MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

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

COURSE NAME : AGRICULTURAL ENGINEERING

COURSE CODE : AU

DURATION OF COURSE : 6 SEMESTERS **WITH EFFECT FROM 2012-13**

SEMESTER : SECOND **DURATION : 16 WEEKS**

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

SR. NO	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME								SW (17200)
							PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)		
				TH	TU	PR		Max	Min	Max	Min	Max	Min	Max	Min	
1	Communication Skills $	CMS	17201	02	--	02	03	100	40	--	--	25#	10	25@	10	
2	Engineering Drawing β	EDG	17205	01	--	04	04	100	40	--	--	--	--	50@	20	
3	Engineering Mathematics $	EMS	17216	03	01	--	03	100	40	--	--	--	--	--	--	
4	Engineering Chemistry	ECH	17227	02	--	02	02	50	20	--	--	--	--	25@	10	**50**
5	Agricultural Science	AGR	17228	02	--	02	03	100	40	25#	10	--	--	25@	10	
6	Development of Life Skills $	DLS	17010	01	--	02	--	--	--	--	--	25@	10	--	--	
7	Workshop Practice	WPC	17011	--	--	04	--	--	--	50#	20	--	--	50@	20	
			TOTAL	**11**	**01**	**16**	**--**	**450**	**--**	**75**	**--**	**50**	**--**	**175**	**--**	**50**

Student Contact Hours Per Week: **28 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks **: 800**

@ - Internal Assessment, # - External Assessment, No Theory Examination, $ - Common to all branches, β – Common to Mechanical & Chemical Engineering Groups

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, 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, 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 : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/ ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX/AU

Semester : Second

Subject Title : Communication Skills

Subject Code : 17201

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:

In this age of globalization, competition is tough. Hence effective communication skills are important. Communication skills play a vital and decisive role in career development. The subject of Communication Skills introduces basic concepts of communication. It also describes the verbal, non-verbal modes and techniques of oral & written communication.

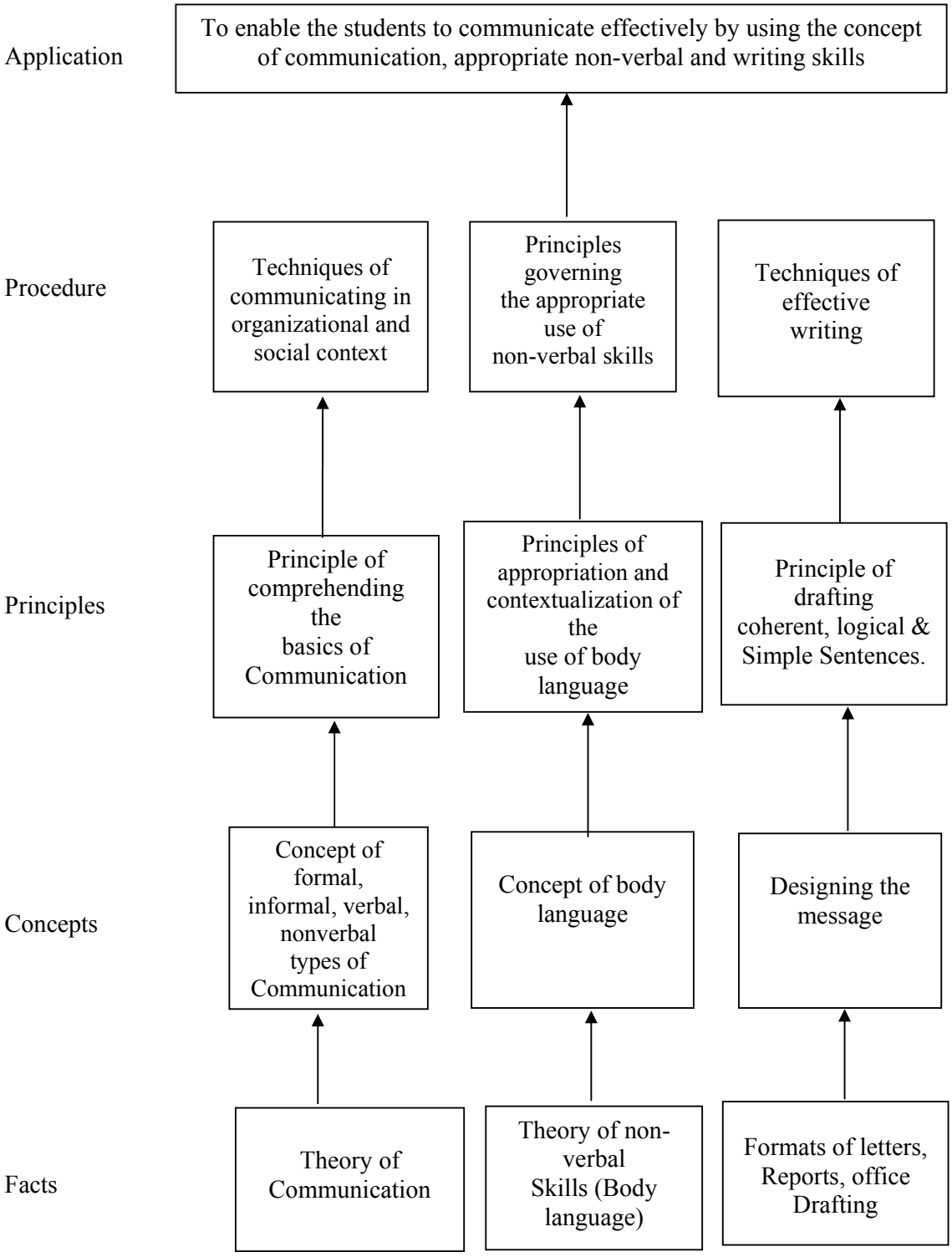
It will guide and direct to develop a good personality and improve communication skills.

General Objectives:

Students will be able to:

1. Utilize the skills necessary to be a competent communicator.
2. Select and apply the appropriate methods of communication in various situations.

Learning Structure:



Theory

Name of the Topic	Hours	Marks
Topic 01 - Introduction to Communication: **Specific Objective:** ➢ Describe the process of communication. **Contents:** • Definition of communication • Process of communication • Types of communication -- Formal, Informal, Verbal, Nonverbal, Vertical, Horizontal, Diagonal	06	16
Topic 02 - Effective communication **Specific Objective:** ➢ Identify the principles and barriers in the communication process **Contents:** ❖ Principles of communication. ❖ Barriers to communication a. **Physical Barrier**: ❖ Environmental (time, noise, distance & surroundings), ❖ Personal (deafness, stammering, ill-health, spastic, bad handwriting) b. **Mechanical** : Machine oriented c. **Psychological:** Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status inattentiveness, perception. d. **Language** : Difference in language, technical jargons, pronunciation & allusions.	08	20
Topic 03 - Non verbal & Graphical communication: **Specific Objectives:** ➢ Effective use of body language & nonverbal codes ➢ View and interpret graphical information precisely. **Contents:** 3.1 Non- verbal codes: [08 Marks] • Proxemics, • Chronemics • Artefacts 3.2 Aspects of body language (Kinesics) [10 Marks] • Facial expression • Eye contact • Vocalics, paralanguage • Gesture • Posture • Dress & appearance	08	28

• Haptics 3.3 Graphical communication [10 Marks] • Advantages & disadvantages of graphical communication • Tabulation of data & its depiction in the form of bar graphs & pie charts.		
Topic 04 - Listening **Specific Objective:** ➢ Effective use of listening **Contents:** • Introduction to listening • Listening versus hearing • Merits of good listening • Types of listening. • Techniques of effective listening.	02	08
Topic 05 - Formal Written Communication **Specific Objectives:** ➢ Use different formats of formal written skills. **Contents:** • Office Drafting: Notice , memo & e-mail • Job application with resume. • Business correspondence: Enquiry letter, order letter ,complaint letter, adjustment letter. • Report writing: Accident report, fall in production, investigation report. • Describing objects & giving instructions	08	28
Total	**32**	**100**

Skills to be developed in practical:

Intellectual Skills:

1. Analyzing given situation.
2. Expressing thoughts in proper language.

Motor Skills:

1. Presentation Skills focusing on body language.
2. Interpersonal skills of communication

Journal will consist of following assignments:

01: Draw the diagram of communication cycle for given situation.

State the type and elements of communication involved in it.

02: Graphics:- a) Draw suitable bar-graph using the given data.
b) Draw suitable pie-chart using the given data.

03: Role play: Teacher should form the group of students based on no. of characters in the situation. Students should develop the conversation and act out their roles.

04: Collect five pictures depicting aspects of body language from different sources such as magazines, newspapers, internet etc. State the type and meaning of the pictures.

NOTE: The following assignments should be performed by using Language Software.

05 Practice conversations with the help of software.

06 Describe people/personalities with the help of software and present in front of your batch.

07 Prepare and present elocution (three minutes) on any one topic with the help of software.

08 Describe any two objects with the help of software.

Learning Resources:

Sr. No.	Author	Title	Publisher
01	MSBTE, Mumbai.	Text book of Communication Skills.	MSBTE, Mumbai.
02	MSBTE, Mumbai.	CD On Communication Skills	MSBTE
03	Joyeeta Bhattacharya	Communication Skills.	Reliable Series
04	Communication Skills	Sanjay Kumar, Pushpa Lata	Oxford University Press

Web Sites for Reference:

Sr. No	Website Address
01	Website: www.mindtools.com/page8.html-99k
02	Website: www.khake.com/page66htm/-72k
03	Website: www.BM Consultant India.Com
04	Website: www.letstak.co.in
05	Website: www.inc.com/guides/growth/23032.html-45k

Course Name : Diploma in Agriculture Engineering

Course code : AE/CH/FE/ME/MH/MI/PG/PT/PS/AU

Semester : Second

Subject Title : Engineering Drawing

Subject Code : 17205

Teaching and Examination Scheme:

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

NOTE:

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:

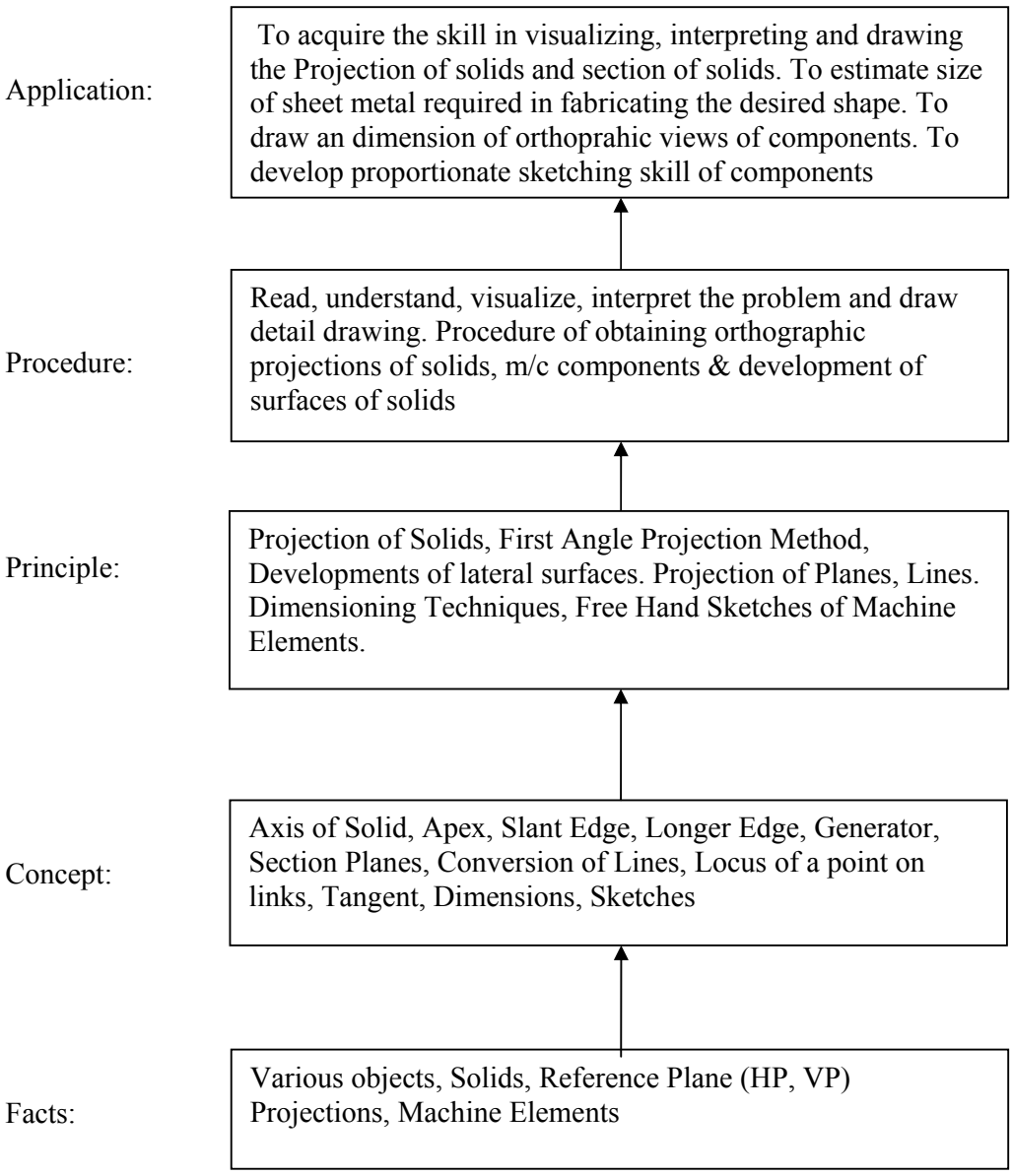
Engineering drawing is the graphical language of engineers. It describes the scientific facts, concepts, principles and techniques of drawing in any engineering field to express the ideas, conveying the instructions, which are used to carry out jobs in engineering field. This course aim for building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

Objectives:

After studying this subject, the students will be able to:

1. Understand the basic concepts of projection of different entities.
2. Visualize and draw views of objects in different positions.
3. Develop lateral surfaces of different solids.
4. Prepare proportionate free hand sketches of basic machine elements.

Learning Structure:



Theory:

Topic and Content	Hours	Marks
1. Projection of Lines and planes Specific Objectives Understand and draw the projections of lines and planes 1.1 Lines inclined to both reference plane and limited to both ends in one quadrant.----------6 marks 1.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other. ----------10 marks	02	16
2. Projection of Solids Specific Objectives Visualize and draw the projection of regular solids on HP, VP and auxiliary plane 2.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.----------10 marks 2.2 Projections of same solids on auxiliary plane. ----------6 marks	02	16
3. Sections of Solids. Specific Objectives Visualize and draw the projection of different cut models of regular solids 3.1 Cone, Pyramid and Tetrahedron resting on their base on Horizontal Plane. ----------5 marks 3.2 Prism, Cylinder: ----------6 marks a) Axis parallel to both the reference plane b) Resting on their base on HP. 3.3 Section plane inclined to one reference plane and perpendicular to other. ----------5 marks	02	16
4. Developments of Surfaces. Specific Objectives Develop the lateral surfaces of various solids and understand its engineering applications 4.1 Developments of Lateral surfaces of cube, prism, cylinder, pramid, cone ----------8 marks 4.2 Applications such as tray, funnel, Chimney, pipe bends etc. ------8 marks	02	16
5. Sectional Orthographic and missing views (First angle method) Specific Objectives Visualize and draw missing views and sectional views of different objects 5.1 Types of sections and Conversion of pictorial view into sectional orthographic views.(complete object involving slots, threads, ribs etc)--------10 marks 5.3 Draw missing view from the given Orthographic views ---------10 marks	04	20
6. Free Hand Sketches of m/c elements. Specific Objectives • Prepare proportionate free hand sketches of given m/c elements. • Understand function and use of machine element Free hand sketches of machine elements such as nuts, bolts, set screws, rivet	04	16

heads, riveted joints, locking arrangements for nuts, threads, foundation bolts, Flange coupling, pulleys.----------		
Total	**16**	**100**

Skills to be developed for practical:

Intellectual skills

1) To develop ability to differentiate between true length, shape and apparent length and shape
2) To interpret the position of lines, planes, solids with reference plane.
3) Able to interpret the development of surfaces of different solids.
4) To interpret the missing views from given orthographic views.
5) To identify various parts of machine like nuts, bolts, screws, different threads, couplings.
6) To understand the sequence of CAD commands

Motor Skills

1) Able to draw Orthographic Projections of line, planes and solids with given orientation
2) To develop ability to draw sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes.
3) Ability to draw true shape of section.
4) Ability to draw the development of surfaces of different objects in different shapes.
5) Develop ability to draw sectional views and missing view from given orthographic views
6) Develop ability to draw orthographic views of different machine elements
7) Use of CAD software for preparing drawings and get the output.

Practical:

1. Projections of Lines and Planes----------6 hours Two problems on projection of lines and two problems on projection of planes (1 Sheet)
2. Projection of solids----------8 hours 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)
3. Section of solids----------8 hours 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)
4. Development of surfaces----------8 hours Any two problems on development of surfaces of different objects.- (1 Sheet)
5. Sectional Orthographic and Missing view ----------10 hours One problem on sectional views and one problem on missing views. - (1 Sheets)
6. Free Hand Sketches----------8 hours Any ten specified elements.- (1 Sheets)
7. Using CAD software----------16 hours Draw any two machine elements with dimensions

Learning Resources:

1. **Books:**

Sr. No.	Title	Author	Publication
1	Engineering Drawing	N. D. Bhatt	Charotar Publishing House, 2010
2	Engineering Drawing	D.Jolhe	Tata McGraw Hill Edu., 2010
3	Engineering Drawing	M.B.Shah, B.C. Rana	Pearson, 2010
4	Engineering Drawing	R. K. Dhawan	S. Chand Co. , Reprint 2010
5	Text Book on Engineering Drawing	K.L.Narayan, P.Kannaiah	Scitech Publications, 24th Reprint August 2011
6	Engineering Drawing and Graphics + AutoCAD	K. Venugopal	New Age Publication, Reprint 2006
7	Engineering Drawing practice for schools and colleges	IS Codes SP – 46.	--

2. Video Cassettes / CD's

1. Instructional / Learning CD developed by ARTADDICT.

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

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

Semester : Second

Subject Title : Engineering Mathematics

Subject Code : 17216

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:

This subject is an extension of Basic mathematics of first semester and a bridge to further study of applied mathematics. The knowledge of mathematics is useful in other technical areas.

Differential calculus has applications in different engineering branches. For example concepts such as bending moment, curvature, maxima and minima.

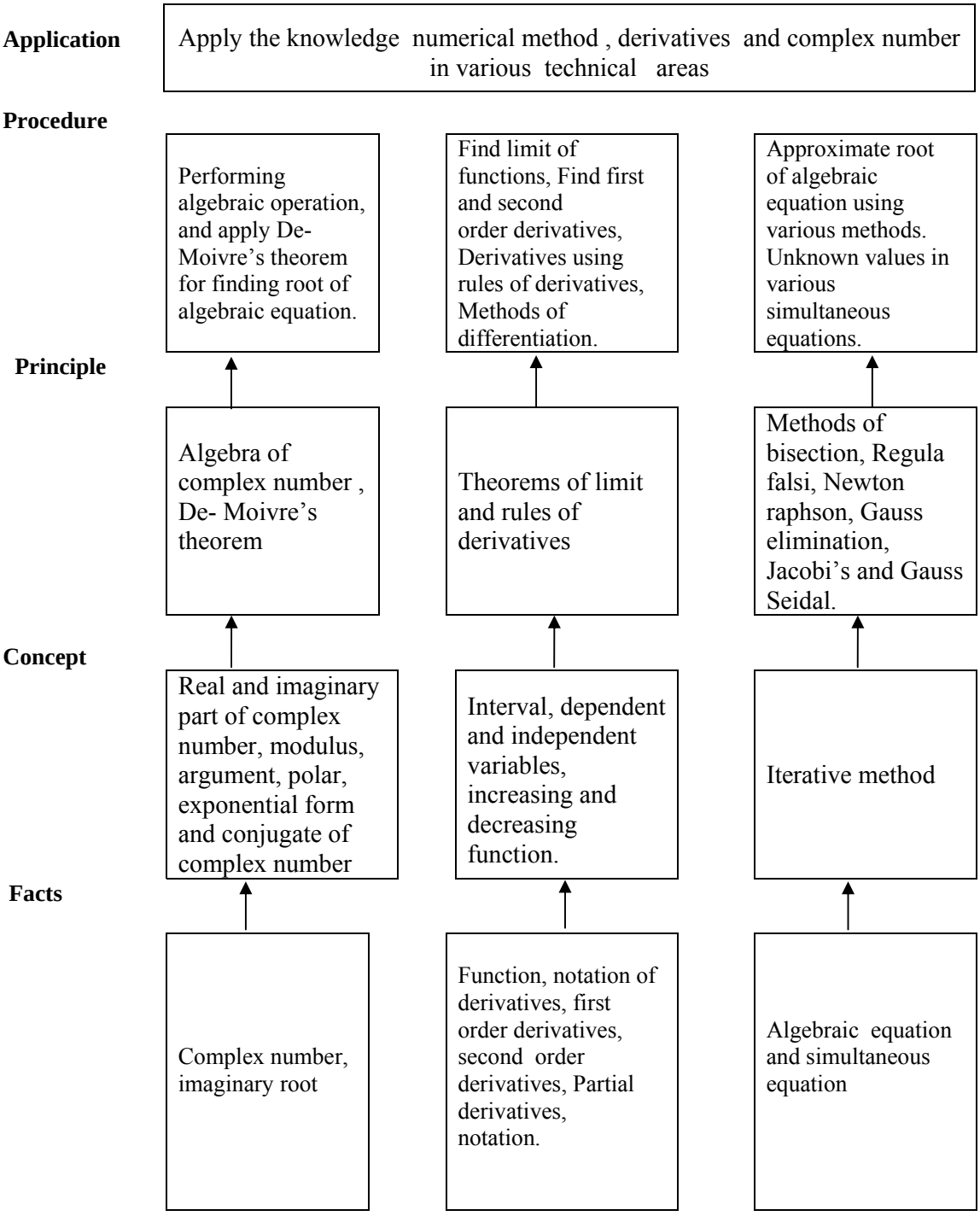
Numerical methods are used in programming as an essential part of computer engineering. For solution of problems in electrical circuits and machine performances complex number is used engineering mathematics lays the foundation to understand technical principles in various fields.

General objectives:

Student will be able to

1) Use complex numbers for representing different circuit component in complex form to determine performance of electrical circuit and machines.
2) Apply rules and methods of differential calculus to solve problems.
3) Apply various numerical methods to solve algebraic and simultaneous equations.

Learning Structure:



Content Theory:

Topic	Hours	Marks
Topic 1 - Complex number		
1.1 Complex Number ---------- 14 **Specific objectives :** ➢ Find roots of algebraic equations which are not in real. • Definition of complex number, Cartesian, polar and exponential forms of complex number. • Algebra of complex number such as equality, addition, subtraction, multiplication and division. • De- Moivre's theorem with simple examples. • Euler's form of circular functions, hyperbolic functions and relation between circular and hyperbolic functions.	08	14
Topic 2 - Differential Calculus		
2.1 Function ---------- 14 **Specific objectives :** ➢ Identify the function and find the value of function. • Definition of function, range and domain of function. • Value of function at a point. • Types of functions and examples.	08	58
2.2 Limits ---------- 20 **Specific objectives :** ➢ To evaluate limit of function. • Concept and definition of limit. • Limits of algebraic, trigonometric, logarithmic and exponential functions with examples.	08	
2.3 Derivatives ---------- 24 **Specific objectives :** ➢ Find the derivatives by first principle. ➢ Solve problems using rules and methods of derivatives • Definition of derivatives, notation, derivatives of standard function using first principle. • Rules of differentiation such as, derivatives of sum or difference, product, and quotient with proofs. • Derivative of composite function with proof (Chain rule) • Derivatives of inverse trigonometric functions using substitution • Derivatives of inverse function. • Derivatives of implicit function. • Derivatives of parametric function. • Derivatives of one function w.r.t another function. • Logarithmic differentiation. • Second order differentiation.	12	
Topic 3 - Numerical Method		
3.1 Solution of algebraic equation ---------- 14 **Specific objectives :** ➢ Find the approximate root of algebraic equation. • Bisection method • Regula falsi method • Newton Rapshon method	06	**28**

3.2 Numerical solution of simultaneous equations ---------- 14 **Specific objectives :** ➢ Solve the system of equations in three unknowns. • Gauss elimination method • Jacobi's method • Gauss Seidal method	06	
Total	**48**	**100**

Tutorials:

1) Tutorial are to be used to get enough practice.
2) In each tutorial make a group of 20 student students and for each group minimum 10 problems are to be given.

List of Tutorials:

Sr No.	Topic for Tutorial
1	Complex number (Examples based on algebra of complex numbers)
2	Complex number (Examples based on De Moivre's theorem and Euler's formulae)
3	Function
4	Limit (algebraic and trigonometric functions)
5	Limit (logarithmic and exponential functions)
6	Derivatives by first principle
7	Derivatives (Examples based on formulae of standard functions and rules)
8	Derivatives (Examples based on methods of differentiation)
10	Solution of algebraic equations
11	Solution of simultaneous equations

Learning Resources:

1) Books:

Sr. No.	Title	Authors	Publication
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 Pablication New Delhi
5	Higher Engineering Mathematics	B. S .Grewal	Khanna publication New Delhi
6	Applied Mathematics	P. N. Wartikar	Pune vidyarthi Griha Prakashan, Pune

2) Websites: www.khan academy

Course Name : Diploma in Agricultural Engineering

Course Code : AU

Semester : Second

Subject Title : Engineering Chemistry

Subject Code : 17227

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	02	02	50	--	--	25@	75

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:

Study of Engineering Chemistry is essential to agricultural engineering course. It provides knowledge about the appropriate use of engineering materials, their protection and lubrication process in different working conditions of machines.

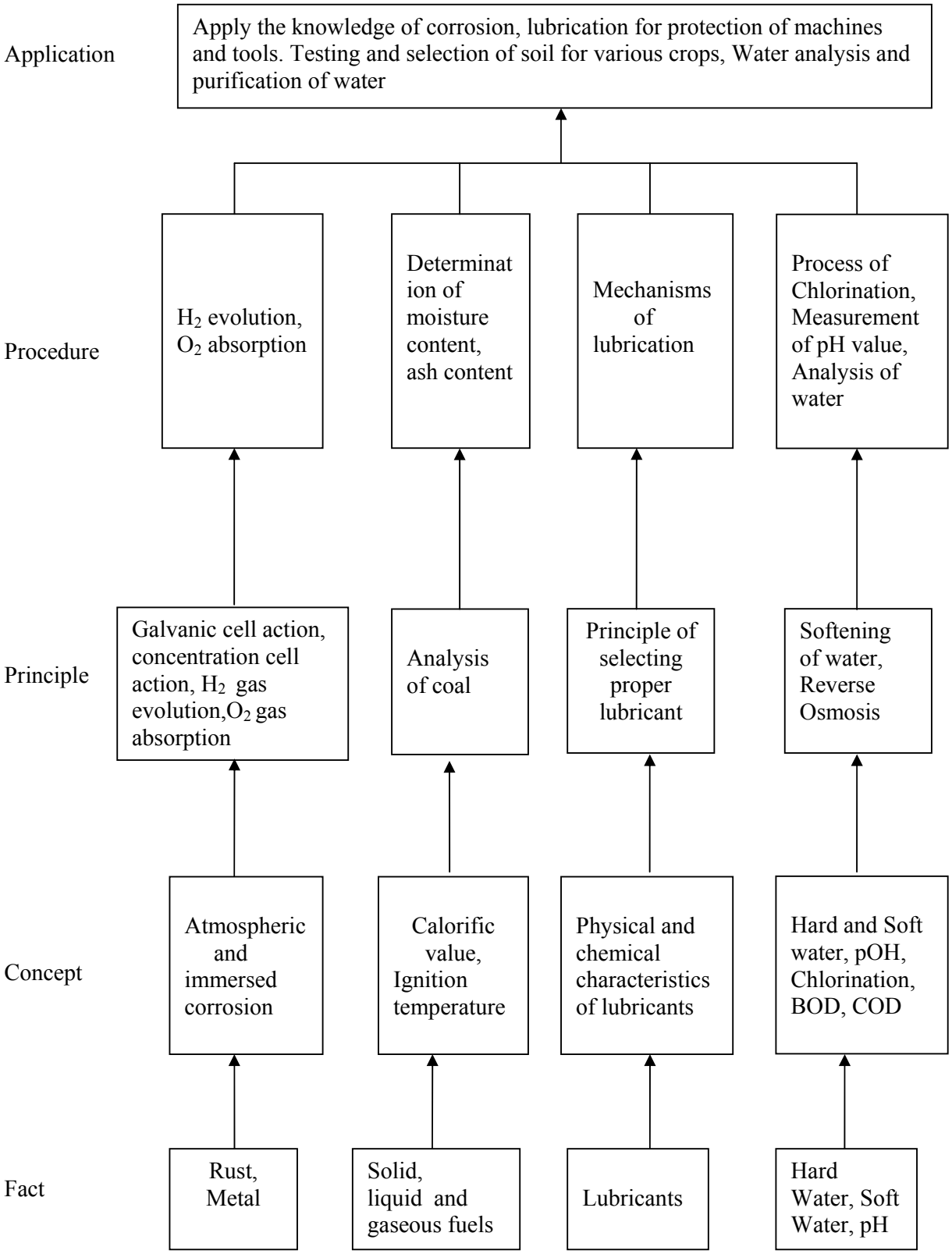
Study of lubricants and corrosion of metal will enable the learner to understand trouble free working and operations of different machines and equipments. Study of Fuels will provide details about various fuels, their usage for agricultural implements. The study of above subject matter will enable the learner in solving problems while working in industries. This will be the gateway for development of reasoning capacity of student and understanding new technology as well.

General Objectives:

The student will be able to:

1. Understand various factors influencing corrosion.
2. Judge the selection of proper lubricants.
3. Know properties and applications of different types of fuels.

Learning Structure:



Theory Content:

Topic and Contents	Hours	Marks
Topic 1] Corrosion: **Specific Objectives:** ➢ Explain Mechanism of atmospheric corrosion and immersed corrosion. ➢ Describe different methods of protection of metal from corrosion **2.1 Corrosion: [6 Marks]** • Definition of corrosion, Types of corrosion. • Atmospheric Corrosion: Definition, mechanism of oxidation corrosion, types of oxide films and their significance, factors affecting rate of atmospheric corrosion. • Immersed Corrosion: Definition, mechanism of immersed corrosion by galvanic cell action- with evolution of hydrogen gas and absorption of oxygen gas, factors affecting immersed corrosion. **2.2 Protection of metals by: [8 Marks]** • Modification of environment, modification of properties of metal, electrochemical protection by sacrificial anodic protection and impressed current cathodic protection, use of protective coatings. • Application of metallic coatings: By galvanising, tinning, metal spraying, electroplating, metal cladding, cementation- sherardizing, chromising, colourising. • Application of non-metallic coatings: paint-definition, characteristics, constituents of paint and their functions.	09	14
Topic 2] Fuels: **Specific Objectives:** ➢ State characteristics of a good fuel. ➢ Write significance of proximate analysis of a fuel. ➢ Explain fractional distillation of crude petroleum. **3.1 Properties of fuels:** **[4 Marks]** • Definition of a fuel, calorific value and ignition temperature. Characteristics of a good fuel, Classification of fuels with suitable examples, advantages and disadvantages of solid fuels, liquid fuels and gaseous fuels. **3.2 Classification of fuels :** **[8 Marks]** • Solid fuels: Analysis of solid fuel - proximate analysis for determination of moisture, volatile matter, ash and fixed carbon, significance of proximate analysis, determination of gross calorific value by using Bomb calorimeter. • Liquid fuels: Origin, fractional distillation of crude petroleum, boiling range, composition, and applications of petroleum fractions obtained, composition, properties, applications of-Biodiesel. • Gaseous fuels: Composition, properties, applications of- Biogas, LPG, CNG,	10	16
Topic 3] Lubricants: **Specific Objectives:** ➢ Write functions of lubricants ➢ Describe the mechanism of lubrication.	07	10

➢ State characteristics of Lubricants. Lubricant: definition of lubricant, functions of lubricants. • Classification of lubricant: Solid lubricants- characteristics and applications of graphite and molybdenum disulphide. Liquid lubricants – characteristics and applications of synthetic fluid (silicone oil), water as a lubricant (coolent). Semisolid lubricant- characteristics and applications of grease (plastic lubricant). • Mechanism of Lubrication: Definition of by lubrication, mechanism of fluid film lubrication, boundary lubrication, extreme pressure lubrication • Characteristics: Physical characteristics of lubricants –viscosity, viscosity index, oiliness, volatility, flash and fire point, cloud and pour point. Chemical characteristics of lubricants-acid value or neutralization number, emulsification, saponification value. • Selection of Lubricants for road rollers, steam engines, sewing machine, concrete mixer, I.C engine, cutting tools, gears.		
Topic 4] Water Analysis for Agriculture **Specific Objectives:** ➢ Perform water analysis for use in agriculture ➢ Use various methods for developing potable water **Content:** 4.1 **Water Treatment :** • Concept of hard and soft water, Hardness of water, Its limits and determination of hardness of water by EDTA method. • Softening methods: Sods lime, Zeolite and Ion exchange resin process, Reverse osmosis • Characteristics imparted by various impurities or contaminants such as colour, odour, taste and sediments and their analysis. • Analysis of Water : A. Estimation of chlorides in water. B. Determination of dissolved oxygen. • Disinfecting of Water : By Chloric, Ozone and Chlorination with its mechanism • Advantage and disadvantage of chlorination, Break point chlorination (Free residual chlorination). • Definition of BOD and COD 4.2 **pH and pOH** Definition of pH, pOH, buffer solution. Types of buffer solution, Numericals.	06	10
Total	**32**	**50**

Practical:

Intellectual Skills:

1. Select proper equipments and instruments.
2. Interpret the results.
3. Plan the set up of the experiment.
4. Verify the characteristics of materials.

Motor Skills:

1. Handle various laboratory reagents.

2. Measure chemicals accurately.
3. Observe the completion of reaction.
4. Note down readings.
5. Follow systematic procedure step by step.

List of Experiments:

Sr. No.	Name of the Experiment
1	Calculation of pH value of given water sample
2	Find the relation between loss in weight of aluminium strip in acidic and alkaline medium and rate of corrosion.
3	Determine electrode potential of various metals to study their tendency towards corrosion.
4	Determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution by using pH meter.
5	Determine the Chloride content in supplied water sample by using Mohr's methods.
6	Determine the percentage of moisture content in the given coal sample.
7	Determine the percentage of ash content in the given coal sample by proximate analysis.
8	Determine coefficient of viscosity using Ostwald's Viscometer.
9	Determine the total hardness of water sample in terms of CaCo3 by EDTA titration method using E Br indicator.

References

1. **List of Reference Books:**

Sr. No.	Author	Name of the book	Publisher
01	Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
02	S. S. Dara	Engineering Chemistry	S. Chand Publication
03	R. Sivakumar and N. Sivakumar	Engineering Chemistry	Tata McGraw-Hill Publishing Company Limited
04	R. Srinivasan	Engineering Materials and Metallurgy	Tata McGraw-Hill Education Private Limited
05	Vedprakash Mehta	Polytechnic Chemistry	Jain brothers

2. **List of web sites, Videos and Animations:**

http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_metals
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_ceramics
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_polymers
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_composites
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_fluids
http://www.ausetute.com.au/corrosion.html
http://www.youtube.com/watch?v=8s8rcnxqLIw
http://www.sherardizing.com/resources/files/9_Sherardizing_Corrosion.pdf (Sheradizing)
http://www.galvanizeit.org/aga/animation/4728?keepThis=true&TB_iframe=true&height=480&width=640 (Galvanizing)
http://www.ehow.com/list_6725219_different-types-metal-cladding.html (Metal Clading)

Course Name : Diploma in Agricultural Engineering

Course Code : AU

Semester : Second

Subject Title : Agricultural Science

Subject Code : 17228

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)**

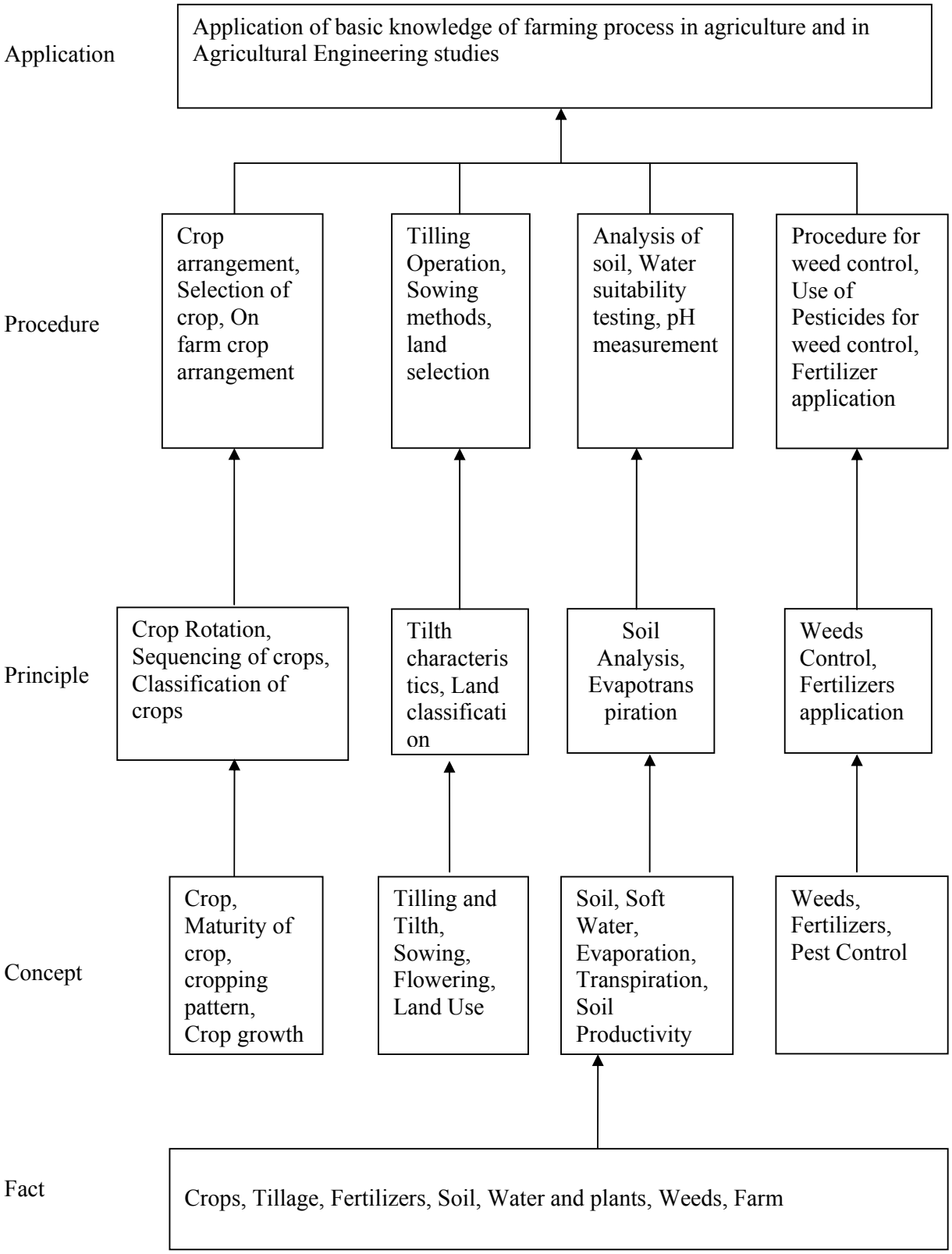
Rationale:

Agricultural science is a basic subject for a diploma holder in agricultural engineering. Students joining this course may not have any agricultural background and hence it is necessary that knowledge about basic inputs of agricultural science is provided to them. The course contents of this subject have been developed to inculcate the skill of identification of the crops, common weeds, insecticide, fungicide and fertilizers. It also contains Soil, Water and Plant relationship.

General Objectives:

1. Classify the crops into various categories
2. Identify the soil types and select the soil for various crops
3. Specify water needs for crops
4. List various types of weeds

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1] Classification of Crops: Specific Objectives; ➢ Identify the crops on the basis of their classification Contents: • Basis of Classification: Utility, Parts of plant used, economy, seasonal, Botanical • Study of cereals crops (wheat, paddy and maize) legume crops (soyabean, moong and arhar),cash crops (potato, sugarcane), oil seed crops, sunflower (mustard,groundnut) and fruit crops (mango, apple and guava)	04	12
Topic 2] Tillage and Tilth Specific Objectives; ➢ Decide the strategy for tilling as per crop ➢ Decide the tillage based on properties of soil Contents: • Objectives of tillage, characteristics of ideal seed bed, effect of tillage on soil properties: Pore space, texture, structure, bulk Density, colour of the soil • Types of tillage – Primary and Secondary tillage, factors affecting preparatory cultivation, after cultivation and puddling. • Tillage Implements: Power machines(Sub soilars) • Sowing methods • Tilth and its characteristics	04	12
Topic 3] Soil, Water and Plant Relationship: Specific Objectives: ➢ Classify soils based on their Characteristics ➢ Decide water requirement for crop ➢ Specify Sustainable farming parameters Contents: **Soil: 10 Marks** • Types of soils, its classification • Characteristics of soil: Based on Colour, Porosity, Bulk density • Land use classification: Related to Physiography, Depth, Slope, Fertility and Productivity • Soil fertility – Soil fertility and Soil productivity, fertility losses, maintenance of soil fertility, soil organic matter. **Water: 14 Marks** • Sources of Water: Rainfall, River, Wells, Dams, Canals • Water Characteristics: • Atmospheric humidity and its expression; saturation; Effects of humidity on crops. • Effect of Temprature and Light on crops • Evaporation and transpiration definitions - Factors affecting rate of evaporation and transpiration. • Monsoons – Definition, origin of South West and North East Monsoons and their occurrence. Their impact on agricultural operations during different cropping seasons. • Rainfall – Types of rainfall - Clouds, classification of clouds and the	10	30

characteristics of different forms of clouds. • Consumptive use of water • Water requirement for crops and criteria for scheduling crop irrigation **Organic farming and Sustainable Agriculture: 06 Marks** • Organic Farming: Meaning of the term, Processes and components of organic farming. • Sustainable farming: Meaning of the term, Its relationship with organic farming, Methods and limitations of sustainable farming		
Topic 4] Weeds and Weeds Contol: Specific Objectives: ➢ Identify the losses due to weeds ➢ Decide method weed removal Contents: • Weed control – Definition of weed – Losses and uses of weeds • Weed influence on crop production • Principles of crop weed competition, critical periods for weed control in different crops, • Methods of weed control and principles in weed management and Integrated Weed Management(IWM).	05	16
Topic 5] Cropping and Farming Systems: Specific Objectives: ➢ Select cropping pattern for given tye of soil ➢ Decide crop arrangement ➢ Select farming system Content: • Cropping systems – Mono cropping and its disadvantages • Definition and principles of crop rotation, mixed cropping, intercropping, relay cropping, multistoried cropping, sole cropping and sequence cropping • On farm crop arrangement/plan • Crop arrangement of field: Season wise, per season • Effect of different parameters on plant growth and development • Harvest maturity: Criteria • Types of farming systems and combination of Farm Enterprises: Agri. Farming, Animal Husbandry, Poultry, Piggery, Dairy	05	16
Topic 6] Manure and fertilizer Requirements: Specific Objectives; ➢ Calculate fertilizer requirement for crops ➢ Decide on package of practices for given crop pattern Content; • Classification of Manures and Fertilizers • Calculations of Manures and Fertilizers requirements • Method of application of fertilizers, zoning, identification of root zones. • Study of different field crops: Origin, biology, flowering, soil requirements • Package of Practices including pest and disease control	04	14
Total	**32**	**100**

Practicals:
Skills to be developed:

Intellectual skills:

1. Identify different manures, fertilizers, green manure plants etc.
2. Identify various crops and weeds, pesticides, fertilizers
3. Analyse soil samples to decide suitability for crops
4. Crop planning

Motor Skills:

1. Participate in all agricultural operations like ploughing, puddling, sowing, application of fertilizers, harvesting
2. Ability for sowing of seeds
3. Use meteorology instruments for measurement of weather data

List of Practcals:

1. Identify various crops, and weeds
2. Identify various Pesticides, Fertilizers, Chemicals, Herbicides
3. Study of Mechanical weed control and Chemical control
4. Calculations of Fertilizer requirement and application methods
5. Study and use of tilling equipment
6. Collection of soil samples and it physical and chemical analysis
7. Study of Meteorological instruments and use for recording measurements
8. Judging of maturity of crops and study and use different harvesting methods
9. Study of Threshing methods, seed viability and germination test
10. Visit to agro farm to study various activities on the farm

Learning Resources:
Books:

Sr. No.	Title of the Book	Nam e of the Author	Publisher
1	Principles of Agronomy	Yellamanda Reddy T and Sankara Reddy G H	1995. Kalyani Publishers, Ludhiana
2	Principles of Agronomy,	Sankaran S and Mudaliar V S	1995. The Banagalore Printing and Publishing Co. Ltd., Bangalore
3	Basic Principles of Agricultural Meteorology	Radha Krishna Murthy	V 2002. B.S. Publications, Hyderabad
4	Terminology on Agrometeorology and Agronomy	Radha Krishna Murthy V, Yakadri M and Prasad P V	V 2006. B.S. Publications, Hyderabad

Course Name : All Branches of Diploma in Engineering and Technology

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

Semester : Second

Subject Title : Development of Life Skills

Subject Code : 17010

Teaching and Examination Scheme:

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

Rationale:

Globalization has emphasized the need for overall development of technician to survive in modern era. Soft skills development in addition to technical knowledge; plays a key role in enhancing his/her employability.

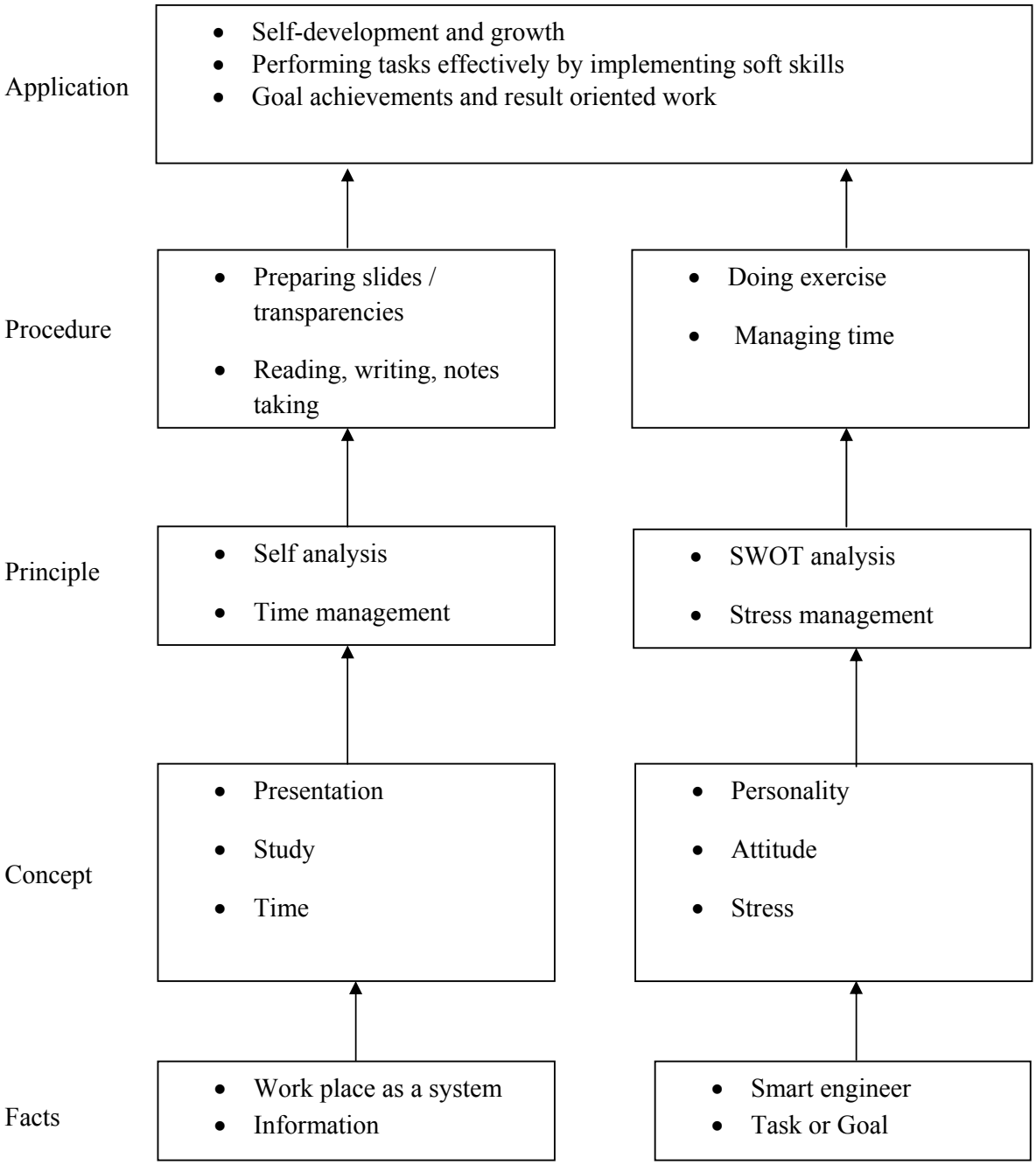
This subject aims to provide insights into various facets of developing ones personality in terms of capabilities, strengths, weakness, etc as well as to improve reading, listening and presentation skills. Also in this age fierce competition, the time and stress management techniques will immensely help the technician to live happy and purposeful life.

General Objectives:

After studying this subject, the students will be able to:

1. Understand and appreciate importance of life skills.
2. Use self-analysis and apply techniques to develop personality.
3. Use different search techniques for gathering information and working effectively.
4. Improve the presentation skills.

Learning Structure:



Theory:

Topic and Contents	Hours
TOPIC 1: SELF ANALYISIS Specific Objectives: ➢ To introduce oneself. Contents: 1.1 Need of Self Analysis 1.2 Attitude and types (positive, negative, optimistic and pessimistic) Guidelines for developing positive attitude.	02
TOPIC 2: STUDY TECHNIQUES Specific Objectives: ➢ To identify different process and strategies. ➢ To improve reading, listening and notes taking skills. Contents: 2.1 Learning strategies 2.2 Learning process 2.3 Organization of knowledge 2.4 Reading skills 2.5 Listening skills 2.6 Notes taking 2.7 Enhancing memory	03
TOPIC 3: INFORMATION SEARCH Specific Objectives: ➢ To search information as per the need. Contents: 3.1 Sources of information 3.2 Techniques of information search (library, internet, etc)	02
TOPIC 4: SELF DEVELOPMENT Specific Objectives: ➢ To set primary goals using SMART parameters. ➢ To Priorities the work effectively. ➢ To cope up with stress effectively. Contents: 4.1 Goal setting and its importance. 4.2 Characteristics of Goal setting (**SMART- S**pecific, **M**easurable, **A**ttainable, **R**ealistic, **T**ime bound) 4.3 Time Management - Importance, prioritization of work, time matrix, time savers, and time wasters. 4.4 Stress Management - Definition, types of stress, causes of stress, managing stress, and stress busters.	05
TOPIC 5: PRESENTATION TECHNIQUES Specific Objectives: ➢ To plan for presentation. ➢ To prepare contents for presentation. Contents:	02

5.1 Importance of presentation. 5.2 Components of effective presentation (Body language, voice culture , rehearsal, etc) 5.3 Preparing for presentation. 5.4 Use of audio/video aids. (audio, video, transparency's, PowerPoint presentations, etc) 5.5 Performing presentation (Seminars, paper presentations, compering, etc)	
TOPIC 6: GROUP DISCUSSION Specific Objectives ➢ To understand the concept of group discussion ➢ To know the purpose of group discussion Contents 6.1 Group discussion concept and purpose 6.2 Method of conduction	02
Total	**16**

Practical:
Skills to be developed:

Intellectual Skills:

Student will be able to

- Develop ability to find his capabilities.
- Select proper source of information.
- Follow the technique of time and stress management.
- Set the goal.

Motor Skills:

Student will be able to

- Follow the presentation of body language.
- Work on internet and search for information.
- Prepare slides / transparencies for presentation.

List of Practicals/activities:

1. Giving self introduction. Observe the demonstration of self introduction given by the teacher and prepare a write up on the following points and introduce yourself in front of your batch in 5 minutes
   - Name
   - Native place
   - Background of school from where he / she passed
   - Family background

- Hobbies / salient achievements / idols if any for self development
- Aims of life as an Engineer

2. Provide responses to the questions based on the moral story given in the assignment.
3. Judge your attitude by responding to the tests given in the assignment and write comments on your score.
4. Read any chapter from the subject of Engineering Physics / Engineering Chemistry and identify facts, concepts, principles, procedures, and application from that chapter
5. Participate in the panel discussion on techniques of effective learning and provide the responses to the questions.
6. Access the book on Biography of Scientists/Industrialist/Social leader/Sports Person from library. Read the book and note the name of author, publication, year of publication, and summarize the highlights of the book.
7. Prepare notes on given topic by referring to books / journals / websites.
8. Prepare 8 to 10 power point slides based on the notes prepared on the above topic. Present the contents for 10 minutes Group wise(Group will be of 4 students)

Note – Subject teacher shall guide the students in completing the assignments based on above practical.

Learning Resources:
Books:

Sr. No.	Author	Name of Book	Publication
1	Richard Hale and Peter Whitlam	Target setting and goal achievement	Kogan Page
2	Andrew Bradbury	Successful Presentation Skills	The Sunday Times – Kogan
3	Ros Jay and Antony Jay	Effective Presentation	Pearson – Prentice Hall
4	Subject Experts - MSBTE	Handbook on Development of Life Skills	MSBTE
5	Nitin Bhatnagar and Mamta Bhatnagar	Effective Communication and Soft Skills	Pearson
6	D. Sudha Rani	Business Communication and Soft Skills	Pearson
7	Barak K Mitra	Personality Development and Soft Skills	Oxford University Press
8	Dr. T. Kalayani Chakravarti and Dr. Latha Chakravarti	Soft Skills for Managers	biztantra

Course Name : Diploma in Agriculture Engineering

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

Semester : Second

Subject Title : Workshop Practice

Subject Code : 17011

Teaching and Examination Scheme:

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

Rationale:

Diploma Mechanical Engineer is expected to develop basic workshop skills in Carpentry, Welding, Fitting and Smithy operations.

Students are require to identify, select and use different kinds of tools, such as marking, measuring, cutting, supporting, striking and various holding devices.

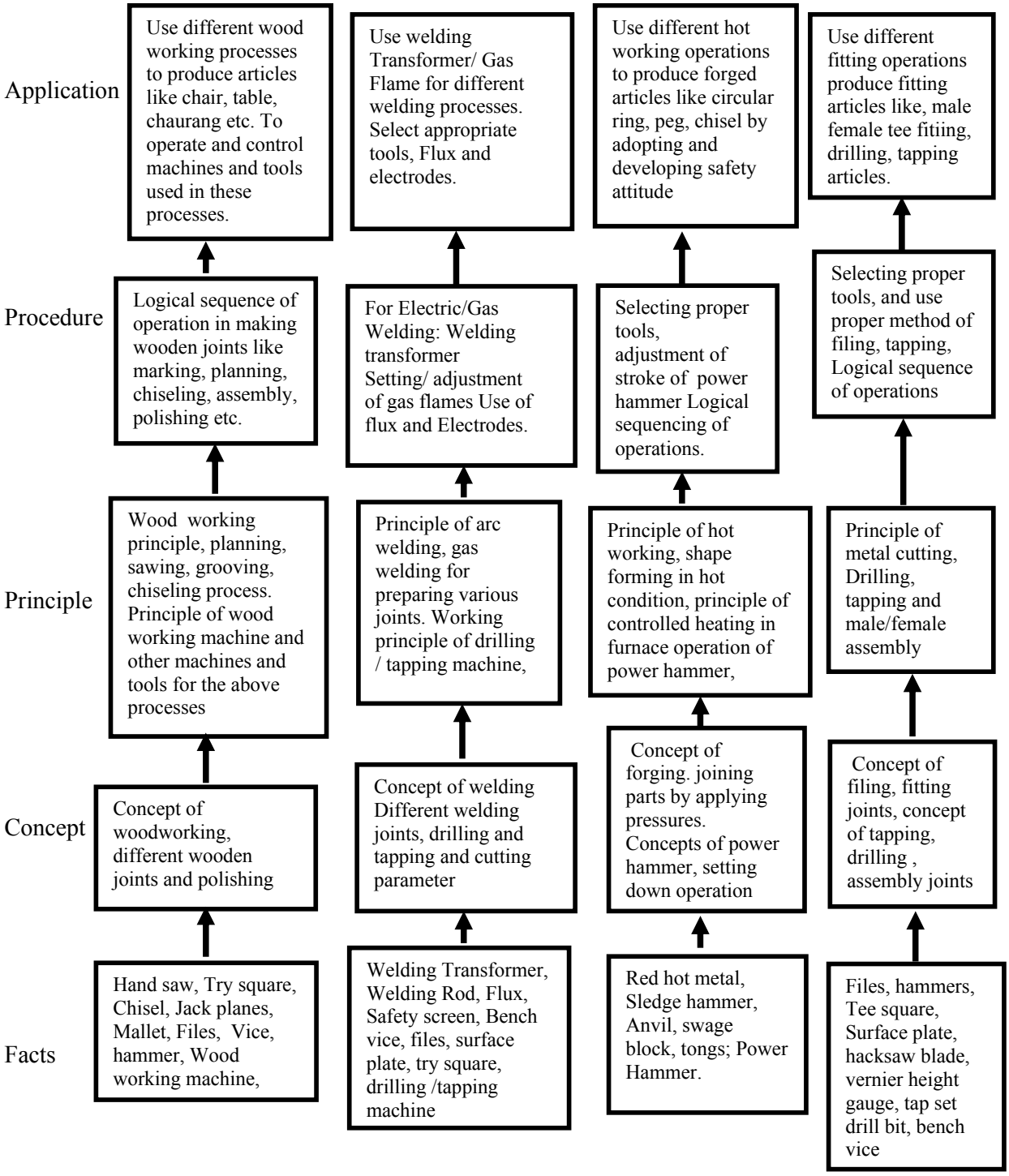
These workshop practices are commonly used in engineering industries. Knowledge of Basic Workshop Practice and Workshop Practice enables students to use in preparing composite jobs.

General Objectives:

The student will able to

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

Learning Structure:



Practical
Skill to be developed:

Intellectual Skills:

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

Motor Skills:

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

Sr. No	Topic Objectives	Details of Practical Contents	Hours
01	➢ To appreciate the importance of Carpentry in engineering works ➢ To select the proper wood material for the job undertaken ➢ To identify and use various marking, measuring, cutting, striking and inspection tools used in Carpentry section.	**CARPENTERY SHOP:** 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. Note:1]One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. Max. 4 students. 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.	14
02	➢ To appreciate the importance of Welding in engineering works ➢ To select the proper Steel material and proper welding machine for the job undertaken ➢ To identify and use various marking , measuring, cutting,	**WELDING SHOP** 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) **Note:** 1] One job of standard size (Saleable/marketable article shall be preferred)	14

	striking and inspection tools used in Welding	2] Batch size should be selected depending on volume of work. Max. 4 students 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.	
03	➢ To appreciate the importance of Fitting operations in engineering works ➢ To select the Proper material and tools of Fitting section for the job undertaken. ➢ To identify and ➢ and use various marking, measuring, cutting, striking and inspection tools used in Fitting section	**FITTING SHOP**: Demonstration of different fitting tools and drilling machines and power tools. Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. One simple fitting job (Male/female assembly type) involving practice of chipping, filing, drilling, tapping, cutting etc.	14
04	➢ To appreciate the importance of black smiths operations in engineering works ➢ To select the proper material and tools and processes required for the job undertaken. ➢ To identify and ➢ and use various marking, measuring, cutting, striking and inspection tools used in Smithy section	**SMITHY SHOP** 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. **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.	14

Assignments: ---------- 8 hours

A journal shall consist of one assignment each on the topics 1 to 4 mentioned above.

Each assignment shall consist of –

- Procedural steps in completing a given job
- Description with sketches of equipment/machinery used, write the specifications of equipment / machinery
- List of types of tools used in completing the job
- List of safety equipments used and safety rules observed

Notes:

1] The subject teacher should provide necessary theory inputs to students for all shops before start of practical sessions

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

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

4] Workshop Tool Manual at institute level shall be provided to the students

5] Distribution of 50 marks allotted for Tern Work will be as follows

For completion of job (acceptable standard) = 40 Marks

For assignments given = 10 marks.

Guidelines for conducting Practical Examination for WORKSHOP PRACTICE 2nd semester

1. External examiner should be Workshop Superintendent or Teaching staff having 4-5 years of experience in teaching the work shop related subjects.
2. The job drawing must be jointly decided by the External and Internal examiner prior to one day in advance from the commencement of practical examination. Every student should be supplied the copy of job drawing before examination.
3. Time for practical hours should be of **two hours. OR (04)**
4. Practical examination of the students shall be from amongst the above 4 shops, ensuring the equal distribution of students in each shop. Students will perform the job as per allotted shop and as per the drawing provided to them.
5. Preferable Suggested specification of Jobs and its material are as follows.

- For carpentry any type of Carpentry joint made from 50 m.m, Breadth's 37m.m. Thick wood.
- For welding any type of welding joint made from 50 m.m, Bredth.x 37m.m. Thick M.S.Material.
- For Fitting any Male & Female joint with Drilling and Tapping operation. from 75 m.m, Bredth.x 6 m.m. Thick M.S.Material.
- For Smithy Section any job like Peg, Hook, Chisel, Bolt head etc. from 12 m.m. M. S. round rod.

Learning Resources:

1. **Books:**

Sr. No.	Author	Title	Publisher / Edition
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	H.S.Bawa	Workshop Practice	Tata McGraw Hill Publishers,New Delhi
04	Kent's	Mechanical Engineering Hand Book	John Wiley and Sons, New York
05	P. Kannaiah and K. L. Narayana	Workshop Manual	SCITECH Publications
06	Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021		

2. **CDs, PPTs Etc.:**

- Learning Materials Transparencies and CDs, CBT Packages developed by N.I.T.T.E.R. and other organizations

- Workshop Manual by P. Kannaiah and K. L. Narayana , SCITECH Publications

3. **Websites:**
   - Refer website www.npkauto.com for Workshop Tool Manual