Saleable 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 4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p>
02	<p>WELDING SHOP</p> <ul style="list-style-type: none"> • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair, table frame (square pipe 25 mm) cooler frame (folding type)

	<p>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.</p>
03	<p>SMITHY SHOP</p> <ul style="list-style-type: none"> • Demonstration of different forging tools and Power Hammer. • Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. • One job like hook peg, flat chisel or any hardware item. <p>• Note: 1]One job of standard size (Saleable/marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.</p>
04	<p>PLUMBING SHOP</p> <ul style="list-style-type: none"> • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material. <p>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 workin 4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p>
05	<p>SHEET METAL SHOP</p> <ul style="list-style-type: none"> • One composite job from the following: Letter box, Trunk, Grain Container, Water-heater Container, Bucket, Waste Paper Basket, Cooler Tray, Water-draining Channel, etc. (including soldering and riveting) <p>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.</p>

06	<p>Demonstration of power tools and practice of utility items.</p> <ul style="list-style-type: none"> • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. • Any other item as per the requirement of college/Deptt./ <p><u>(Note: Utility item are not to be assessed)</u></p>
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Learning Resources:**Books:**

Sr. No.	Author	Title	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 : 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/AA/DC/PN/SC/TC/TR/TX

Semester : Second

Subject Title : Development of Life Skills-I

Subject Code : 12018

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	25#	25@	50

Rationale:

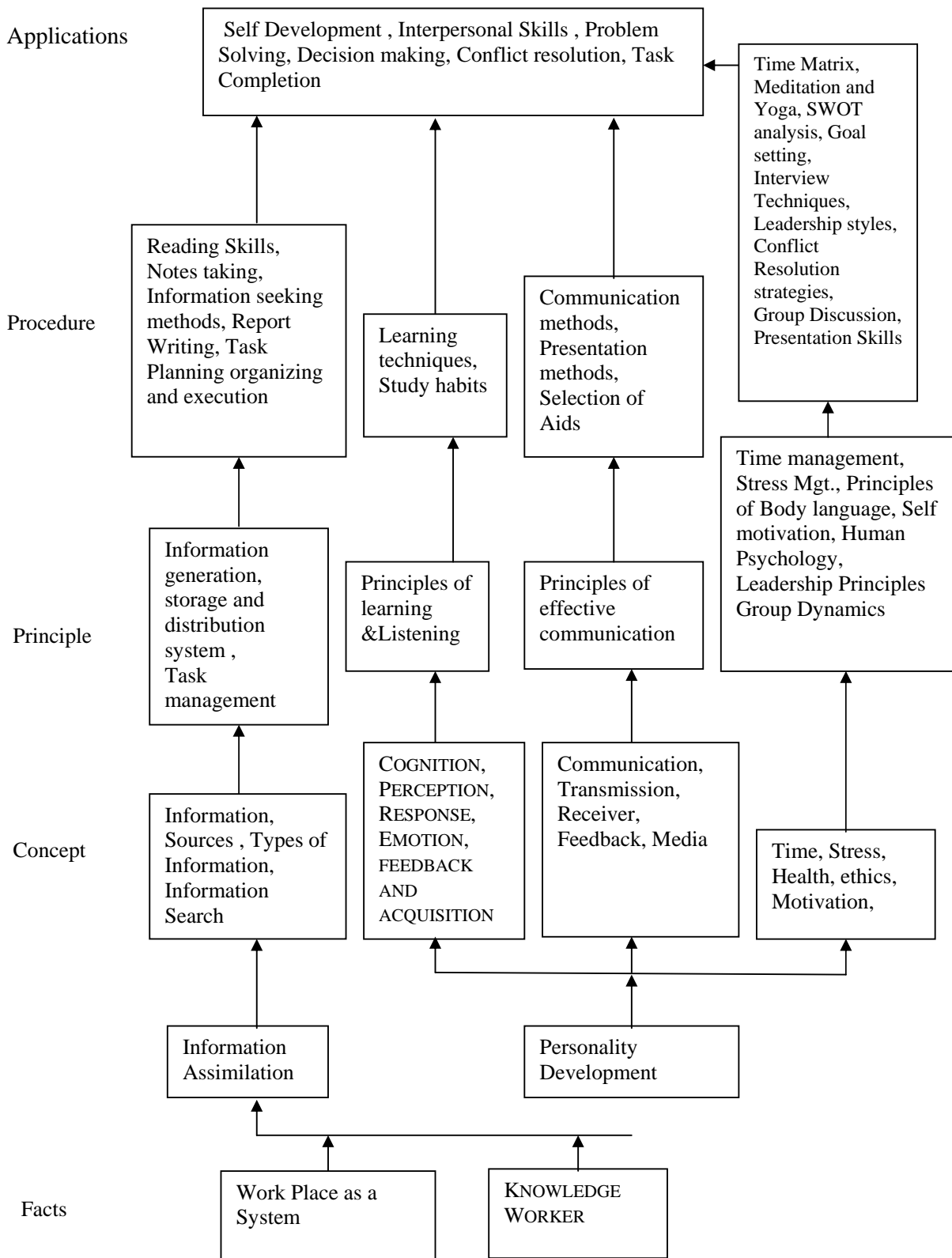
In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

This subject will develop the student as an effective member of the team. It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems. The Subject Is Classified Under Human Science.

Objectives: The students will be able to:

1. Develop reading skills
2. Use techniques of acquisition of information from various sources
3. Draw the notes from the text for better learning.
4. Apply the techniques of enhancing the memory power.
5. Develop assertive skills.
6. Prepare report on industrial visit.
7. Apply techniques of effective time management.
8. Set the goal for personal development.
9. Enhance creativity skills.
10. Develop good habits to overcome stress.
11. Face problems with confidence.

LEARNING STRUCTURE:



Contents: Theory

Topic No	Contents	Hours
1	Importance of DGS, Introduction to subject, importance in present context ,application	01
2	Information Search Information source –Primary, secondary, tertiary Print and non - print , documentary, Electronic Information center, Library , exhibition, Government Departments. Internet Information search – Process of searching, collection of data -questionnaire, taking Interview , observation method.	02
3	Written communication METHOD OF NOTE TAKING Report writing –Concept, types and format.	01
4	Self Analysis Understanding self - Attitude, aptitude, assertiveness, self esteem, Confidence buildings. Concept of motivation.	02
5	Self Development Stress Management – Concept, causes, effects, remedies to void/minimize stress. Health Management – Importance, dietary guidelines and exercises. Time management- Importance, Process of time planning, Urgent Vs importance, Factors leading to time loss and ways to handle it, Tips for effective time management. EMOTION-CONCEPT, TYPES, CONTROLLING, EMOTIONAL INTELLIGENCE. CREATIVITY-CONCEPT, FACTORS ENHANCING CREATIVITY. GOAL SETTING – CONCEPT, SETTING SMART GOAL.	07
6	Study habits Ways to enhance memory and concentration. Developing reading skill. Organisation of knowledge, Model and methods of learning.	03
Total		16

LIST OF ASSIGNMENTS:**The Term Work Will Consist Of Following Assignments.**

- 1) Self Awareness.
- 2) Techniques of developing positive attitude.
- 3) Learning, Memory and Concentration.
- 4) To understand the concept of study techniques and participate in a panel discussion on it.
- 5) To understand the concept of motivation and emotional intelligence.
- 6) Goal Setting.
- 7) Information search in library.
- 8) Information search through internet.
- 9) Time Management.
- 10) Health and stress Management
- 11) Assertiveness and confidence building
- 12) Creativity

NOTE:- THESE ARE THE **SUGGESTED ASSIGNMENT** FOR GUIDE LINES TO THE SUBJECT TEACHER. HOWEVER THE SUBJECT TEACHERS CAN SELECT, DESIGN ANY ASSIGNMENT RELEVANT TO THE TOPIC, KEEPING IN MIND THE OBJECTIVES OF THIS SUBJECT.

Learning Resources:

Books:

Sr. No	Author	Title of the book	Publisher
1	Marshall Cooks	Adams Time management	Viva Books
2	E.H. Mc Grath , S.J.	Basic Managerial Skills for All	Pretice Hall of India, Pvt Ltd
3	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.
4	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
5	Adair, J	Decision making & Problem Solving	Orient Longman
6	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
7	Marion E Haynes	Make Every Minute Count	Kogan page India
8	Pearson Education Asia	Organizational Behavior	Tata McGraw Hill
9	Michael Hatton (Canada – India Project)	Presentation Skills	ISTE New Delhi
10	--	Stress Management Through Yoga and Meditation	Sterling Publisher Pvt Ltd.
11	Richard Hale ,Peter Whilom	Target setting and Goal Achievement	Kogan page India
11	Chakravarty, Ajanta	Time management	Rupa and Company
12	Harding ham .A	Working in Teams	Orient Longman

Internet Assistance:

- 1) <http://www.mindtools.com>
- 2) <http://www.stress.org>
- 3) <http://www.ethics.com>
- 4) <http://www.coopcomm.org/workbook.htm>
- 5) <http://www.mapornonprofits.org/>
- 6) <http://www.learningmeditation.com> <http://bbc.co.uk/learning/courses/>
- 7) <http://eqi.org/>
- 8) <http://www.abacon.com/commstudies/interpersonal/indisclosure.html>
- 9) <http://www.mapnp.org/library/ethics/ethxgde.htm>
- 10) http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
- 11) <http://members.aol.com/nonverbal2/diction1.htm>
- 12) http://www.thomasarmstron.com/multiple_intelligences.htm
- 13) <http://snow.utoronto.ca/Learn2/modules.html>
- 14) <http://www.quickmba.com/strategy/swot/>

Course Name : Mechanical Engineering Group

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

Semester : Second

Subject Title : Professional Practices-II

Subject Code : 12019

Teaching and Examination Scheme:

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

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

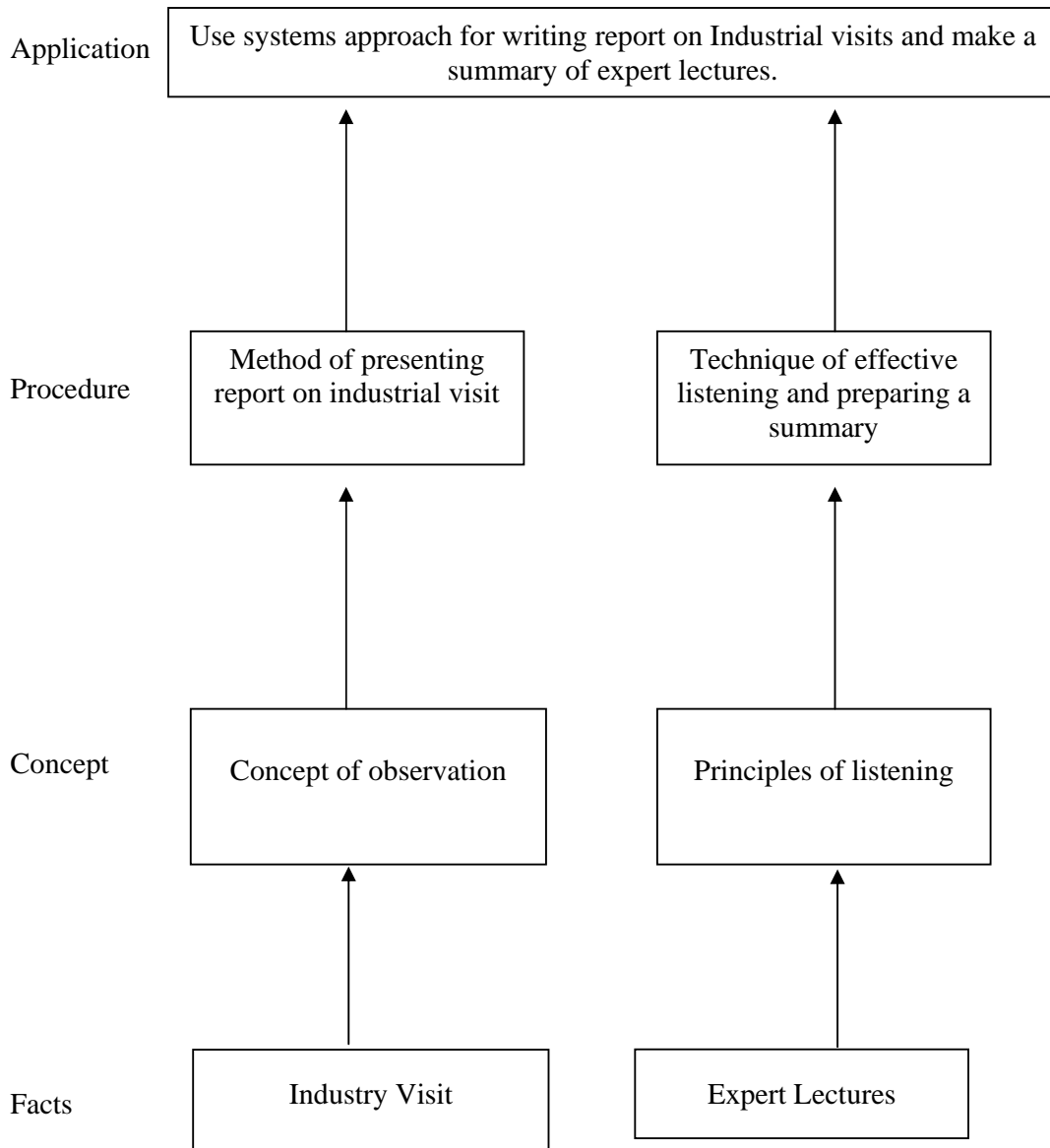
The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

The Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Learning Structure:



Sr. No.	Activities	Hours
01	<p>Industrial Visits:</p> <p>Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work.</p> <p>Visits to any two of the following :</p> <ul style="list-style-type: none"> i) Nearby Petrol Pump.(fuel, oil, product specifications) ii) Automobile Service Station (Observation of Components / aggregates) iii) Engineering Workshop(Layout, Machines) iv) Dairy Plant / Water Treatment Plant 	10
02	<p>Lectures by Professional / Industrial Expert / Student Seminars based on information search to be organized from any THREE of the following areas :</p> <ul style="list-style-type: none"> i) Pollution control. ii) Non destructive testing. iii) Acoustics. iv) Illumination / Lighting system. v) Fire Fighting / Safety Precautions and First aids. vi) Vedic Mathematics. vii) Computer Networking and Security. viii) Topics related to Social Awareness such as – Traffic Control System, Career opportunities, Communication in Industry, Yoga Meditation, Aids awareness and health awareness. 	06
03	<p>Group Discussion :</p> <p>The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are -</p> <ul style="list-style-type: none"> i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to mechanical engineering field. 	08
04	<p>Student Activities:</p> <p>The students in a group of 3 to 4 will perform any one of the following activities (others similar activities may be considered</p> <p>Activity :</p> <ul style="list-style-type: none"> i) Collect and study IS code for Engineering Drawing.. ii) Collecting information from Market: Nomenclatures and specifications of engineering materials. iii) Specifications of Lubricants. iv) Draw orthographic projections of a given simple machine element using and CAD software 	08
Total		32