

**MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI**

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

**COURSE NAME : CIVIL ENGINEERING GROUP**

**COURSE CODE : CE/CS/CR/CV**

**DURATION OF COURSE : 6 SEMESTERS / 8 SEMESTERS FOR CV**

**WITH EFFECT FROM 2006-07**

**SEMESTER : SECOND**

**DURATION : 16 WEEKS**

**FULL TIME / PART TIME : FULL TIME**

**SCHEME C:**

SR. NO	SUBJECT TITLE		TEACHING SCHEME			EXAMINATION SCHEME											
			TH	TU	PR	PAPER HRS	TH		TEST	TOTAL		PR		OR		TW	
							Max	Min		Max	Min	Max	Min	Max	Min		
1	Communication Skills	9005	02	--	02	03	80	28	20	100	40	--	--	25#	10	25@	10
2	Engineering Mathematics	9006	03	01	--	03	80	28	20	100	40	--	--	--	--	--	--
3	Applied Science (CIVIL)	9007	04	--	04	03	80	28	20	100	40	50@	20	--	--	--	--
4	Engineering Mechanics	9011	03	--	02	03	80	28	20	100	40	--	--	--	--	25@	10
5	Workshop Practice	--	--	--	04	--	--	--	--	--	--	--	--	--	--	50@	20
6	Development of Life Skills-I	--	01	--	02	--	--	--	--	--	--	--	--	25#	10	25@	10
7	Professional Practices	--	--	--	02	--	--	--	--	--	--	--	--	--	--	50@	20
<b>TOTAL</b>			<b>13</b>	<b>01</b>	<b>16</b>	<b>--</b>	<b>320</b>	<b>--</b>	<b>80</b>	<b>400</b>	<b>--</b>	<b>50</b>	<b>--</b>	<b>50</b>	<b>--</b>	<b>175</b>	

STUDENT CONTACT HOURS PER WEEK (FORMAL TEACHING) : **30 HRS.**

**THEORY AND PRACTICAL PERIODS ARE OF 60 MINUTES EACH.**

@ - INTERNAL ASSESSMENT, # - EXTERNAL ASSESSMENT.

**TOTAL MARKS – 675**

ABBREVIATIONS: TH – THEORY, TU – TUTORIAL, PR – PRACTICALS, OR –ORAL, TW – TERMWORK.

**Assessment of Practical, Oral & Term work to be done as per the prevailing norms of curriculum implementation & assessment.**

**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 : 9005**

**Teaching and examination scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	TEST	OR	TW	TOTAL
02	--	02	03	80	20	25#	25@	150

**Rationale:**

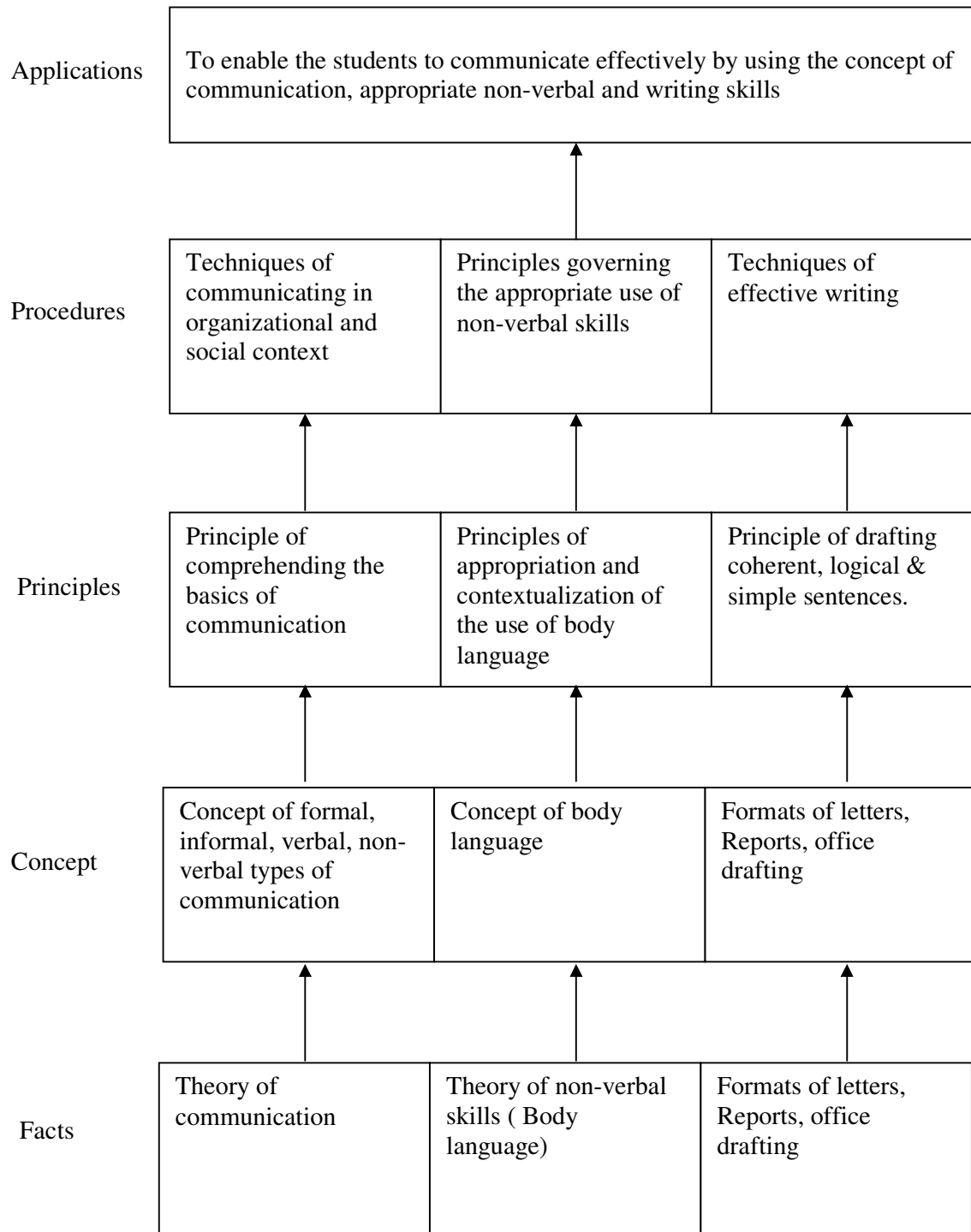
The Students have been already been exposed to the Language Skills pertaining to English, leading to a better understanding of English & use of grammar, developing a base for the language. Now with a view to achieve some mastery over the language & to develop Communication Skills, which is the main objective 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:**



## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Introduction to communication:</b> 1.1 Definition , communication cycle/ process, 1.2 The elements of communication : sender- message – channel- Receiver –Feedback & Context. 1.3 Definition of communication process. 1.4 Stages in the process : defining the context, knowing the audience, designing the message, encoding , selecting proper channels, transmitting, receiving, decoding and giving feedback.	04	08
02	<b>Types of communication</b> Formal- Informal, Verbal- Nonverbal, Vertical- horizontal- diagonal	04	08
03	<b>Principals of effective communication :</b> 3.1 Definition of effective communication 3.2 Communication barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback.	04	10
04	<b>Non verbal- graphic communication:</b> 4.1 Non- verbal codes: A- Kinesecs , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F -Chronemics , G –Artifacts 4.2 Aspects of body language 4.3 Interpreting visuals & illustrating with visuals like tables, charts & graphs.	08	22
05	<b>Formal written skills :</b> 5.1 Office Drafting : Circular, Notice , and Memo. 5.2 Job Application with resume. 5.3 Business correspondence : Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Report writing : Accident report, fall in production, Progress / Investigative. 5.5 Defining & describing objects & giving Instructions.	12	32
<b>Total</b>		<b>32</b>	<b>80</b>

## Assignments:

1. Communication Cycle (With The Help Of Diagram)
2. Communication Situations (List Of 5 Communication situations stating the type of communication)
3. Barriers That Hinder A Particular Communication Situation. (State the type of barrier, and how to overcome them).
4. Developing A Story Or A Paragraph For The Given Topic Sentence.(in a group of 5 – 6 students)
5. Describing Various Equipments.

6. Identifying The Various Sentences With Their Type Of Writing. (e.g. Scientific, legal, colloquial etc.)
7. Business Letters
8. Letters Of Suggestion
9. Comparative Time Table Of 2 Students
10. Description Of Two Different Persons.(seeing the picture)
11. Letter To The Librarian, Principal
12. Report Writing.

NOTE: The above assignments are suggested to be completed in the prescribed work-book.

**Learning Resources:**

**Books:**

<b>Sr. No.</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
01	Krushna Mohan, Meera Banerji	Developing Communication Skills	Macmillan
02	Joyeeta Bhattacharya	Communication Skills	Reliable Series
03	Jayakaran	Every ones guide to effective writing	Apple publishing

**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 : 9006**

**Teaching and examination Scheme**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	01	--	03	80	20	--	--	--	100

**Rationale:**

In 21<sup>st</sup> 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:

<b>Application:</b>	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.
<b>Procedure:</b>	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 theorem of probability	Explain geometric meaning of deri., max, & mini, rates, radius of curvature. to explain algebra of complex numbers Euler's forms, hyperbolic function.
<b>Concept:</b>	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.
<b>Facts:</b>	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. Definition of probability, random experiment.	First order and second order derivatives. Number system. Imaginary unit.

**Contents: Theory****Note:**

1. Chapters 1 to 3 are common for all branches.
2. Chapter 4-For Civil, Electrical, Mechanical and Electronics groups
3. Chapter 5-For Computer Engineering Group.

Chapter	Name of the Topic	Hours	Marks
01	<b>Function and Limit</b> <b>1.1 Function</b> 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
	<b>1.2 Limits</b> 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	08	12
02	<b>Derivatives</b> 2.1 Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule) 2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.	12	20
03	<b>Statistics And Probability</b> <b>3.1 Statistics</b> 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations.	10	16
	<b>3.2 Probability</b> 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	04	08
<b>NOTE: Chapter 4 is for Civil, Electrical, Electronics and Mechanical Groups</b>			
04	<b>4.1 Applications Of Derivative</b> 4.1.1 Geometrical meaning of Derivative, Equation of tangent and Normal 4.1.2 Rates and Motion 4.1.3 Maxima and minima	06	08



	4.1.4 Radius of Curvature <b>4.2 Complex number</b> 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number (Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem (without proof) and simple problems. 4.2.4 Euler's form of Circular functions, hyperbolic functions and relations between circular & hyperbolic functions	<b>04</b>	<b>08</b>
<b>Note: Chapter 5 is for Computer Engineering Group Only</b>			
<b>05</b>	<b>5.1 Numerical Solution of Algebraic Equations</b> 5.1.1 Bisection method, Regula-Falsi method and Newton-Raphson method	<b>06</b>	<b>08</b>
	<b>5.2 Numerical Solution of Simultaneous Equations</b> 5.2.1 Gauss elimination method 5.2.2 Iterative methods-Gauss Seidal and Jacobi's method	<b>04</b>	<b>08</b>
<b>Total</b>		<b>48</b>	<b>80</b>

### 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	Probability
10	Probability
11	Application of derivative/numerical Solution of algebraic equations
12	Application of derivative/numerical Solution of algebraic equations
13	Complex Numbers/Numerical Solution of Simultaneous Equations
14	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 Engineering Group**

**Course Code: CE/CS/CR/CV**

**Semester: Second**

**Subject Title: Applied Science (CIVIL)**

**Subject Code: 9007**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
04	--	04	03	80	20	50@	--	--	150

- Note:**
1. Two periods each for theory and Practical will be used for Applied Physics and Applied Chemistry respectively
  2. Theory paper will have two parts one for Applied Physics and one for Applied Chemistry. Each will have same weightage of 40 marks.
  3. Practical Marks will be divided equally between Applied Physics and Applied Chemistry

### **Part A: Applied Physics**

#### **Rationale:**

Physics provides foundation for core technology subjects. Understanding of any subject is entirely depending on logical thinking and hierarchy of knowledge component. As Physics is considered as basic science its principles, laws, hypothesis, concepts, ideas are playing important role in reinforcing the knowledge of technology.

Deep thought is given while selecting topics in physics. They are different for different groups. This will provide sound background for self-development in future to cope up with new innovations. Topics are relevant to particular program and student will be motivated to learn and can enjoy the course of Physics as if it is one of the subjects of their own stream.

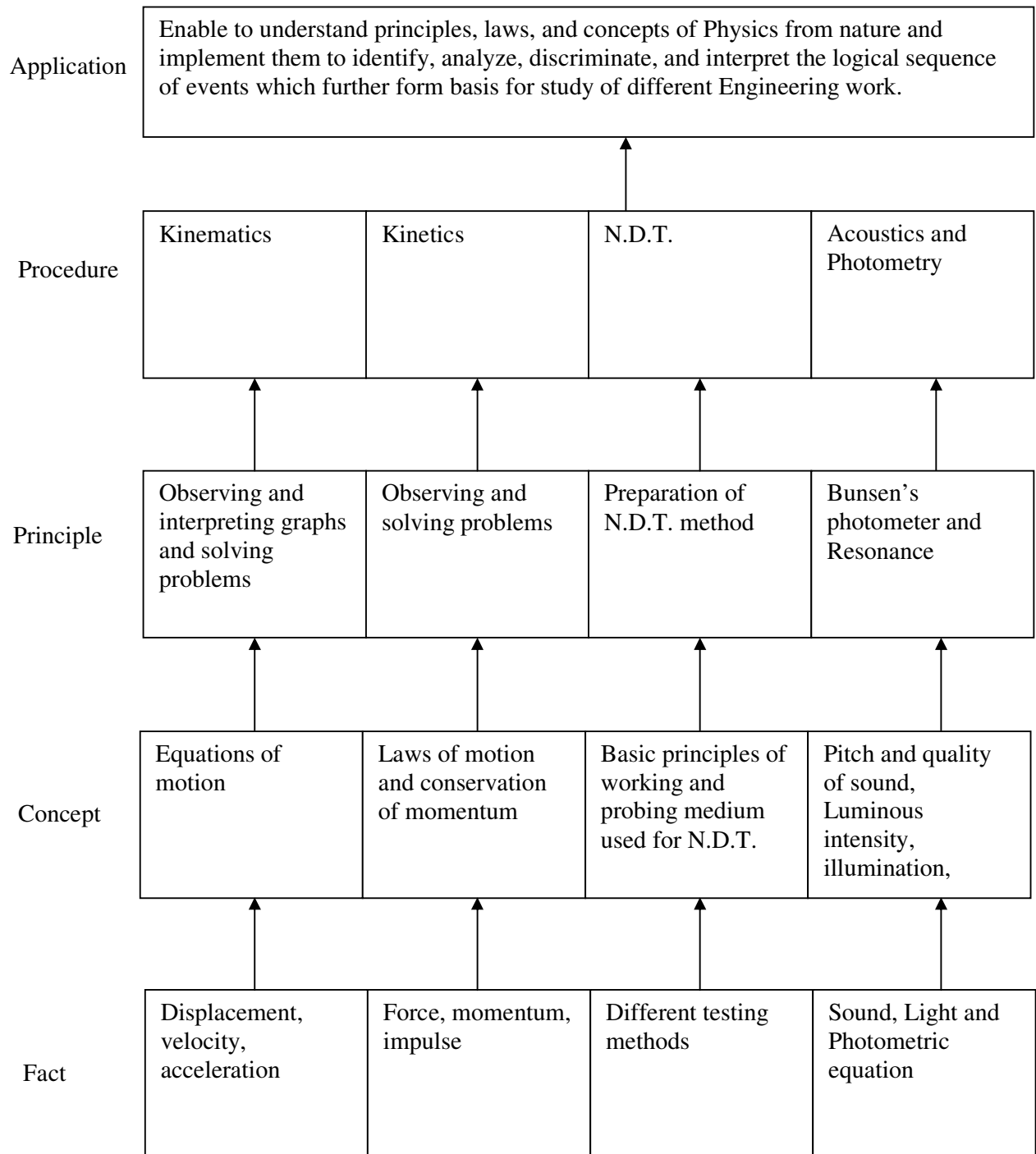
In correlation with above cited thought teacher should put deliberate efforts to procure the focus of the subject so that tertiary level will be covering both science and technology. This will be gateway for development of reasoning capacity of student and understanding of new technology as well.

#### **Objectives:**

The Student will be able to:

1. Differentiate kinetic and kinematics and solve the problems on kinematics and kinetics.
2. Graphically represent rectilinear motion, S.H.M. and use for solving engineering problems.
3. Use N.D.T. in quality assurance and saving of man power, machining, materials,
4. Use principles of illumination for enhancing work efficiency
5. Analyze variation of sound intensity with respect to distance.
6. Identify different factors affecting acoustical planning of buildings
7. Identify different factors affecting indoor lighting.

**Learning Structure:**



**Contents: Theory**

Chapter	Name of The Topic	Hours	Marks
01	<p><b>1. Kinematics</b></p> <p><b>1.1 Rectilinear Motion</b> Equations of Motions-<math>v=u+ a t</math>, <math>s=ut+1/2at^2</math>, <math>V^2=u^2+2as</math>(only equation), Distance traveled by particle in <math>n^{th}</math> second, Velocity Time Diagrams-uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity.</p> <p><b>1.2 Angular Motion</b> Definition of angular displacement, angular velocity, angular acceleration, Relation between angular velocity and linear velocity, Three equations of circular motion (no derivation) angular distance traveled by particle in <math>n^{th}</math> second (only equation), Definition of S.H.M. and S.H.M. as projection of uniform circular motion on any one diameter, Equation of S.H.M. and Graphical representation of displacement ,velocity, acceleration of particle in S.H.M. for S.H.M. starting from mean position and from extreme position.</p> <p><b>2. Kinetics</b></p> <p><b>2.1</b> Definitions of momentum, impulse, impulsive force, Statements of Newton’s laws of motion and with equations, Applications of laws of motion—Recoil of gun, Motion of two connected bodies by light inextensible string passing over smooth pulley, Motion of lift.</p> <p><b>2.2 Work ,power ,Energy</b> Definition of work, power and energy, equations for P.E. K.E., Work energy principle, Representation of work by using graph, Work done by a torque(no derivation)</p>	16	16
02			
03	<p><b>3. Non –destructive testing of Materials.</b></p> <p><b>3.1</b> Testing methods of materials -Destructive and Nondestructive, Advantages and Limitations of N.D.T., Names of N.D.T. Methods used in industries, Factors on Which selection of N.D.T. dependents, Study of Principle, Set up, Procedure,</p> <p><b>3.2</b> Working, Advantages, limitations, Applications and Application code of following N.D.T. methods -Penetrant method, Magnetic particle method, Radiography, Ultrasonic, Thermography.</p>	08	12

04	<p><b>Acoustics and Indoor Lighting of Buildings</b></p> <p><b>4.1 Acoustics</b> Weber and Fletcher's law, limit of intensity and loudness, echo, Reverberation and reverberation time (Sabine's formula), Timbre (quality of sound), Pitch or Frequency of sound. Factors affecting Acoustical planning of auditorium-- echo, reverberation, creep, focusing, standing wave, coefficient of absorption, sound insulation, noise pollution and the different ways of controlling these factors.</p> <p><b>4.2 Indoor lighting</b> Definition of luminous intensity, intensity of illumination with their SI units, Inverse square law and Photometric equation, Bunsen's photometer— ray diagram, working and applications, Need of indoor lighting, Indoor lighting schemes and Factors Affecting Indoor Lighting.</p>	08	12
<b>Total</b>		<b>32</b>	<b>40</b>

**Practical:**

Skills to be developed:

Intellectual skills:

- Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
- 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.
- 

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.

**List of Practical:**

1. To represent simple harmonic motion with the help of vertical oscillation of spring and to determine spring constant (K) (Stiffness Constant)
2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity.
3. To determine the velocity of sound by using resonance tube
4. To compare luminous intensities of two luminous bodies by using Bunsen's photometer.
5. To calculate coefficient of absorption for acoustical materials
6. To determine Joule's constant (J) by electric method
7. To determine wavelength of Sodium light by using Newton's rings
8. To Verify Ampere's rule using Oersted's Experiment and find variation of intensity of magnetic field with Current and Distance
9. To determine frequency of sound by using sonometer
10. To calculate refractive index of material of prism using spectrometer device .
11. To determine the divergence of He-Ne laser beam.

**Laboratory based Mini Projects:**

1. To detect surface cracks in the working piece by using liquid penetration method (LPT).
2. To determine coefficient of thermal conductivity of good conductor by using Searle's method
3. To determine the moments of inertia ( $I_{\alpha}$  and  $I_{\beta}$ ) of the given irregular body and to determine the rigidity modulus of the material of the given suspension wire by setting up a torsional pendulum.

**Learning Resources:****Books:**

Sr. No.	Author	Title	Publisher
01	V. Rajendran	Physics-I	Tata McGraw- Hill
02	Arthur Beiser	Applied physics	Tata McGraw- Hill
03	R.K.Gaur and S.L.Gupta	Engineering Physics	Dhanpatrai
04	Rensic and Halliday	Physics	--

**Part B: Applied Chemistry****RATIONALE:**

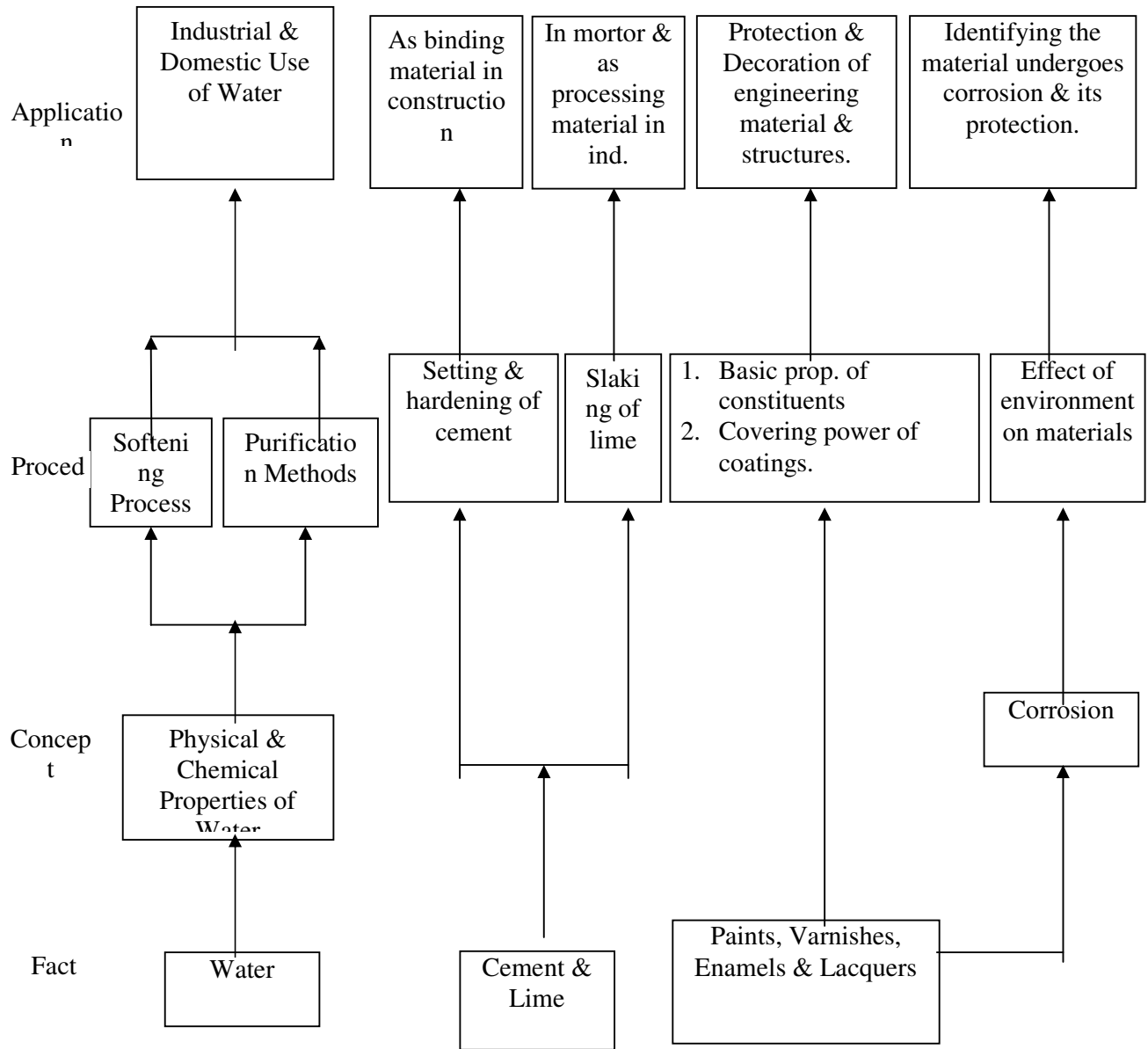
This syllabus of chemistry for civil students is classified under the category of applied science. It is intended to teach students the quality of water & its treatment as per the requirement, & selection of various construction materials & their protection by metallic & organic coatings.

**OBJECTIVES:**

1. Implementing the knowledge for the utilization of water resources in engineering & troubleshooting of the problems while using unsuitable water.
2. Able to select appropriate materials used in construction.
3. Apply knowledge to enhance operative life span of construction material & structure by various protective methods.



**LEARNING STRUCTURE:**



**Contents: Theory**

<b>Chapter</b>	<b>Name of The Topic</b>	<b>Hours</b>	<b>Marks</b>
<b>01</b>	<b>Water</b> Characteristics, Sources, Impurities, Hard & Soft Water, Causes of Hardness, Types of Hardness, Degree of Hardness, Ill Effects of Hard Water in Industries, Domestic Field & Steam Generation, Scale & Sludge Formation – Causes, Disadvantage & Removal, Softening Methods such as Boiling, Clark's, Soda Ash, Lime Soda, Permulite Zeolite & Ion Exchange Methods with Principle Chemical Reactions, Removal of Fe, SiO <sub>2</sub> , Dissolved Oxygen, Oil, & Algae from the Water Used in Industry, Characteristics of Potable Water – Its treatment by Screening, Sedimentation, Coagulation, Filtration, Sterilization with Principle, Process & Chemical Reactions, Plumbo solvency & its Removal Methods – pH & Its Applications in Engineering, Numericals.	<b>10</b>	<b>12</b>
<b>02</b>	<b>Cement &amp; Lime</b> Cement – Definition, Types, Portland Cement, Composition, Compound Constituents, Functions of Compound Constituents, Setting & Hardening of Cement with Chemical Relaxation, Function of Gypsum in Cement, Properties of Cement Quality, Setting Time, Shrinkage, Soundness, Colour, Heat of Setting or Hardening, Strength, Corrosion by Acid, CO <sub>2</sub> & Sulphate, ISI Specifications of Cement, Uses of Cement, Properties & Application of Water Proofing Cement, Slag Cement, Acid Resisting Cement, Super Sulphate Cement, White & Coloured Cement, Sorel's Cement, Plaster of Paris, Mortar & Concrete, Lime – Definition, Slaking of Lime, Types, their Composition, Properties & Uses.	<b>08</b>	<b>10</b>
<b>03</b>	<b>Paints &amp; Varnishes</b> <b>Paints</b> Definition, Characteristics of Good Paint, Constituents & their functions & Examples, Methods of Applications, Failure of Paint Film, Remedy to Prevent Failure, Classification of Paint based on Applications such as Exterior House Paint, Interior Wall Paints, Chemical Resistant Paints, Luminous Paints, Emulsion Paints, Metal Paints, Cement Paints, Water Paint or Distempers.  <b>Varnishes</b> Definition, Characteristics, Constituents, Types, Composition, Properties & Application of Japans, Enamels, Lacquers.	<b>08</b>	<b>10</b>
<b>04</b>	<b>Corrosion</b> Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric Corrosion & Immersed Corrosion or Electrochemical Corrosion, Mechanism, Protection of Metals by Purification of Metals, Alloy Formation, Cathode Protection, Controlling the External Conditions & Application of Protective Coatings, i.e. Galvanising, Tinning, Metal Spraying, Sherardizing,	<b>06</b>	<b>08</b>

	Electroplating, Metal Cladding, Cementation or Diffusion Method, their Definition, Procedure, Uses, Advantages & Disadvantages, Examples of Non Corrosive Materials.		
	<b>Total</b>	<b>32</b>	<b>40</b>

**Practical:**

Intellectual Skills:

1. Select proper equipment and instruments
2. Interpret results

Motor Skills:

1. Accuracy in measurement
2. Careful use of equipment

**List of Practical:**

- 1 To know your chemistry laboratory
- 2 To determine alkalinity of given water sample.
- 3 To determine of degree of hardness of water by EDTA method to find the suitability of water in industrial and domestic sue.
- 4 To determine of chloride content in the given sample of water by Mohr's method.
- 5 To determine pH value of given solutions by using pH paper, universal indicator and pH meter.
- 6 To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution using pH meter.
- 7 To determine percentage of calcium content in cement.
- 8 To determine thinner content in oil paint.

**Laboratory based mini projects**

- 10 To compare the quality of white cement / gray cement available in the market by estimating percentage of calcium from it.
- 11 To compare the quality of water from different sources by finding total dissolved matter from it and decide their significance in construction.
- 12 To find the rate of corrosion of Al strip in acidic and basic medium graphically.

**Learning Resources:****Books:**

<b>Sr. No.</b>	<b>Author</b>	<b>Name of the book</b>	<b>Publisher</b>
01	Jain & Jain	Engineering Chemistry	Dhanpat Rai and Sons
02	S. S. Dara	Engineering Chemistry	S. Chand and Co.
03	B. K. Sharma	Industrial Chemistry	Goel Publication
04	S. S. Dara	Environmental Chemistry & Pollution Control	S. Chand and Co.

**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 : 9011**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	---	---	25@	125

**Rationale:**

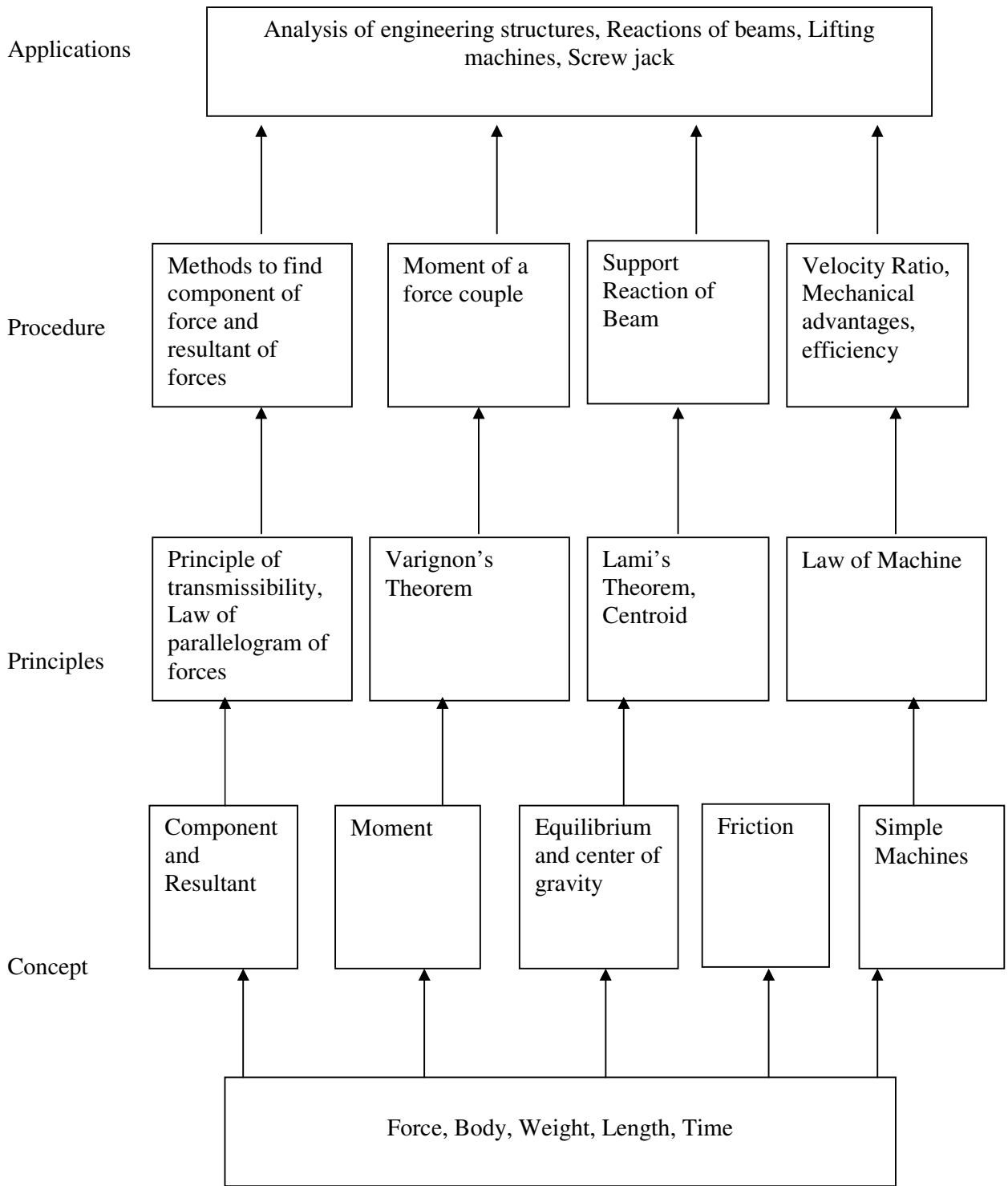
The Subject is grouped under basic engineering courses, which helps the students to understand facts, concepts, principles and techniques of scientific investigation in the field of Civil Engineering. The subject describes analysis of structure and mechanisms, principles which are commonly used in Civil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



Fact

**Contents: Theory**

Chapter	Name of the Topic	Hours	Marks
01	<p><b>Force</b></p> <p>a. <b>Fundamentals:</b> - Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units.</p> <p>b. <b>Force:</b> - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.</p> <p>c. <b>Resolution of a force:</b> Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components.</p> <p>d. <b>Moment of a force:</b> - 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 its use, couple – definition, S.I. unit, measurement of a couple, properties of couple.</p> <p>e. <b>Force system:</b> - Definition, classification of force system according to plane and line of action</p> <p>f. <b>Composition of Forces:</b> - 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),            II - Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.</p>	12	20

02	<p><b>Equilibrium:</b></p> <p>2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and 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.</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), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.</p>	10	16
03	<p><b>Friction:</b></p> <p>3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. 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 up and down.</p> <p>3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane.</p> <p>3.4 Ladder friction, Wedge and block.</p>	08	16
04	<p><b>Centroid and Centre Of Gravity:</b></p> <p>4.1 <b>Centroid:</b> 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 figure.</p>	08	12



	4.2 <b>Center of gravity:</b> Definition, center of gravity. of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. centre of gravity of composite solids.		
<b>05</b>	<p><b>Simple Machines:</b></p> <p>5.1 Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load.</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, 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, pulleys : First, second and third system of pulleys, gear train, hoist mechanism.</p>	<b>10</b>	<b>16</b>
	<b>Total</b>	<b>48</b>	<b>80</b>

**Practical:**

Skills to be developed:

Intellectual Skill:

1. Calculate the forces on given structure
2. Interpret the results
- 3.

Motor Skills:

1. Handle the equipment carefully
2. Draw graph

The term work consist of any five experiments from Group A,B and graphical solution in Group C

**Group A:**

- 1) Verify law of polygon of forces
- 2) Verify law of moments
- 3) Verification of Lami's theorem
- 4) Forces in members of a jib crane.
- 5) Comparison of coefficient of friction of various pair of surfaces and
- 6) determination of angle of repose
- 7) Equilibrium of parallel forces – simply supported beam reactions.
- 8) 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 ( Any five):

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

**Group C:** A 2 Size drawing sheets containing graphical solutions for –

- 1) Concurrent force system : Two problems
- 2) Parallel force system : Two problems
- 3) Reactions of a beam : 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	Joseph F. Shelley	Vector Mechanics for Engineers Vol. I & II	Tata McGraw Hill, Delhi

**Course Name : Civil Engineering Group**

**Course Code : CE/CS/CR/CV**

**Semester : Second**

**Subject Title : Workshop Practice**

**Subject Code : --**

**Teaching and Examination Scheme:**

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

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

**Rationale:**

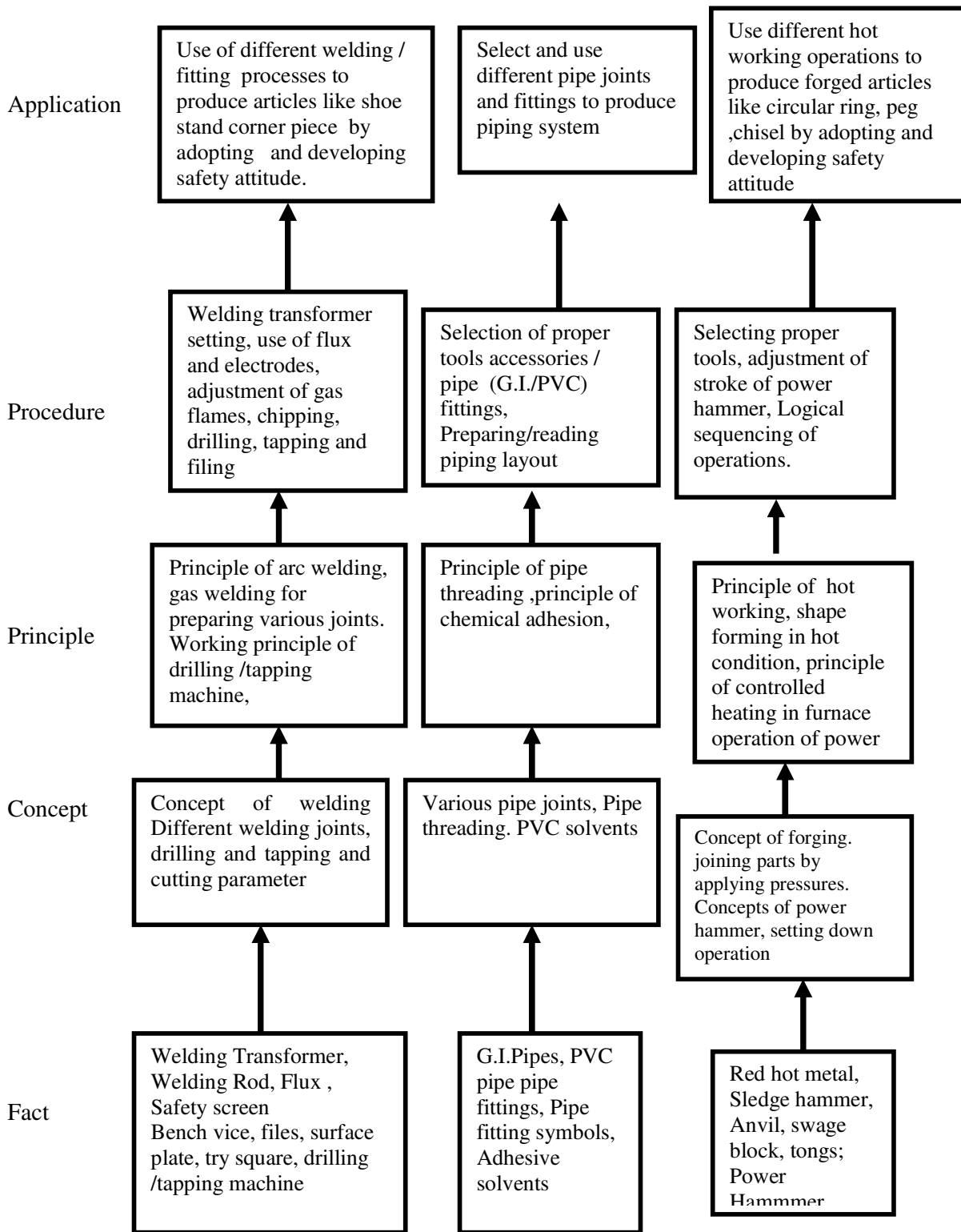
Civil diploma technician is expected to know basic workshop practice like, Gas Welding gas cutting. Fitting, Drilling, Tapping, plumbing and hot working processes. The students are required to identify operate and control various machines. The students are required to select and use various tools and 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:**



**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><b>WOOD WORKING SHOP:</b></p> <ul style="list-style-type: none"> <li>• Any one composite job from the following involving different joint, turning and planning, 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.</li> </ul> <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  4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p>
02	<p><b>WELDING SHOP</b></p> <ul style="list-style-type: none"> <li>• 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)</li> </ul> <p><b>Note:</b> 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><b>SMITHY SHOP</b></p> <ul style="list-style-type: none"> <li>• Demonstration of different forging tools and Power Hammer.</li> <li>• Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc.</li> <li>• One job like hook peg, flat chisel or any hardware item.</li> </ul> <p>• <b>Note:</b> 1] One job of standard size ( Saleable/marketable article shall</p>

	<p>be preferred)</p> <p>2] Job allotted should comprise of 4-6 hours of actual working operations.</p> <p>3] Student shall calculate the cost of material and labor required for their job from the drawing.</p>
<b>04</b>	<p><b>PLUMBING SHOP</b></p> <ul style="list-style-type: none"> <li>• Demonstration of PVC pipe joint with various fittings.</li> <li>• Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material.</li> </ul> <p>Note:1] One job of standard size (Saleable/marketable article shall be preferred)</p> <p>2] Batch size should be selected depending on volume of work.</p> <p>3] Job allotted should comprise of 6-8 hours of actual working</p> <p>4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p>
<b>05</b>	<p><b>SHEET METAL SHOP</b></p> <ul style="list-style-type: none"> <li>• 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)</li> </ul> <p>Note:1]One job of standard size (Saleable/marketable article shall be preferred)</p> <p>2] Batch size should be selected depending on volume of work.</p> <p>3] Job allotted should comprise of 4-6 hours of actual working ions.</p> <p>4] Student shall calculate the cost of material and labor cost required for their job from the drawing.</p>
<b>06</b>	<p><b>Demonstration of power tools and practice of utility items.</b></p> <ul style="list-style-type: none"> <li>• Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories.</li> <li>• Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring.</li> <li>• Any other item as per the requirement of college/Department</li> </ul> <p><b><u>(Note: Utility item are not to be assessed)</u></b></p>

### Learning Resources:

#### Books:

Sr. No.	Name of the Auther	Name of the Book	Publisher
<b>01</b>	S.K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers,New Delhi
<b>02</b>	B.S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
<b>03</b>	R K Jain	Production Technology	Khanna Publishers, New Delhi
<b>04</b>	H.S.Bawa	Workshop Technology	Tata McGraw Hill Publishers,New Delhi

<b>05</b>	--	Kent's Mechanical Engineering Hand book	John Wiley and Sons, New York
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**Video Cassettes/ CDS**

Learning Materials Transparencies, CBT Packages developed by NITTER Bhopa

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

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

**Semester : Second**

**Subject Title : Development of Life Skills- I**

**Subject Code : --**

**TEACHING AND EXAMINATION SCHEME:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPERS HRS	TH	TEST	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.

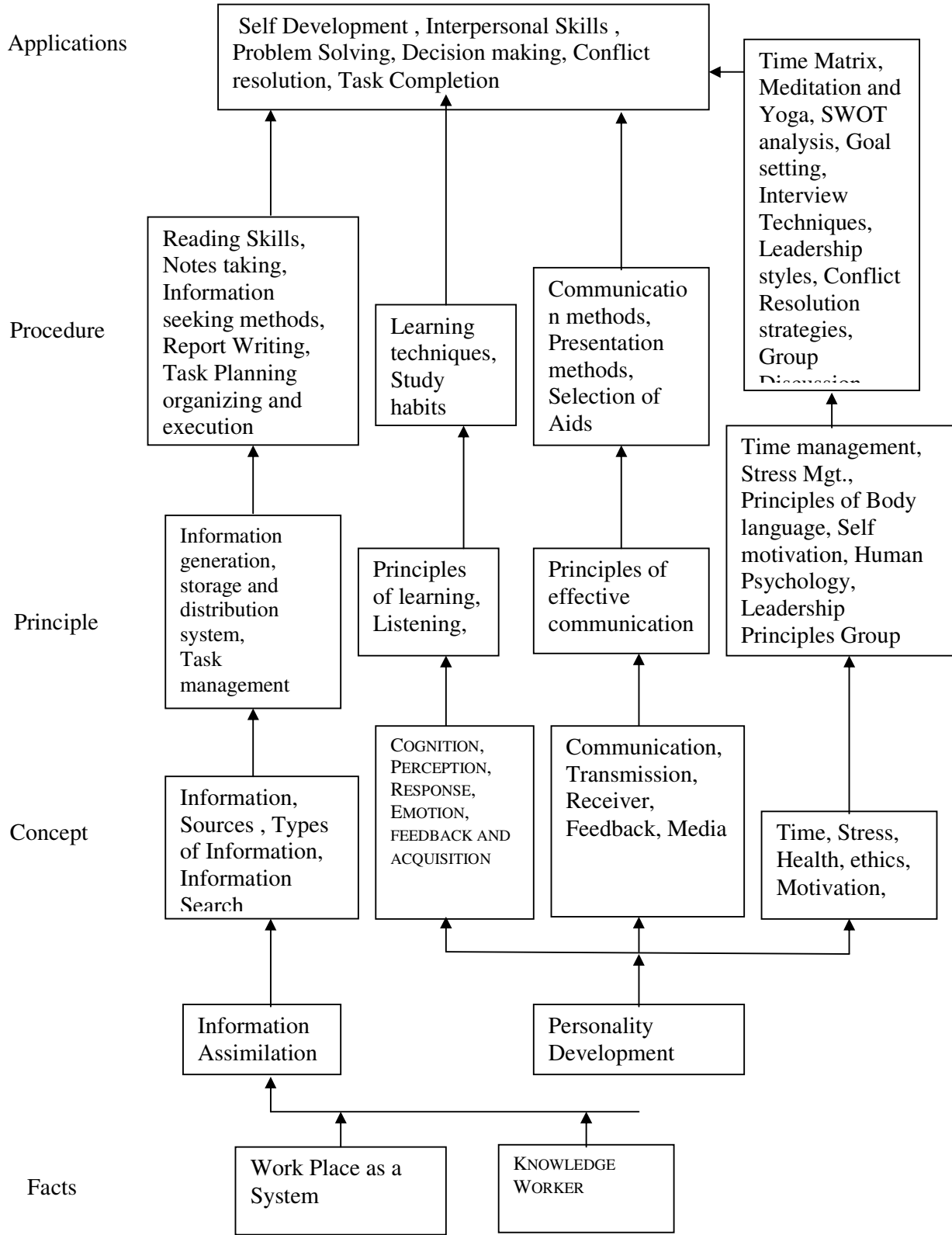
**Objectives:**

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	<b>Importance of DLS,</b> Introduction to subject, importance in present context ,application	01
2	<b>Information Search</b> 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	<b>Written communication</b> METHOD OF NOTE TAKING Report writing –Concept, types and format.	01
4	<b>Self Analysis</b> Understanding self— Attitude, aptitude, assertiveness, self esteem, Confidence buildings. Concept of motivation.	02
5	<b>Self Development</b> Stress Management –Concept, causes, effects , remedies to Avoid /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	<b>Study habits</b> Ways to enhance memory and concentration. Developing reading skill. Organisation of knowledge, Model and methods of learning.	03
<b>Total</b>		<b>16</b>

### LIST OF ASSIGNMENTS:

**The Term Work Will Consist Of Following Assignments.**

- 1) Library search:-  
Visit your Institute's Library and enlist the books available on the topic given by your teacher.  
Prepare a bibliography consisting name of the author, title of the book, publication and place of publication.
- 2) Enlist the magazines, periodicals and journals being available in your library. Select any one of them and write down its content. **Choose a topic for presentation.**

- 3) Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.
- 4) Visit to any one place like historical/office/farms/development sites etc. and gather information through observation, print resources and interviewing the people.
- 5) Prepare your individual time table for a week -
  - a) List down your daily activities.
  - b) Decide priorities to be given according to the urgency and importance of the activities.
  - c) Find out your time wasters and mention the corrective measures.
- 6) Keep a diary for your individual indicating- planning of time, daily transactions, collection of good thoughts, important data, etc
- 7) Find out the causes of your stress that leads tension or frustration .Provide the ways to avoid them or to reduce them.
- 8) Undergo the demonstration on yoga and meditation and practice it. Write your own views, feeling and experiences on it.

**NOTE:-** THESE ARE THE **SUGGESTED ASSIGNMENTS** 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.mapfornonprofits.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](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](http://www.thomasarmstron.com/multiple_intelligences.htm)
- 13) <http://snow.utoronto.ca/Learn2/modules.html>
- 14) <http://www.quickmba.com/strategy/swot/>

**Course Name : Civil Engineering Group**

**Course Code : CE/CS/CR/CV**

**Semester : Second**

**Subject Title : Professional Practices-II**

**Subject Code : --**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	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.

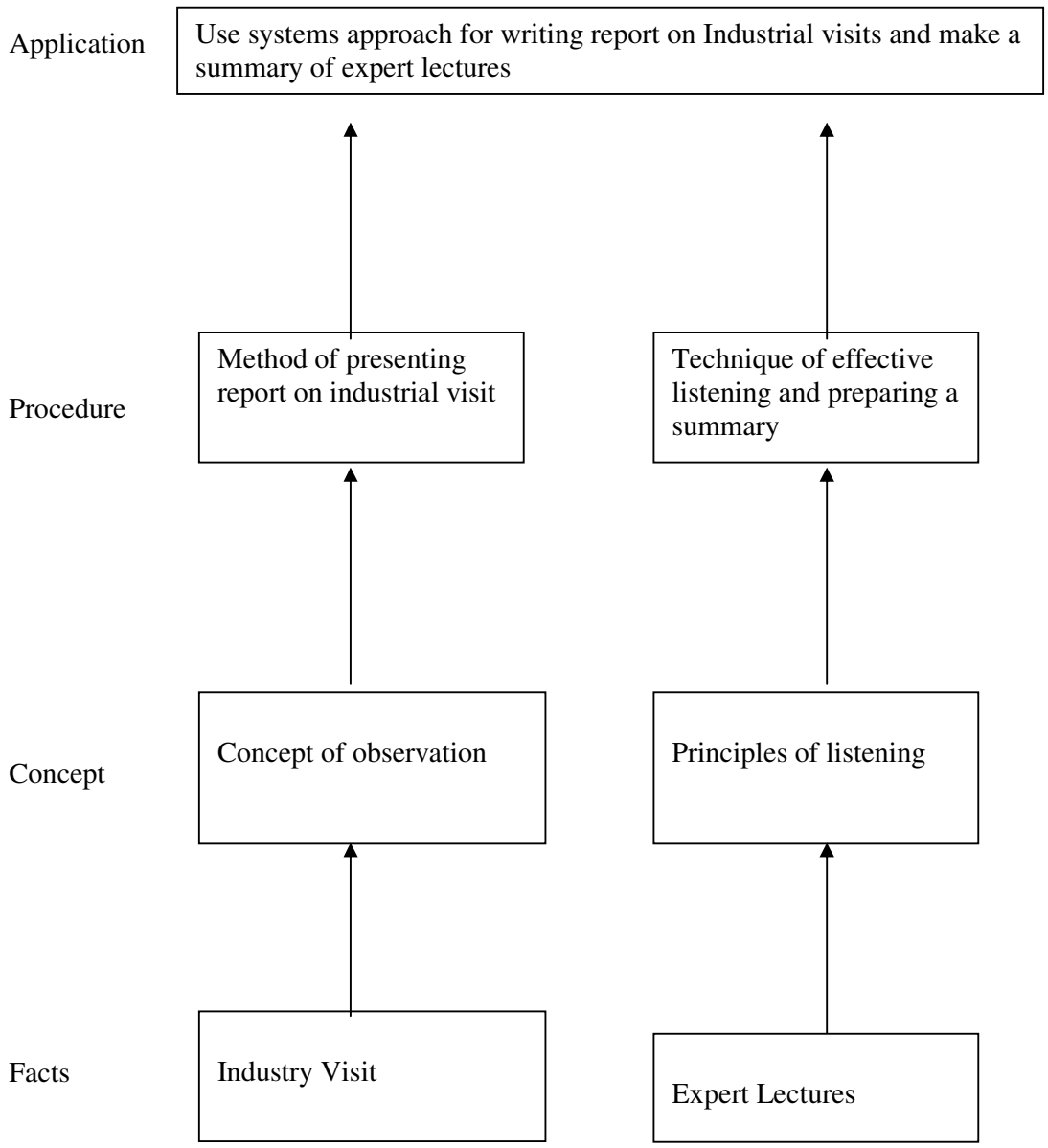
The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation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

**Objectives:**

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.	Activity	Hours
1	<p><b>Industrial Visits:</b>  Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work.  Visits to any two of the following :</p> <ul style="list-style-type: none"> <li>i) Construction site for residential / Public building</li> <li>ii) Tile manufacturing unit</li> <li>iii) Water treatment plant</li> <li>iv) Road construction site</li> <li>v) Architect/Structural design Office</li> </ul>	14
2	<p><b>Lectures by Professional / Industrial Expert to be organized on any three topics of the following suggested areas or any other suitable topics:</b></p> <ul style="list-style-type: none"> <li>i) Pollution control.</li> <li>ii) Acoustics.</li> <li>iii) Fire Fighting / Safety Precautions and First aids.</li> <li>iv) Vedic Mathematics.</li> <li>v) Topics related to Social Awareness such as –Traffic Control System, Career opportunities , Communication in Industry, Blood Donation Camp, Yoga Meditation, Aids awareness and health awareness</li> </ul>	10
3	<p><b>Group Discussion :</b></p> <p>The students should discuss in group of six to eight students and write a brief report on the same as part of term work. The topic for group discussions may be selected by the faculty members. Some of the suggested topics are -</p> <ul style="list-style-type: none"> <li>i) Sports</li> <li>ii) Cultural</li> <li>iii) Discipline and House Keeping</li> <li>iv) Current topic related to civil engineering field.</li> </ul>	08
<b>Total</b>		<b>32</b>