MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

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

COURSE NAME : DIPLOMA IN FOOD TECHNOLOGY

COURSE CODE : FC

DURATION OF COURSE : 6 SEMESTERS **WITH EFFECT FROM 2014-15**

SEMESTER : FIRST **DURATION : 16 WEEKS**

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

SR. NO	SUBJECT TITLE	Abbre viation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									
				TH	TU	PR	PAPER HRS	TH (1)		PR (4)		OR (8)		TW (9)		SW (19100)
								Max	Min	Max	Min	Max	Min	Max	Min	
1	English $	ENG	17101	03	--	02	03	100	40	--	--	--	--	25@	10	50
2✶	Basic Science – Physics $	EPH	17102	02	--	02	02	50	100 40	25@	50 20	--	--	--	--	
	Basic Science – Chemistry $	ECH	17103	02	--	02	02	50		25@		--	--	--	--	
3	Basic Mathematics $	BMS	17104	04	01	--	03	100	40	--	--	--	--	--	--	
4	Principles of Food Preservation	PFP	19106	04	--	04	03	100	40	50#	20	--	--	50@	20	
5	Food Hygiene and Sanitation	FHS	19107	02	--	--	02	50	20	--	--	--	--	--	--	
6	Computer Fundamentals $	CMF	17002	01	--	04	--	--	--	50#*	20	--	--	25@	10	
	TOTAL			**18**	**01**	**14**	**--**	**450**	**--**	**150**	**--**	**--**	**--**	**100**	**--**	**50**

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

Theory and practical periods of 60 minutes each.

Total Marks **: 750**

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

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 and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code as mentioned.

✶ Basic Science is divided into two parts- Basic Physics and Basic Chemistry. Theory examination of both parts as well as practical examination of both parts will be conducted on separate days. Sum of theory marks of both parts shall be considered for passing theory examination of Basic Science. Similarly it is also applicable to practical examination. It is mandatory to appear theory and practical examination of both parts. Remaining absent in any examination of any part will not be declared successful for that examination head.

✶ **Candidate remaining absent in examination of any one part of Basic Science subject i.e. Physics, Chemistry will be declare as Absent in Mark List and has to appear for examination. The marks of the part for which candidate was present will not be processed or carried forward.**

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

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

COURSE NAME : DIPLOMA IN FOOD TECHNOLOGY

COURSE CODE : FC

DURATION OF COURSE : SIX SEMESTERS **WITH EFFECT FROM 2014-15**

SEMESTER : SECOND **DURATION : 16 WEEKS**

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

SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									SW (19200)
							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	50
2	Basic Food Chemistry	BFC	19207	04	--	04	03	100	40	50#	20	--	--	25@	10	
3	Food Microbiology	GMB	19208	04	--	04	03	100	40	25#	10	--	--	25@	10	
4	Engineering Mathematics $	EMS	17216	03	01	--	03	100	40	--	--	--	--	--	--	
5	Engineering Drawing	EDG	19020	02	--	02	--	--	--	--	--	--	--	50@	20	
6	Development of Life Skills $	DLS	17010	01	--	02	--	--	--	--	--	25#	10	--	--	
			TOTAL	**16**	**01**	**14**	**--**	**400**	**--**	**75**	**--**	**50**	**--**	**125**	**--**	**50**

Student Contact Hours Per Week: **31 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks **: 700**

@ Internal Assessment, # External Assessment, $ – Common to All Conventional Diploma, [ ] No Theory Examination.

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

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

Course Name : All Branches of Diploma in Engineering 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/FG/AA/SC/ FC/HM/PN/PC/ TR/ML

Semester : First

Subject Title : English

Subject Code : 17101

Teaching and Examination Scheme:

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

NOTE:

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

Rationale:

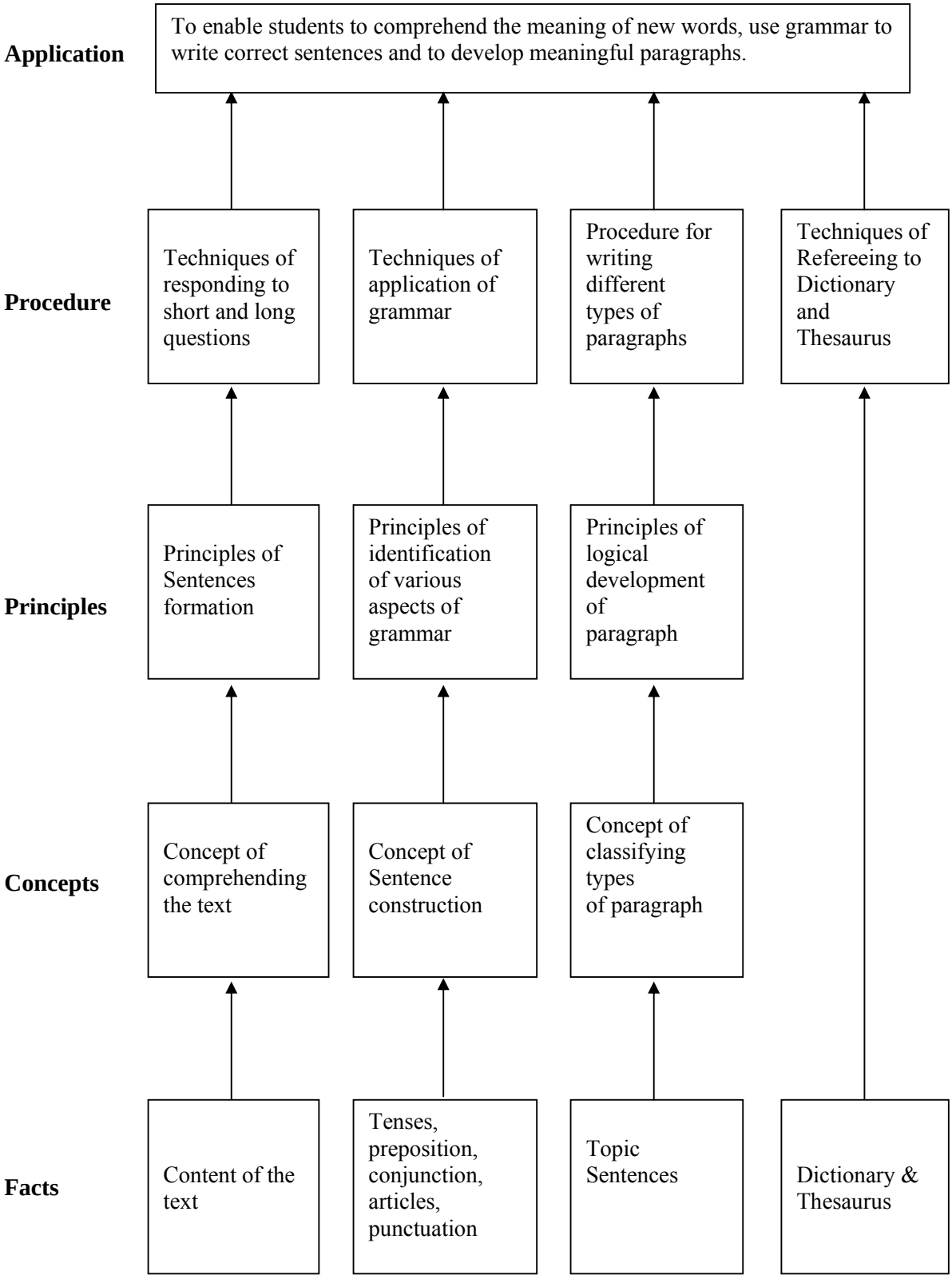
The most commonly used medium to express oneself is language. English, being a global language, is used in all the spheres of human life i.e., personal, professional and social. A diploma student is expected to be proficient in English language and pursue the existing course of study to handle the future jobs. The content of the text includes the aspects related to language skills.

General Objectives:

Students will be able to;

1. Develop vocabulary.
2. Apply the rules of grammar.
3. Comprehend the given unseen passage.

Learning Structure:



CONTENTS: Theory

Name of the Topic	Hours	Marks
PART I - Application of Grammar **Specific Objective**: ➢ Apply grammatical rules to form correct sentences. **Contents:** ▪ **Articles**: Appropriate use of definite and indefinite Articles ▪ **Prepositions**: To use correct Prepositions as per context ▪ **Conjunctions**: Co-ordinating and sub-ordinating Conjunctions ▪ **Tenses**: Correct usages of past, present and future tenses ▪ **Active and Passive voice**: Use of Active and Passive voice ▪ **Direct and Indirect sentences**: Conversion of direct into indirect sentence and vice versa	**12**	**24**
PART II – Text **Specific Objectives:** ➢ Answer the questions based on the articles ➢ State the meanings of the given words from the articles **Contents:** ▪ Articles	**20**	**32**
PART III - Paragraph Writing **Specific Objective:** ➢ Write a paragraph on a given topic **Contents**: ▪ **Paragraph Writing**: Elaborate and expand the ideas with cohesion, coherence and use of correct punctuation marks ▪ **Types of Paragraph**: Narrative, Descriptive, Technical, Comparison and Contrast ▪ **Dialogue Writing**: Based on various situations ▪ **Speech Writing based on situations:** Welcome Speech, Farewell Speech, Vote of Thanks and Introducing a Guest	**06**	**16**
PART IV – Comprehension **Specific Objective:** ➢ Comprehend and provide the answers on given passages **Contents:** ▪ **Comprehension of Passage**: Comprehending questions and writing the answers on unseen passages	**04**	**12**
PART V- Vocabulary Building **Specific Objective:** ➢ Use correct words in given situations **Contents**: ▪ Words Often Confused	**06**	**16**

▪ Collocation ▪ Prefix and Suffix ▪ Synonyms and Antonyms		
Total	**48**	**100**

Skills to be developed in practicals:

Intellectual Skills:

1. Select appropriate words/verbs and formulate correct sentences
2. Develop ability of correct pronunciation
3. Report writing skills

Assignments:

Journal consists of the following assignments:-

1. Punctuate 25 sentences given by the teacher.
2. Rewrite the passage/passages with correct form of verbs. [Teacher is expected to give passage /passages of verbs used wrongly [at least 25 verbs.]
3. Write 15 synonyms and 15 antonyms with the help of the thesaurus.
4. Write a paragraph each on descriptive, narrative, comparison, contrast and technical type in 75 to 100 words.
5. Write 10 words of prefixes and 10 words of suffixes and use them in sentences.
6. Select one news from any English newspaper. The news may be from any one of the following areas – Social, environmental, financial, economics, sports, etc. Prepare a summary of the news and make it presentable by using relevant photographs/graphics.
7. Students will be given ten collocations, develop three sentences for each collocation.

NOTE*:* The following assignment should be performed in the Language Laboratory/with the help of interactive media.

8. Listen and practice the dialogues with the help of interactive media/ interactive software.

Learning Resources:

Sr. No.	Title	Author	Publisher
1	MSBTE TEXTBOOK	----------	MSBTE
2	ESSENTIAL ENGLISH GRAMMAR	RAYMOND MURPHY	CAMBRIDGE
3	HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION	WREN AND MARTIN	S CHAND & CO.

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/FG/FC/PC/PN

Semester : First

Subject Title : Basic Science (Physics)

Subject Code : 17102

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)**
- **Students should compulsory appear for Basic Science (Physics) & Basic Science (Chemistry) theory examination. There should be combined passing for the subject (40/100). Remaining absent in any examination of any part will not be declared successful for that examination head.**
- **Students should compulsory appear for Basic Science (Physics) & Basic Science (Chemistry) practical examination. There should be combined passing for the subject (20/50). Remaining absent in any examination of any part will not be declared successful for that examination head**.

Rationale:

Physics is a foundation of all core technology subjects. Study of science and technology goes hand in hand. Technical knowledge can be gained more effectively using concepts of Physics. Curriculum of Engineering Physics includes fundamental concepts used in industrial applications.

Study of various properties of matter is helpful in the study of Strength of Material, Fluid mechanics, Fluid power etc., and selection of lubricant for machine parts. Property of Surface tension is applicable in Paint industry and capillarity phenomenon is useful in plumbing.

Thermal properties of matter are applicable in study of various core technology subjects like Thermal Engineering, Heat Transfer etc. Optical phenomena such as refraction and dispersion are required in higher study as well as in industry such as in characterization of material using Spectroscopy, X-ray diffraction (XRD), Atomic Force Microscopy (AFM).

Study of wave motion, Simple Harmonic Motion and their behavior is useful in field of Civil Engineering, Electronics & Communication Engineering, Mechanical Engineering and Electrical Engineering.

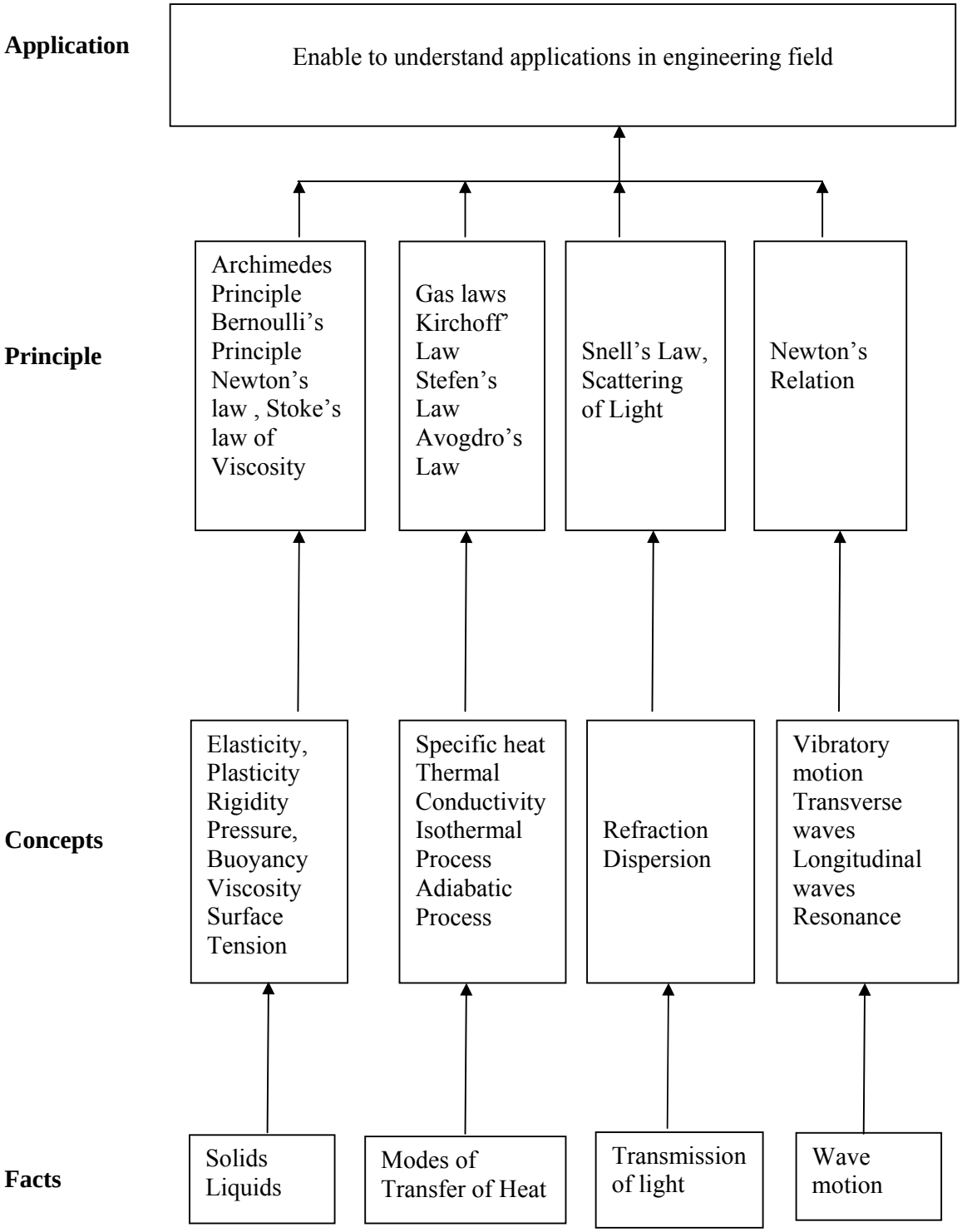
Principle of Photocell and its applications are required in study of Solar cells, Photovoltaic cells.

General Objectives: Student will be able to:

1. Understand method of selection of material for intended purpose.
2. Apply knowledge of good and bad conductors of heat in various engineering concepts.
3. Know the effect of interference between light waves.

4. Apply knowledge of characteristics of wave motion and resonance in engineering applications.
5. Apply Concept of photoelectric effect for applications like photovoltaic cell, Solar cell.

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1] Properties of solids: **Specific Objectives** ➢ Calculate the Young's Modulus of material of wire. • **Elasticity:** Definitions of deforming force, restoring force, elasticity, plasticity, Factors affecting elasticity. • **Stresses**: Tensile, Compressive, Volumetric and Shear stress, • **Strains:** Tensile, Volumetric and Shear strain. • Elastic limit, Hooke's law. • **Elastic co-efficient-** Young's modulus, bulk modulus, modulus of rigidity and relation between them • Stress -strain diagram, behavior of wire under continuously increasing load, yield point, ultimate stress, breaking stress, factor of safety. compressibility, Poisson's ratio.	**05**	**08**
Topic 2] Properties of liquids **Specific objectives:** ➢ Determine the surface tension of the given liquid ➢ Determine the coefficient of viscosity by Stoke's method. **2.1 Fluid friction: [8 Marks]** • Pressure , pressure-depth relation ($P = \rho h g$), atmospheric pressure, Pascal's law, Archimedes's principle. • Viscous force, definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its SI unit. • Streamline and turbulent flow with examples, critical velocity, Reynold's number and its significance. • Up thrust force, terminal velocity, Stokes law, and derivation of coefficient of viscosity by Stoke's method, effect of temperature and adulteration on viscosity of liquid. **2.2 Surface tension : [4 Marks]** • Cohesive and adhesive force, Laplace's molecular theory of surface tension, Surface Tension: definition and unit, effect of temperature on surface tension. • Angle of contact, Capillarity and examples of capillary action, derivation of expression for surface tension by capillary rise method, applications of surface tension.	**09**	**12**
Topic 3] Thermal properties of matter: **Specific objectives:** ➢ Distinguish between isothermal and adiabatic process. ➢ Determine the relation between specific heats. **3.1 Modes of transformation of heat : [6 Marks]** • Difference between heat and temperature, definition of calorie, Absolute zero, units of temperature: °C, °F,°K, with their conversion. • Conduction, law of thermal conductivity, coefficient of thermal conductivity, good conductors of heat & insulators with suitable examples, applications of conduction. Convection, applications of convection. Radiation, applications of radiation. **3.2 Gas laws: : [6 Marks]** • Gas Laws: Boyle's law, Charles law, Gay lussac's law (Statement and	**08**	**12**

mathematical equation only) • Perfect gas equation (PV=RT) (No derivation), specific heat of a substance , SI unit, specific heat of gas at constant volume (C_V) specific heat of gas at constant pressure (C_P), ratio of specific heat ,Mayer's relation between C_P and C_V ,isothermal process, adiabatic process, difference between isothermal process and adiabatic process.		
Topic 4] Optics **Specific objectives:** ➢ Calculate refractive index of prism. ➢ Determine the numerical aperture of optical fiber **Refraction of light : [6 Marks]** • Refraction of monochromatic light, Snell's law, Derivation of prism formula, total internal reflection, critical angle. • Optical fibre: principle, structure of optical fiber, propagation of light wave through optical fibre, derivation of numerical aperture and acceptance angle.	**04**	**06**
Topic 5] Wave motion **Specific objectives:** ➢ Differentiate between transverse waves and longitudinal waves ➢ Derive expression for displacement, velocity and acceleration of a body executing SHM **5.1 Wave motion : [6 Marks]** • Definition of a wave, wave motion, wave velocity, wave period, wave frequency, wave length, vibratory motion, periodic motion, amplitude of a vibrating particle, derivation of $v = n \lambda$ • Simple harmonic motion (SHM), examples of SHM, equation of SHM, expression of velocity and acceleration of a body executing SHM. • Types of progressive waves**:** transverse and longitudinal waves with examples. **5.2 Resonance: [6 Marks]** • Stationary wave, formation of stationary wave, examples of stationary wave, characteristics of stationary waves, free and forced vibrations with examples. • Resonance: definition of resonance, examples of resonance, formula to calculate velocity of sound by resonance tube method.	**06**	**12**
TOTAL	**32**	**50**

Practical:

Skills to be developed

1) **Intellectual skills-**
   - Select proper measuring instruments
   - Verify the principles, laws, using given instruments under different conditions.
   - Read and interpret the graph.
   - Interpret the results from observations and calculations.
2) **Motor skills-**
   - Handle the instruments.
   - Measuring physical quantities accurately.
   - Observe the phenomenon and to list the observations in a tabular form.
   - Plot the graphs.

List of experiments

1. Know your Physics Laboratory, measuring instruments and interpretation of graph.
2. Measure the dimensions of given objects using vernier caliper.
3. Measure the dimensions of given objects using micrometer screw gauge.
4. Determine Young's modulus of elasticity of metal wire by using Searle's apparatus.
5. Determine coefficient of viscosity of given liquid using Stoke's Method
6. Determine surface tension of liquid by capillary rise method using travelling microscope.
7. Determine the coefficient of thermal conductivity of copper by Searle's method
8. Determine refractive index of liquid by concave mirror.
9. Determine stiffness constant 'K' of a helical spring.

Learning Resources:

1. Reference Books:

Sr. No.	Title	Author	Publisher
01	Engineering Physics	B.L. Theraja	S. Chand Publishers – New Delhi
02	Engineering Physics	V. Rajendran	Tata McGraw-Hill Publications
03	Conceptual Physics	P. G. Hewitt	Pearson education (Tenth edition)
04	Physics- Std XI, Std XII	-	HSC board/CBSE Board
05	Engineering Physics	R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.

2. Websites:

http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
http://physics.info
http://inventors.about.com/od/xyzstartinventions/a/x-ray.htm
http://www.kettering.edu/physics/drussell/Demos/waves/wavemotion.html
http://physics.usask.ca/~hirose/ep225/anim.htm
http://hyperphysics.phy-astr.gsu.edu/hbase/geoopt/dispersion.html

3) Videos:

1. http://www.youtube.com/watch?v=u5AxlJSiEEs: Demonstration showing **surface tension** of water using screen
2. http://www.youtube.com/watch?v=v5h3h2E4z2Q Demonstration showing Photoelectric effect and Photo Cell
3. http://www.youtube.com/watch?v=42Qv8lkB-nM Demonstration showing viscosity of various liquids
4. http://www.can-do.com/uci/ssi2003/gas-laws.html Demonstration of various Gas Laws

4) CD:

Educational Cd of NCERT
Educational cd of Pearson education India

5) PPT:

www.slidehare.net/donpraju/photoelectriceffect-ppt
www.khanacademy.com

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/FG/FC/PC/PN

Semester : First

Subject Title : Basic Science (Chemistry)

Subject Code : 17103

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).**
- **Students should compulsory appear for Basic Science (Physics) & Basic Science (Chemistry) theory examination. There should be combined passing for the subject (40/100). Remaining absent in any examination of any part will not be declared successful for that examination head.**
- **Students should compulsory appear for Basic Science (Physics) & Basic Science (Chemistry) practical examination. There should be combined passing for the subject (20/50). Remaining absent in any examination of any part will not be declared successful for that examination head.**

Rationale:

Basic Chemistry is the basic science which is essential to all engineering courses. For an engineer, the usage of equipments and instruments would require knowledge of chemical substances, their composition and properties. Hence the content of this subject provides knowledge of engineering materials. This knowledge also aims to bridge the theoretical concepts and their practical engineering applications, thus highlighting the role of chemistry in the field of engineering. It helps in understanding chemical and physical properties of engineering materials.

The content of this curriculum has four units which provide the knowledge of chemical bonding, mechanisms of various applications of electrochemistry. It also provides in depth knowledge of extraction processes, properties and applications of metals and alloys. The non-metallic materials like plastics, rubber, insulators are the back bone of developing industries.

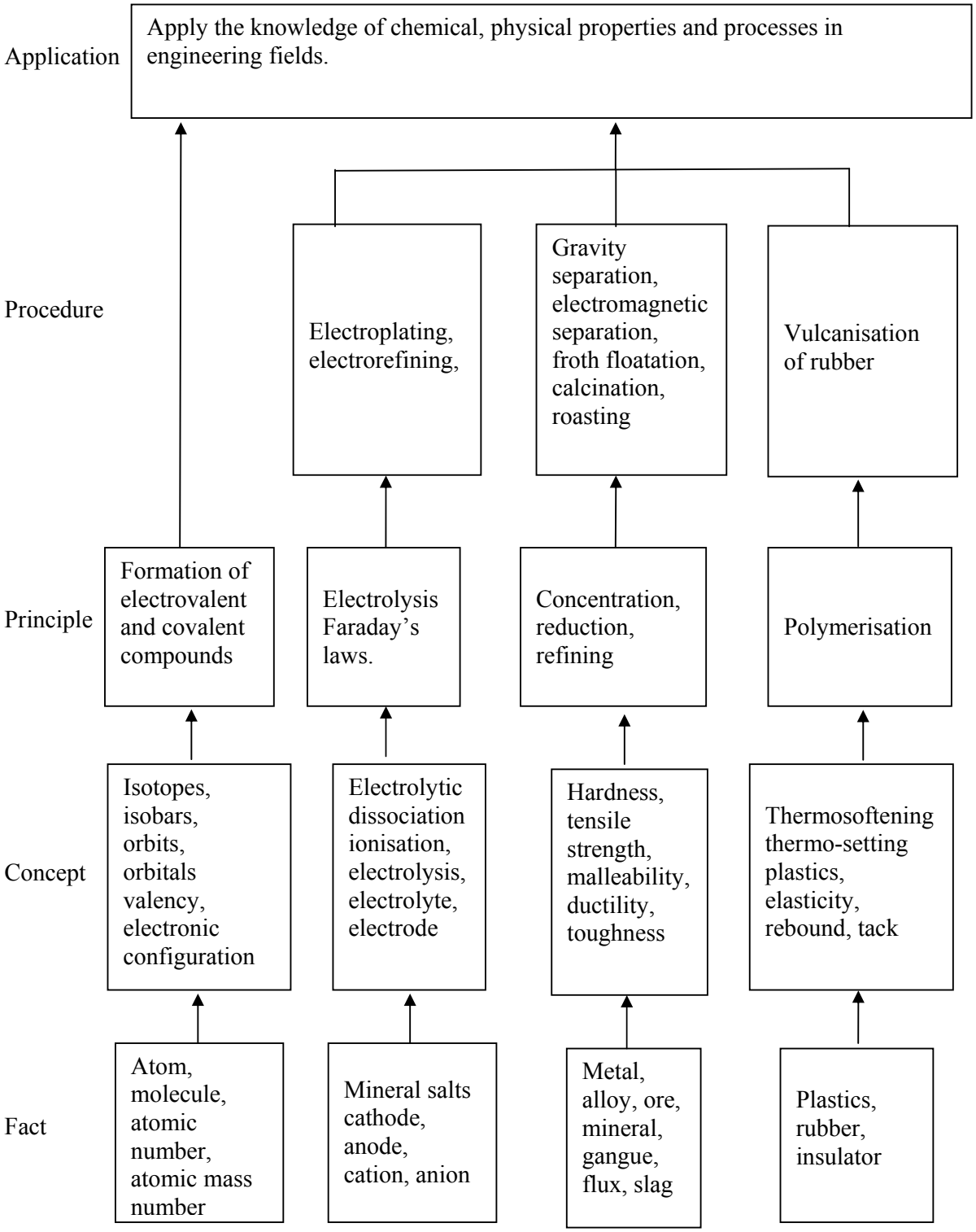
General Objectives:

The student will be able to

1. Know the concepts of valence electrons and valency of elements.
2. Apply the knowledge of electrolysis in engineering applications.
3. Understand the formation of various molecules.

4. Apply the properties of metals and alloys in engineering field.
5. Use non-metallic materials in engineering applications.

Learning Structure:



Theory Content:

Topic and Contents	Hours	Marks
Topic 1] Chemical Bonding: **Specific Objectives:** ➢ Predict valence electrons and valency of elements. ➢ Draw schematic diagram for formation of molecules. **1.1 Atomic Structure : [8 Marks]** • Definition of atom, Bohr's atomic model, structure of modern atom, characteristics of fundamental particles of an atom, definition of atomic number, atomic mass number and their differences, Isotopes and Isobars: Definitions, examples and distinction, applications of carbon and cobalt isotopes. Orbits: Bohr's energy levels, sub-energy levels, s, p, d, f orbitals, shapes and description of s-orbital and p- orbital. Distribution of electrons in orbitals: Definition of electronic configuration, Aufbau's principle, Hund's rule, orbital electronic configurations (s, p, d, f) of elements having atomic number 1 to 30, **1.2 Valency: [4 Marks]** • Definitions of valence electrons, valency. • Definition of electrovalency, positive and negative electrovalency, formation of Electrovalent compounds-MgO,$CaCl_2$ • Definition of covalency, single, double and triple covalent bonds, formation of Covalent compounds H_2O,CO_2,N_2	**08**	**12**
Topic 2] Electrochemistry: **Specific Objectives:** ➢ Describe the mechanism of electrolysis. ➢ Identify the role of electrodes in application of electrolysis. **2.1 Basic concepts of electrolysis: [4 Marks]** • Electrolyte, types of electrolyte- strong and weak electrolyte, their difference. • Ionisation and electrolytic dissociation, Arrhenius theory of electrolytic dissociation, degree of ionization, factors affecting degree of ionization. Definitions of electrolytic cell, electrodes-cathode, anode, electrode potential-oxidation potential and reduction potential. **2.2 Electrolysis: [10 Marks]** • Mechanism of electrolysis- Electrolysis, electrochemical series for cations and anions, • Mechanism of electrolysis of $CuSO_4$ solution by using platinum electrodes and copper electrodes • Applications of electrolysis- Electroplating of silver, electro refining of blister copper, • Faraday's laws of electrolysis: Faraday's first and second law, relation between electrochemical equivalent and chemical equivalent, Numericals. • **pH and pOH:** Definition of pH, pOH, pH Scale, Numericals.	**10**	**14**
Topic 3] Metals and Alloys: **Specific Objectives:** ➢ Identify the properties of metals and alloys related to engineering applications. ➢ Describe the process of extraction of metals. **3.1 Metals: [8 Marks]**	**08**	**12**

• Occurrence of metals in free and combined state, definitions- mineral, ore, gangue, flux and slag, metallurgy. • Metallurgy- Detailed Flow chart for extraction of metal, • Important extraction processes-Concentration-gravity separation, electro-magnetic separation, froth floatation, calcination and roasting, Reduction-smelting, aluminothermic process, Refining- poling, electrorefining • Mechanical properties of metals- Hardness, ductility, malleability, tensile strength, toughness, machinability, weldability, forging, soldering, brazing, castability. **3.2 Alloys: [4 Marks]** • Definition, purposes of making alloys with examples. • Preparation methods- Fusion, Compression • Classification of Alloys- Ferrous and non ferrous alloys with examples. • Examples of alloys- Composition, properties and applications of duralumin, Woods metal, babbit metal.		
Topic 4] Non-metallic Engineering Materials: **Specific Objectives:** ➢ Distinguish between thermosoftening and thermosetting plastics. ➢ List the properties of rubber ➢ State the applications of thermal insulators. **4.1 Polymers (Plastics, Rubber) : [8 Marks]** • Plastics: Definition of plastic, polymer, polymerisation, types of polymerisation with examples. Types of plastic- thermo softening plastics and thermosetting plastics and their difference, properties and applications of plastics. • Rubber: Types of rubber. • Natural Rubber- definition, drawbacks of natural rubber, vulcanization of rubber with chemical reaction, applications of vulcanized rubber. Synthetic rubber- definition, difference between natural and synthetic rubber, examples of synthetic rubber, properties of synthetic rubber like - elasticity, tack, and abrasion resistance, their definition and related applications. **4.2 Thermal Insulators [4 Marks]** • Thermal Insulators -Definition, characteristics of thermal insulators, classification- organic and inorganic thermal insulators, their examples, preparation, properties and applications of thermocole and glasswool.	**06**	**12**
Total	**32**	**50**

Practical:

Intellectual Skills:

1. Analyse given solution and to find the chemical properties of metallic and non-metallic ions.
2. Interpret the results of experiments or numerical values.
3. Understand the set up of the experiment.
4. Verify the laws and characteristics.

Motor Skills:

1. Handle various laboratory reagents.
2. Accurately measure proper quantity of various chemicals.
3. Observe correct colour of precipitate, evolution of gas.
4. Connect electrical circuit as per the circuit diagram.

5. Proficiently handle apparatus and equipments to perform experiments.
6. Observe the completion of reaction.

List of Experiments:

Sr. No.	Name of the experiment
1	Know your Chemistry laboratory and prepare sample solutions of different concentrations.
2	Determine the basic radical (metallic ion) and acidic radical (non-metallic ion) by qualitative analysis of given salt solution no-1.
3	Determine the basic radical (metallic ion) and acidic radical (non-metallic ion) by qualitative analysis of given salt solution no-2.
4	Determine the basic radical (metallic ion) and acidic radical (non-metallic ion) by qualitative analysis of given salt solution no-3.
5	Determine the basic radical (metallic ion) and acidic radical (non-metallic ion) by qualitative analysis of given salt solution no-4.
6	Determine the basic radical (metallic ion) and acidic radical (non-metallic ion) by qualitative analysis of given salt solution no-5.
7	Calculate the electrochemical equivalent of copper by electrolysis of copper sulphate solution using copper electrodes.
8	Determine pH value of given solutions by using pH paper, universal indicator and pH meter.
9	Prepare Phenol formaldehyde resin used in manufacturing of Bakelite plastic.

Learning Resources:

1. Reference books:

Sr. No.	Author	Name of the book	Publisher
1	Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
2	----	Engineering Chemistry	Wiley India Edition
3	B. K. Sharma	Industrial Chemistry	Goel Publication
4	S. S. Dara	Engineering Chemistry	S. Chand Publication

2. List of web sites/ Videos and animations:

Chemical Bonding
http://cas.sdss.org/dr6/en/proj/advanced/spectraltypes/energylevels.asp
http://en.wikipedia.org/wiki/Matter
http://en.wikipedia.org/wiki/Electron_configuration
http://www.chemguide.co.uk/atoms/propsmenu.html#top
http://www.chem1.com/acad/webtext/chembond/
http://www.footprints-science.co.uk/Chemistry.htm
http://www.youtube.com/watch?v=8tqfDE6vqcs&feature=related (Ionic Bonding)
http://www.youtube.com/watch?v=KjoQHqgzda8&feature=related (Chemical Bonding)
http://dwb4.unl.edu/chemAnime/ECONFIG/ECONFIG.html (electronic Configuration)
http://employees.oneonta.edu/viningwj/sims/atomic_electron_configurations_s1.html (electronic Configuration)

http://employees.oneonta.edu/viningwj/sims/atomic_electron_configurations_s2.html (electronic Configuration of Ions)
http://www.kentchemistry.com/links/AtomicStructure/PauliHundsRule.htm (Hunds Rule)
http://www.quimica3d.com/animations/en-21a.php (Orbital)
http://www.ausetute.com.au/lewisstr.html (Lewis Structure)
http://winter.group.shef.ac.uk/orbitron/AOs/2p/index.html (Atomic Orbitals)
http://ippex.pppl.gov/interactive/matter/molecule.html
http://www.kentchemistry.com/links/bonding/typesofBonds.htm (Chemical Bond)

Electrochemistry
http://en.wikipedia.org/wiki/Electrolysis
http://www.chem1.com/acad/webtext/elchem/
http://www.splung.com/content/sid/3/page/batteries
www.teachnet-uk.org.uk/...**Metals**/...**metals**/**Properties**%20of%20**Meta...**
http://www.authorstream.com/Presentation/aSGuest33360-286609-froth-flotation-Entertainment-ppt-powerpoint/
http://dwb4.unl.edu/chemAnime/index.htm
http://physchem.co.za/OB12-che/electrolysis.htm#copper (Electrochemistry)
http://www.mindzeit.com/chemistry.php

Metals and Alloys
http://en.wikipedia.org/wiki/Metal

Plastic and Rubber
http://www.tvo.org/iqm/plastic/animations.html# (Addition Polymerization)
http://www.tvo.org/iqm/plastic/animations.html# (Condensation Polymerization)
http://www.chemistryland.com/PolymerPlanet/Polymers/PolymerTutorial.htm (Plastic)
http://www.elmhurst.edu/~chm/vchembook/403rubber.html (Rubber)

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/FG/FC/AA

Semester : First

Subject Title : Basic Mathematics

Subject Code : 17104

Teaching and Examination Scheme:

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

Notes:

- **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:

Mathematics is the foundation of science and technology. The study of basic mathematics is helpful to understand concepts of Engineering. This subject enhances logical thinking capability. It also improves the systematic approach in solving engineering problem.

Algebra provides the language and abstract symbols of mathematics. It also helps to use that Language in real-life applications.

Matrix and Determinant topics are helpful for finding optimum solution of system of simultaneous equations which are formed in the various branches of engineering using different parameters.

Trigonometry is the study of triangles and angles.

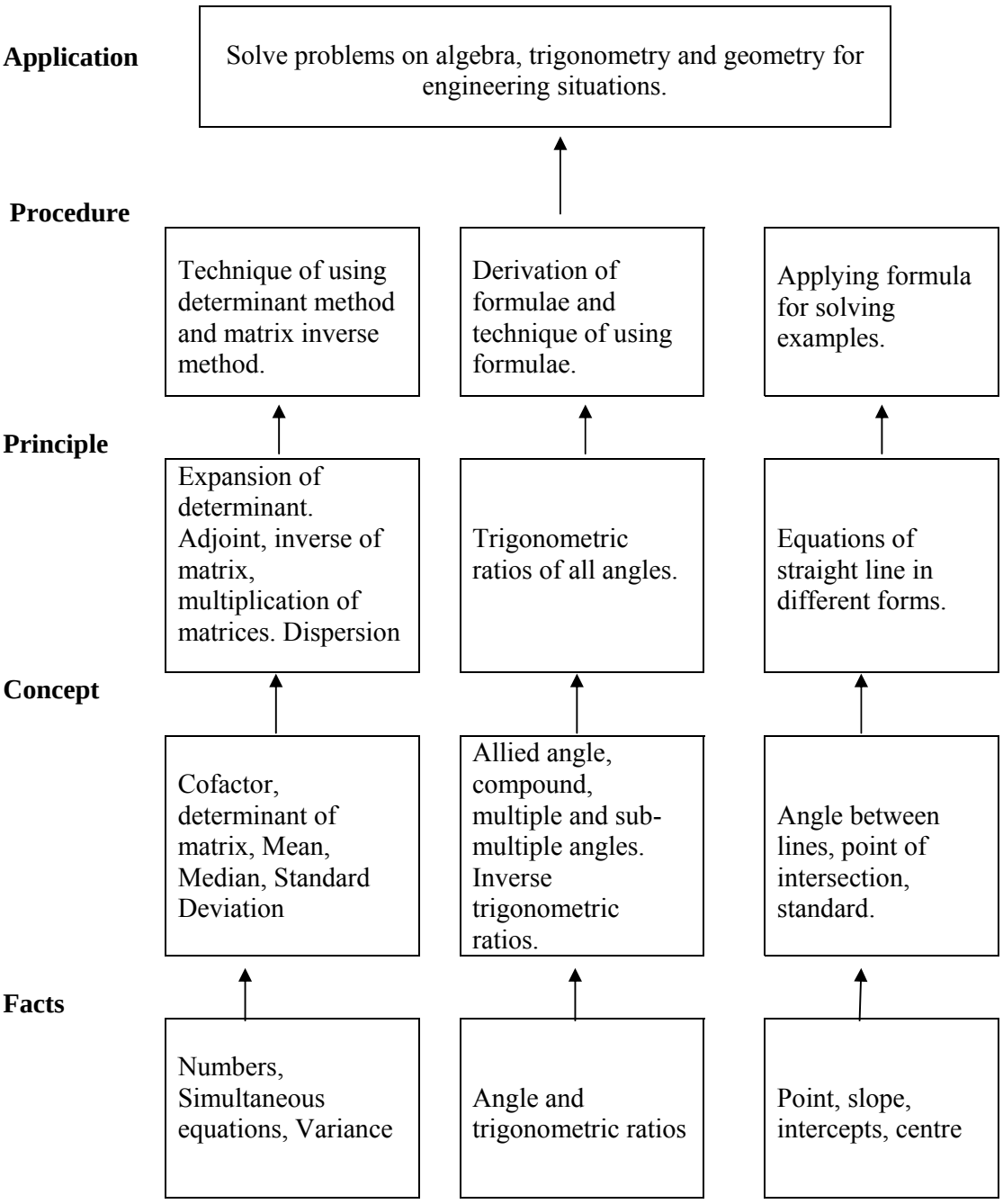
Geometry gives emphasis on understanding the deductive reasoning process. It includes writing derivations of theorems and giving geometric relationships by reasoning. Co- ordinate geometry plays an important role in Animation, AutoCAD, Computer graphics etc. Contents of this subject will form foundation for further study in mathematics.

General Objectives:

Student will be able to:

1. Apply Cramer's rule and matrix method to solve simultaneous equations in three variables.
2. Use concept of allied angle, compound angle, multiple and sub-multiple angles to solve engineering problems.
3. Use factorization and de-factorization formulae to solve examples.
4. Understand the relationship of two variables.

Learning Structure:



Theory

Topic and Contents	Hours	Marks
Topic - I Algebra		
1.1 -Determinant ---------- 04 **Specific objectives:** ➢ Solve simultaneous equations in three variables using Cramer's rule . • Definition and expansion of determinant of order 3 . • Cramer's rule to solve simultaneous equations in three variables.	**04**	**32**
1.2 - Matrices ---------- 16 **Specific objectives :** ➢ Perform all algebraic operations on matrices. ➢ Solve simultaneous equations in three variables. • Definition of a matrix of order m x n and types of matrices. • Algebra of matrices with properties and examples. • Transpose of a matrix with properties. • Cofactor of an element of a matrix. • Adjoint of matrix and inverse of matrix by adjoint method. • Solution of simultaneous equations containing two and three unknowns by matrix inversion method.	**10**	
1.3 -Partial Fraction ---------- 12 **Specific objectives:** ➢ Find partial fraction of proper and improper fraction. • Definition of fraction, proper, improper fraction and partial fraction. • Resolve proper fractions into partial fraction with denominator containing i) non repeated linear factors, ii) repeated linear factors, iii) non repeated quadratic irreducible factors. • To resolve improper fraction in to partial fraction.	**08**	

Topic 2- Trigonometry		
2.1 Trigonometric Ratios of Allied, Compound, Multiple and Sub-Multiple Angles ---------- 16 **Specific objectives:** ➢ Solve examples of allied angle, compound angle, multiple and sub-multiple angles. • Trigonometric ratios of any angle. • Definition of allied angle, compound, multiple and sub-multiple angles. • Trigonometric ratios of above angles with proofs. Simple examples	**10**	**40**
2.2 Factorization and De-factorization Formulae ---------- 12 **Specific objectives:** ➢ Derive factorization and de-factorization formulae to solve examples. • Formulae for factorization and de-factorization with proof and examples.	**08**	
2.3 Inverse Trigonometric Ratios ---------- 12 **Specific objectives:** ➢ Solve examples of inverse trigonometric ratios. • Definition of inverse trigonometric ratios. • Principal value of inverse trigonometric ratios. • Relation between inverse trigonometric ratios with proof and examples.	**08**	
Topic 3- Co –Ordinate Geometry		
3.1 Straight Line ---------- 16 **Specific objectives:** ➢ Solve problems with given condition. • Angle between two lines with proof. Examples. • Condition of parallel and perpendicular lines. • Point of intersection of two lines, equation of line passing through point of intersection with given condition. • Perpendicular distance between point and line with proof and examples. • Distance between two parallel line with proof and examples.	**10**	**16**
Topic 4 - Statistics		
4.1 Measures of Dispersion ---------- 12 **Specific objectives :** ➢ Find the range, mean deviation, standard deviation and consistency of any data. • Measures of dispersion - range, mean deviation from mean and median, and standard deviation. • Variance and its coefficient. Comparisons of two sets of observations.	**06**	**12**
Total	**64**	**100**

Tutorials:

Note: 1) Tutorials are to be used to get enough practice.

1) Make group of 20 students and for each group minimum 10 problems are to be given.

List of tutorial:

Sr. No.	Topic for tutorial
1	Determinant.
2	Matrices (Algebra of matrices)
3	Matrices (Adjoint , inverse and solution of equations using matrix inversion method)
4	Partial fraction.
5	Trigonometric ratio of allied, compound, multiple and sub-multiple angles.
6	Factorization and de- factorization formulae.
7	Inverse trigonometric ratios.
8	Straight line.
9	Statistics(Measure of Dispersion)

Learning Resources:

1) Books :

Sr. No	Title	Authors	Publication
1	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha.
2	Trigonometry	S. L. Loney	S. Chand Publication
3	Matrices	Ayres	Schuam series McGraw Hill
4	Higher Engineering Mathematics	B. S. Grewal	Khanna publication
5	Engineering Mathematics	S. S. Sastry	Prentice Hall of India

2) Websites :

i) www.khan Academy

Course Name : Diploma in Food Technology

Course Code : FC

Semester : First

Subject Title : Principles of Food Preservation

Subject Code : 19106

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	04	03	100	50#	--	50@	200

Notes:

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

Rationale:

The food preservation and storage has become increasing important today in progress of economical life. Without food preservation life as we know today would be impossible.

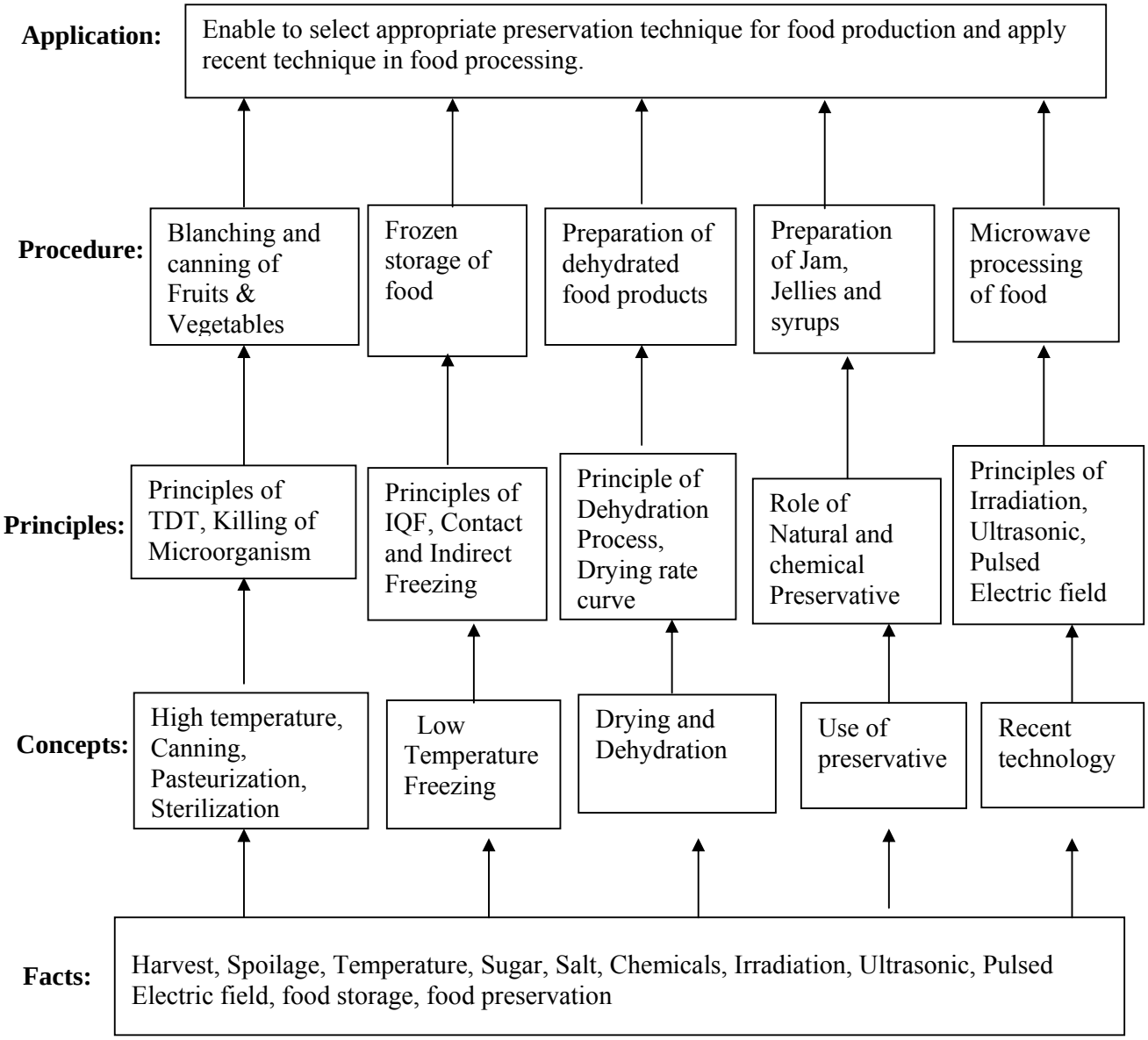
Knowledge and skills related to food processing and preservation are essential for the diploma holder in food technology. In this subject, students are exposed to various techniques of food preservation such as high temperature, freezing and thawing of food, moisture removal, chemical and radiation preservation. Relevant skills will also be imparted through this subject

General Objectives:

Students will be able to:

1. Understand principles of food preservation and Techniques' of Food preservation
2. Understand processing conditions during heat processing
3. Understand recent technique of food processing and its application.

Learning Structure:



Contents: Theory

Topic and Contents	Hours	Marks
Topic 1 : INTRODUCTION **Specific Objectives:** ➢ Define the related term in food technology. ➢ Classify the Food on the basis of spoilage ➢ State post harvest treatment in various food. **Contents:** 1.1 Introduction: (Marks-06) • Definition of food, food technology, food science, food preservation, Importance of food preservation and processing, classification of foods on the basis of shelf life Basic principles and methods of preservation 1.2 Post harvest and storage: (Marks-06) • Post harvest technology, Storage of various foods. . Different types of food spoilage (microbial, biochemical and physical) General principles underlying spoilage and its causes	08	12
Topic 2 : USE OF HIGH TEMPERATURE **Specific Objectives:** ➢ State the principle of food preservation by high temperature ➢ Give process conditions by high temperature processing of foods ➢ Draw process flow sheet of canning ➢ Draw thermal death time curve. **Contents:** • Thermal processing of foods, Thermal Death Time, Heat penetration, factors affecting heat resistance. (Marks-06) • Canning, Pasteurization and Sterilization- Principles, Method, advantages and disadvantages, Effects on foods (Marks-12)	10	18
Topic 3 : USE OF LOW TEMPERATURE **Specific Objectives:** ➢ State the Principle of food preservation by low temperature ➢ List freezing equipments with process parameter. ➢ Describe process of frozen storage of various food. ➢ Describe construction of freezing equipments **Contents:** • Low temperature required for different foods, types of freezer air blast freezer, multi-plate freezer, Immersion freezing and cryogenic freezing), advantages and disadvantages of freezing, frozen storage and thawing of frozen food (Marks-08) • Slow and quick freezing, IQF freezing. Processing of some frozen products (Frozen peas, fish, sea food sweet corn, resins, okra, eggs etc), freeze drying, (Marks-08)	10	16
Topic 4 : DRYING AND DEHYDRATION **Specific Objectives:** ➢ State the Principle of food preservation by drying ➢ Draw sketch of drying equipments ➢ Describe construction and working principles of various dryers. **Contents:** • Drying rate curve, Principle, methods of drying, dehydration	08	14

equipments (Cabinet dryer, tunnel dryer, spray dryer and vacuum dryer etc.) Dehydration of vegetables, fruits and fish , Effects on foods		
Topic 5 : USE OF PRESERVATIVES **Specific Objectives:** ➢ Classify preservatives and its use. ➢ Enlist Natural and Chemical preservative ➢ Draw process flow sheet of Jam, Jellies, Pickles and tomato sauces. **Contents:** • Classification of preservatives, Principles of preservation by salt, sugar and Acids preparation of Pickles, Jams, Jellies, Syrups, Tomato sauces and ketchup. (Marks-14) • Use of chemical preservatives- benzoic acid, Sorbic acid, sulphur dioxide, acetic acid, lactic Acid and others (Marks-08)	16	22
Topic 6: RECENT TECHNOLOGY OF PRESERVATION. **Specific Objectives:** ➢ Give advantages and limitation of Irradiation. ➢ State the principles of Ultrasonic processing & Pulsed Electric. **Contents:** 6.1 **Irradiation**- Principle, uses, dose levels, Advantages and disadvantages (Marks-04) 6.2 **Other methods**: Principles Uses, Advantages of High pressure processing technology, Non thermal Processing, Ultrasonic processing, Pulsed Electric, Magnetic field in food processing (Marks-14)	12	18
Total	**64**	**100**

Practical:
Skills to be developed:

Intellectual Skills:

1. Proper selection of preservative for food preservation
2 Proper selection of equipment & method of food preservation

Motor Skills:

1. Preparation of different food product by application of principles of food preservation.

List of Practical's:

1. Demonstration of Fruit and vegetable processing equipments.
2. Blanching of seasonal fruits and vegetables
3. Preservation of seasonal fruits and vegetables by Freezing.
4. Preservation of seasonal fruits and vegetables by dehydration.
5. Preservation of seasonal vegetables by Fermentation process. (Pickles)
6. Preparation and analysis of sugar syrup and brine
7. Preservation of seasonal fruits and vegetables by Canning process.
8. Preservation of foods using sugar and acid and heat e.g. Jam, jellies etc

9. Preservation of foods using chemicals and heat e.g. Tomato sauces / ketchup etc
10. Preservation food by using salt e.g. salted fish, meat etc.
11. Preservation food by using osmotic drying.
12. Observation Chilling injuries on fruits and vegetables by freezing process.
13. Visit any one Fruit / vegetable / fish processing Industry

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher & Address
1	Arun Behre, Arun Sharma	Food preservation by irradiation	--
2	Fennema and Owen	Principles of food preservation	Marcel Dekker Inc., New York
3	G.Subbulakshmi, Shobha A. Udipi	Food processing and preservation	New Age International Pvt. Ltd. Mumbai
4	N.W.Desoroiser	The technology of food preservation	The AVT Publishing C INC West Port Connecticut
5	Girdharilal, Sidhapa and Tandin	Preservation of fruit and vegetable	CFTRI Mysore
6	S.Ranganna	Handbook of analysis of fruits and vegetables	CFTRI Mysore
7	S. K.Kulshrestha	Food Preservation	---
8	Shirley J. VanGarde	Food preservation and safety principles and practices	Scientific publisher 2001

Course Name : Diploma in Food Technology

Course Code : FC

Semester : First

Subject Title : Food Hygiene & Sanitation

Subject Code : 19107

Teaching and Examination Scheme:

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

Notes:

- **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:

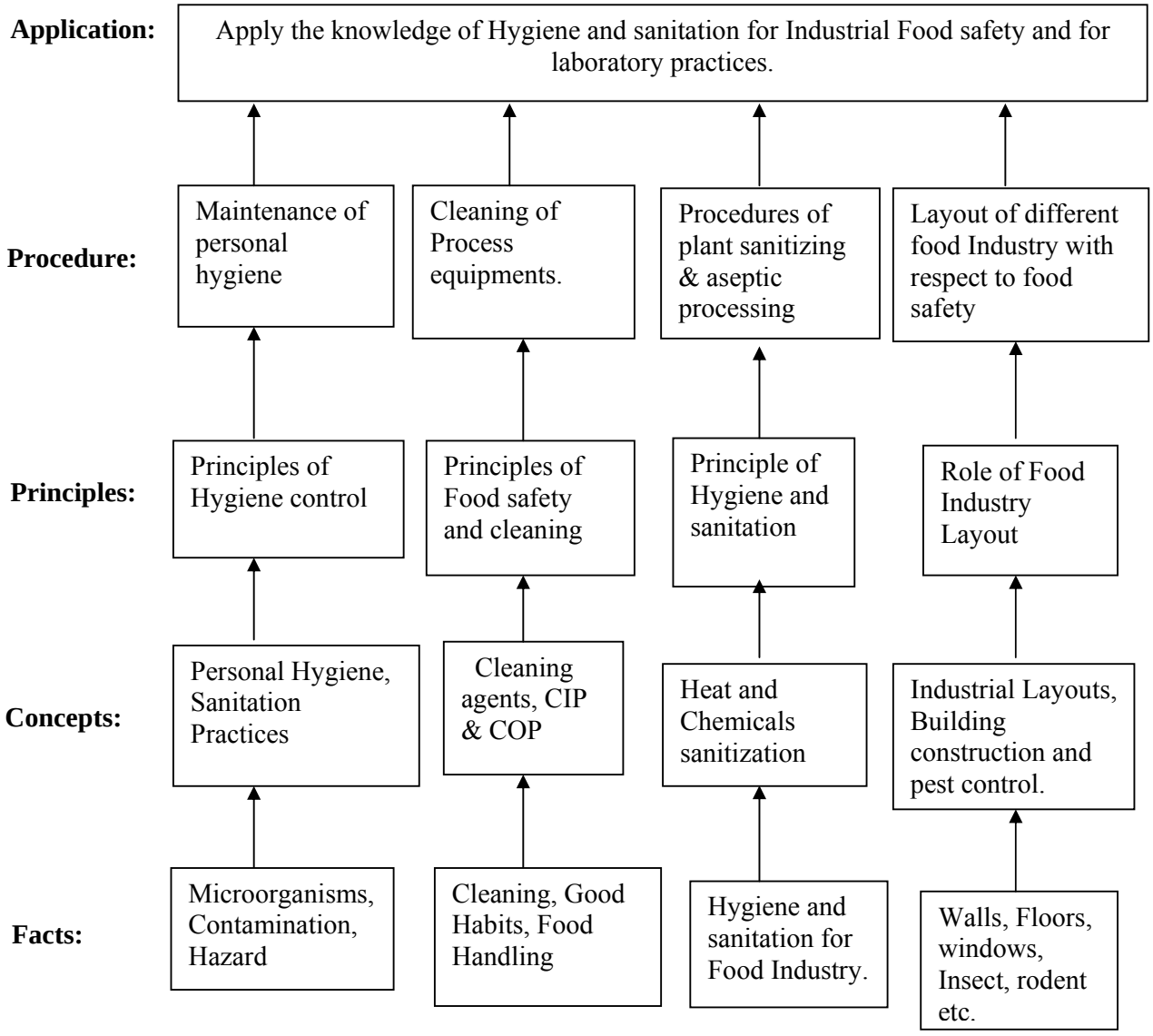
In spite of all the efforts made the number of food poisoning cases reported each year is on the increase at an alarming rate. Keeping in mind above fact it has become important that all food handlers understand and implement the basic principles of food sanitation to avoid food borne illnesses .Food technologist should understand the importance of personal hygiene, must acquire the skill for safest processing methods, plant sanitation practices and skill for managing waste disposal &treatment. This subject covers personal hygiene, aseptic &food processing &safe food handling, water treatment plant sanitation methods, waste disposal &treatment.

General Objectives:

The student will be able to,

a) Understand importance of hygiene and sanitation in food industry.
b) Understand the sanitation practices involved in food industry.
c) Understand hygienic food handling in all type of food operations

Learning Structure:



Contents: Theory

Topic and Contents	Hours	Marks
Topics 1: GENERAL PRINCIPLES OF HYGIENE Specific Objectives: ➢ Define the Cleaning, Food hygiene and sanitation ➢ State principle of food hygiene. ➢ Give the importance of Food hygiene Contents: • Importance of food hygiene and sanitation Definition & Importance of food hygiene, Nature of food hazard, Good hygiene control, Contamination of food and protective against contamination. • General principles of food hygiene viz. aseptic processing, packaging and storage,	04	06
Topics 2: PERSONAL HYGIENE AND FOOD HANDLING Specific Objectives: ➢ Give the importance of personal hygiene ➢ List for good hygienic practices. ➢ Know them clear their role in sanitary food handling. Contents: 2.1 **Personal hygiene (Marks-06)** • Necessity of personal hygiene, Personal appearance of food handler during food processing. • Sanitary practices-Bathing, hair, eyes, teeth, &mouth, hands, fingernails, jewelers, feet & footwear • Protective clothing &uniform Importance of rest ,exercise & recreation 2.2 **Food handling habits (Marks-06)** • List of Good habit of food handling(wearing aprons, mask, gloves, cap, cleaning hands before &after work) • List of Bad habits(coughing, sneezing, smoking, nose picking, handshaking, washing hands in sink used for food preparation, testing of food with spoon, chewing gum ,blowing on food or packaging material, use of dirty handkerchief) • Role of employee in sanitary food handling, Selection criteria of employee to work in food industry(Any five fact)	06	12
Topics 3:- CLEANING AND SANITIZING OPERATIONS **Specific Objectives:** • Identify the different processes that can be used to clean and sanitize • Describe procedures used to clean in food industry. **Contents:** **3.1 Cleaning (Marks-06)** • Principles of cleaning , cleaning agents and methods, CIP, Factors affecting cleaning, Detergents for cleaning, concentration of detergents and cleaning frequency **3.2 Sanitizing (Marks-06)** • Principles of sanitizing, Heat sanitation, Chemical sanitation and Cleaning Environment area	08	12

Topics 4: HYGIENE AND SANITATION IN FOOD SERVICE ESTABLISHMENTS **Specific Objectives:** • Types of hazards associated with food • Design and implementation of food safety management **Contents:** **4.1 Introduction (Marks-06)** • Sources of contamination, General Principles of Food Hygiene (GHP), Sanitization practices and procedures in food plant operations, legal aspects of food hygiene and sanitation **4.2 Planning, layouts and sanitation (Marks-06)** • Building construction consideration, processing and design consideration, Pest control and construction material-In fruit and vegetable Industry, meat and poultry Industry, bakery Industries and Dairy Industry. **4.3 Pest control-**Insect Destruction, Rodents, Birds, Cockroaches and use of pesticides **(Marks-04)**	10	16
Topics 5: SAFTY AT THE WORK PLACE **Specific Objectives** ➢ List types of accidents and their precautions Contents: • Introduction, How to accidents take place, Types to Accidents, common types of injuries, fire safety, fire extinguishers, Precautions to prevent accidents. General Practice in food laboratory.	04	04
Total	**32**	**50**

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	David McSwan, Nancy Rue, Richard Linton	Essential of Food Safety and Sanitation	Prentice-Hall Inc., New Jersey
02	Karla Longree, Gertrude Armbruster	Quantity Food Sanitation	John Wiley & Sons, New York
03	David A. Shapton, Norah F. Shapton	Principles and Practices for the Safe Processing of Foods	Butterworth-Heinemann Ltd., Oxford
04	S.C.Rangwala	Water Supply and Sanitary Engineering [Environmental Engineering]	Pradeep Publications, Anand 388 001
05	C. S. Rao	Environmental Pollution Control Engineering	Wiley Eastern Ltd., New Delhi
06	S. Roday	Food Hygiene &sanitation	Tata McGraw-Hill
07	Norman G.Marriot Robert B.Gravni	Principles of Food sanitation 5th edition	Springer

Websites: www.rsphi.org.uk/download. (Fundamentals of food hygiene for food industry.

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/FE/IC/IE/IF/IS/IU/FG/AA/ FC/GT/PN/SC/TR

Semester : First

Subject Title : Computer Fundamentals

Subject Code : 17002

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	04	--	--	50* #	--	25@	75

*** On Line Examination**

Rationale:

Since early 21st Century the use of Computer has been so rapidly that it is difficult to think of an area where computers are not being used. It is very desirable that everyone should have good knowledge of computer.

Main purpose of this subject is how to use a computer for basic needs. This subject covers application softwares like MS-Word, MS-Excel, MS- PowerPoint.

It is a gateway to wonderful world of information and part of various applications like business, academic, hospitals, construction, designing, chemical fields and many more.

Intellectual Skills:

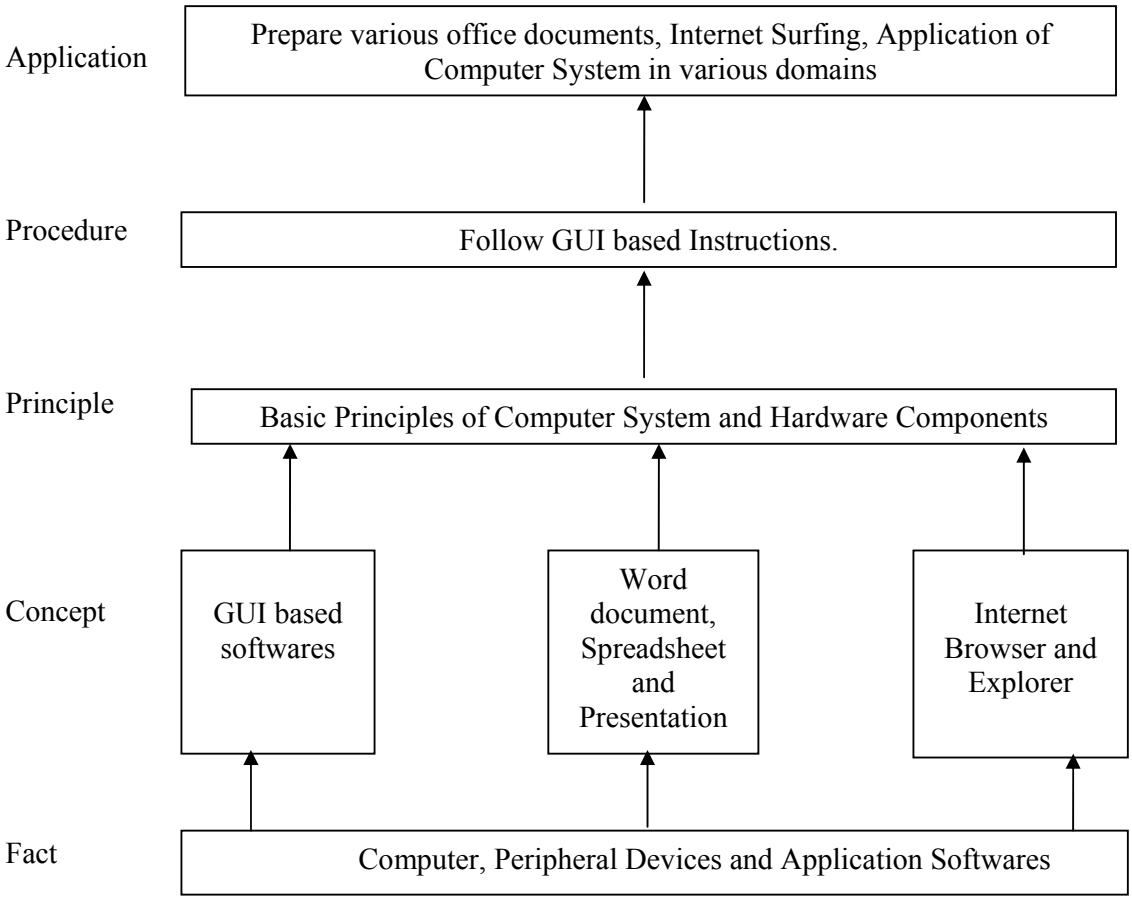
Students should be able to:

1. Use of Operating System.
2. Use MS- Word, MS-Excel, MS- PowerPoint, efficiently for documentation.
3. Use browser for accessing Internet.

Motor Skills:

Handle Personal Computer System.

Learning Structure:



Contents:

Note:

1. It is suggested that the separate batch should be formed for students having less computer background.
2. Contents of theory are to be taught in practical period with the help of LCD projector.

Sr. No	Activity/Topics	Hours
1	• **Algorithms**-Introduction, Three Basic Operations, Procedures and Programs	1
2	• **Data Representation-** Representing different symbols, minimizing errors, Representing more Symbols, Generic Formula, the ASCII code, the EBCDIC code, Rules of Decimal number System and its conversion to binary • **Multimedia-** Digital images, analog to digital conversions, digital audio and digital video	2
3	• **Binary Arithmetic-** binary addition, binary subtraction, multiplication and division • **Logic Gates-** The need for derived gates, Half adder, Full adder, Logical operations	2
4	• **Data Storage- memory-**Main Memory, Memory data transfer, MBR, Memory decoders -1x2,2x4…10x1024, MAR, Address, Data and Control Buses, Load and Store Instructions, Word and Word Length, RAM and ROM, Cache Memory • **Data Storage- Disk-** Memory Hierarchy, Disk basics – Cylinders, Tracks, Surfaces, Sectors, Relationship between logical and physical records, Disk Controller Architecture, Sector format, Formatting Process, Seek Time, Rotational Delay and Transmission time, The relationship between Application program, Operating System, Disk Controller and the actual disk, CDs, DVD • **VDU and Printers-**Human-computer interface, Keyboard, Raster Scanning, Frame Buffer, Basics of Graphics, Black and White/ Color Terminals, Text based terminals, LEDs/LCDs, Inkjet Printers, Laser Printer	3
5	• **Computer Architecture-**CPU Registers, Multiplexers, ALU, Instruction Format, Instruction Decoding, Instruction Execution Cycles • **Operating System-**Concepts of system calls, Multiprogramming, Concepts of Context Switch, Different Services of Operating System, Information Management , Process Management (Process states, Process State Transition, Process Scheduling), Memory Management (Fixed Partition, Variable Partition, Paging, Demand Paging)	2
6	• **Classification of Computers and applications-** Characteristics of Computers, What Computers can do, What computers can't do, Classification of Digital Computer Systems, Anatomy of a Digital Computer	1
7	• **Introduction to Computer** Usage of computer system in different domains like office, book publication, ticket reservation, banks etc. Components of PC – Mouse, keyboard, CPU, monitor, printers, scanners, modem, memory, sound cards, pen drives.	1

8	• **Introduction to Operating System(Windows 7)** Working with Windows desktop, icons, taskbar, menu bar options, My Documents, My Computer, Control Panel, Recycle bin Concept of drives, folders, files Windows accessories – Notepad, WordPad, paint, clock, calendar, calculator	**1**
9	• **GUI Based Software – MS – Office 2010** MS-Word – Opening menus, toolbars, opening and closing documents, clipboard concept MS – Excel – Working and manipulating data with excel, formulas, functions, chart and its types MS – PowerPoint – Working with PowerPoint and presentation ,Changing layout, Graphs , Auto content wizard ,Slide show, Animation effects, Normal, outline, Slide sorter, Reading view.	**2**
10	• **Internet** History of Internet, equipments required for Internet connection, browser (Internet Explorer, Mozilla and Firefox, Google Chrome)	**1**
	Total	**16**

List of Practicals / Activities

Sr. No	Practicals / Activities
1	• Demonstration of above peripheral devices to students
2	• Moving from one window to another window • Opening task bar buttons into a window. • Arranging icons on the desktop and create shortcuts.
3	• Creating folders and files. • Copy, rename, delete files and folders. • Moving folders and files from one drive to another drive.
4	• Create and edit notepad document. • Create and edit WordPad document. • Create paint file by using different drawing tools.
5	• Creating, editing, saving word document. • Entering and formatting text. • Paragraph formatting, use bullets and numbering. • Page formatting – page margins, page size, orientation, page break, headers and footers. • Create tables, insert, and delete rows and columns. • Printer installation and printing document. • Create and print mail merging address for envelop and letters.
6	• Create, open and print worksheet with page setup and print options. • Enter data and format cells. • Select, insert, delete cells, rows and columns. • Insert formulas, functions and named ranges in worksheet. • Create chart of different types.
7	• Create a simple text slide using formatting, Selecting a slide layout. And insert pictures & backgrounds. • Insert auto shapes, clip-arts and form group/un group objects from slides. Apply slide transitions and slide timings and animation effect for slide show
8	• Perform Internet connection.

	• Create own e-mail id, send and receive mail with attachment. • Searching information using search engine (Google, MSN, bing etc.) • Do Internet chatting and understand the chat toolbar. • Organize favorite websites in different browsers.

Learning Resources:

1. Books:

Sr. No	Author	Title	Publisher
1	Achyut Godbole	Demystifying Computer	TMH
2	Alexis Leon	Introduction to Computers	Vikas Publishing House
3	Vikas Gupta	Comdex Computer Course Kit (Windows 7 with Office 2010)	Dreamtech Press
4	Steve Schwartz	Microsoft Office 2010	Pearson
5	Elaine Marmel	Microsoft Project 2010 (Bible)	Wiley India
6	Preppernau Cox	Windows 7 Step by Step	PHI

2. Links:

1. http://www.psexam.com
2. http://www.gcflearnfree.org/office
3. http://www.softwaretrainingtutorials.com/ms-project-2010.php
4. http://www.7tutorials.com

List of Equipments/Tool:

Hardware Tools-

1. Computer System (Pentium –IV or higher version)
2. Printer
3. Modem
4. Pen Drive

Software Tools-

1. Windows- 7 (Operating System)
2. MS-Office 2010
3. MS- Project 2010
4. Internet Explorer/Mozilla/Chrome/Firefox

Guidelines for Online Exam:

1. Total duration for online examination is an hour.
2. There will be theoretical multiple choice questions.
3. There will be certain practical performance based questions.

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/AA/SC/FC/ML /PC/PN/SC/TR

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.

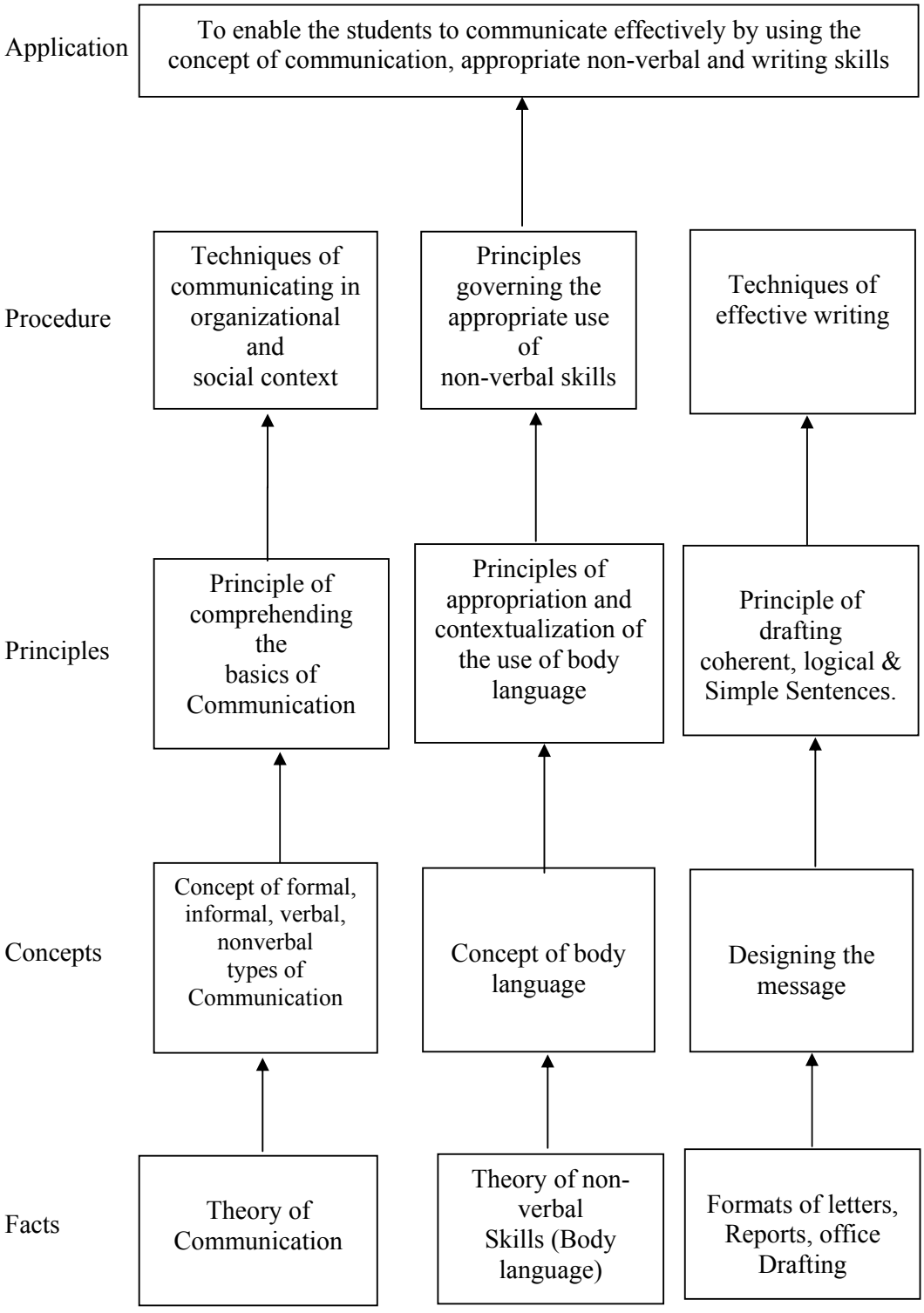
It will guide and direct to develop a good personality and improve communication skills.

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 • Haptics 3.3 Graphical communication [10 Marks]	08	28

• 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 Food Technology

Course Code : FC

Semester : Second

Subject Title : Basic Food Chemistry

Subject Code : 19207

Teaching and Examination Scheme:

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

Notes:

- **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:

Foods are complex substances composed of chemical constituents. Three major constituents of foods are carbohydrates, proteins and lipids. In addition, foods contain small amount of vitamins, minerals, pigments, flavoring substances and enzymes. Another important constituent of all foods is water, which is present in small or large quantities. These constituents give foods their structure, texture, color, flavor and nutritional value. Thus, knowledge of constituents of foods and their properties is important for the food technologist.

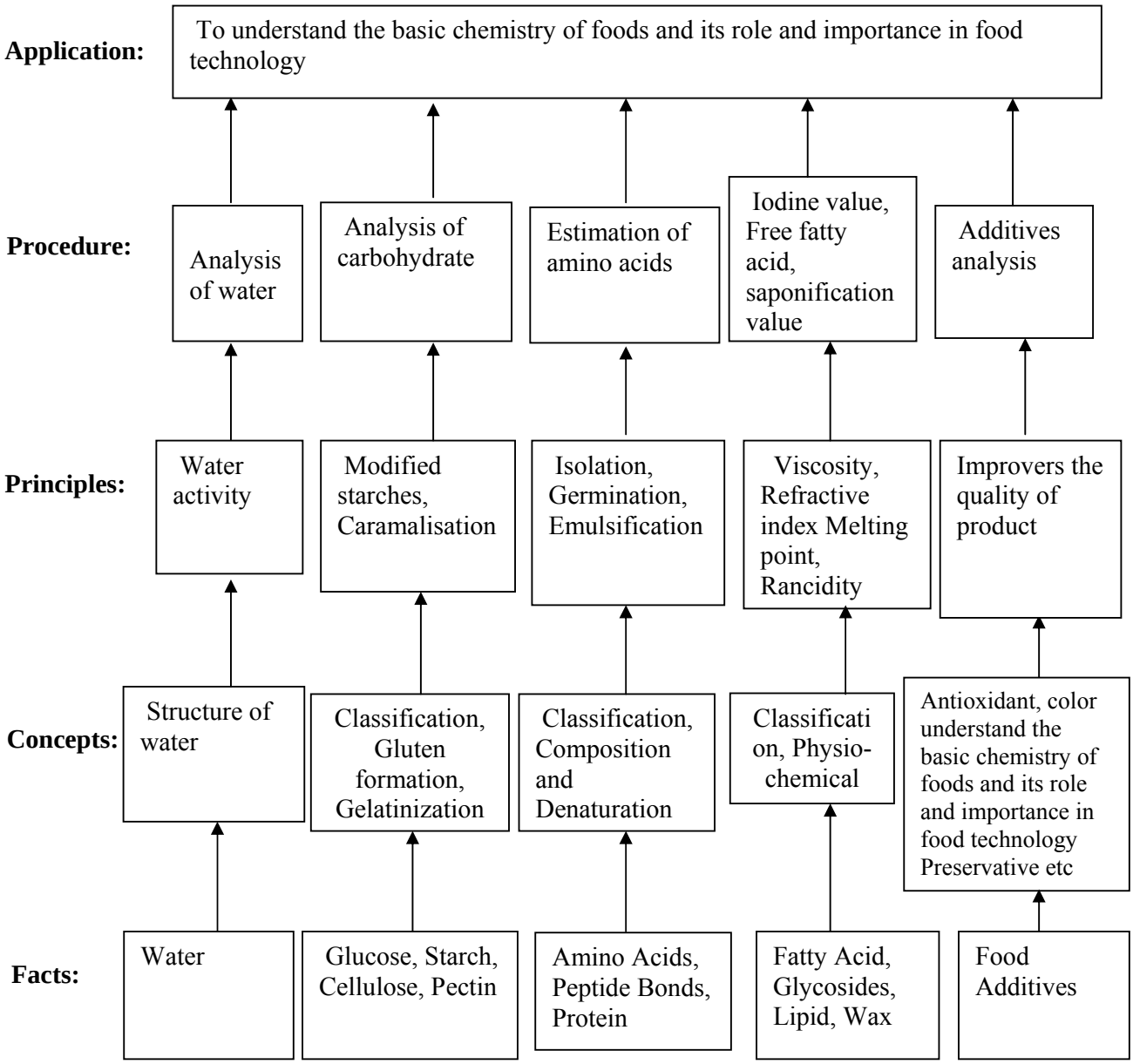
General objectives:

Students will be able:

- Analyze Chemical composition of food.
- Understand the chemistry of foods - composition of food, role of each component and their interactions

.

Learning Structure:



CONTENTS: Theory:-

Topic and Contents	Hours	Marks
Topic 1: WATER **Specific Objectives:** • State the physical properties of water • Sketch the structure of water **Contents:** • Physical Properties of water, Structure of water molecule, Bound water and water activity. Water activity and stability (shelf life) of food products.	04	06
Topic 2: CARBOHYDRATES **Specific Objectives:** • Classify the carbohydrates • Give the effectof chemical constituents in food • State the physico-chemical properties of carbohydrates **Contents:** **2.1** Chemistry of carbohydrate (Marks-10) • Classification and types of carbohydrates, Physico-chemical and functional properties of carbohydrates • Sugar- crystallization, Inversion, Caramalization, Millard reaction 2.2 Gluten and Starch: (Marks-10) • Gluten formation- factors affecting gluten formation, selection of cereal mixture of flours for various preparation • Starch- Gelatinization, factors affecting gelatinization, retro gradation of starch, modified starches	14	20
Topic 3: PROTEINS & AMINO ACIDS **Specific Objectives:** • Define related terms in protein • Classify and give source of proteins • Isolation and identification of protein • State chemical changes in protein during processing. **Contents:** 3.1 Chemistry of Proteins: (Marks-10) • Classification, Physico-chemical properties, Classification of amino acids based on nutritional/physiological role and structure • Primary, secondary, tertiary & quaternary structure of protein, Role of protein in food products, Amphoteric nature, Hydration, Denaturatuion, coagulation and gel formation • Isolation, identification, purity of proteins 3.2 Protein food (Marks-10) • Pulses and legumes Effect of soaking, germination, fermentation on proteins • Milk - effect of heat, acid, alkali and enzymes on proteins • Egg- properties and role of protein- Binding, coating, leavening, emulsifying & glazing agent, • Meat, Fish & poultry- factors affecting tenderness of meat.	14	20

Topic 4: LIPIDS **Specific Objectives:** • State the physico-chemical properties of lipids • Distinguish between saturated and unsaturated fatty acids • Define rancidity and state chemistry of rancidity **Contents:** • Composition, types and sources • Chemistry of fatty acids and glycerides, MUFA, PUFA & nutritional significance Physical characteristics- melting point, plasticity, smoking point, flash point, viscosity, refractive index, density, Functional properties of lipids in foods • Rancidity- Hydrolytic & oxidative, prevention of rancidity, Reversion	12	18
Topic 5: PIGMENTS AND COLOURS **Specific Objectives:** • Enlist colour pigments and their soures in food. • Describe the Physico-chemical properties of pigments • Draw the structure of colour pigments **Contents:** • Chlorophyll, Myoglobin & Haemoglobin, Anthocyanins, Flavonoids, Tannins, Betalains, Quinons & Xanthones, Carotenoids, (composition, occurrence, effect of heat, alkali) nutritional significance of β-carotein (provitamin A activity) (Marks-12) • Enzymatic Browning, Changes during ripening, Meat pigment and colour changes during processing (Marks-04)	08	16
Topic 6: FOOD ADDITIVES **Specific Objectives:** • Describe the chemistry and functions of food additives • Classification, chemical composition , uses and role of additives **Contents:** • Introduction, role and amount to be added of additives - Antioxidants, Coloring and Flavoring agents, Chelating agents, Curing agents, Stabilizers and Thickeners, Emulsifiers, Flour improvers (Marks-10) • Humectants and Anticaking agents, Leavening Agents, Non-nutritive sweeteners**,** Preservatives such as sulphur dioxide and benzoic acid, Buffering agents (Marks-10)	12	20
Total	**64**	**100**

Practical:
Skills to be developed:

Intellectual Skills:

1. Understanding the composition of food, their structure and functional properties.
2. Analysis of carbohydrates, proteins and lipids.
3. To observe the browning reactions during processing.

Motor Skills:

1. To prepare different chemical reagents
2. Identification of types of carbohydrates present in foods.

List of Practicals:

1. Qualitative analysis of carbohydrates (glucose, fructose, sucrose and starch.)
2. Qualitative analysis of protein.
3. Determination of reducing and non-reducing sugar.
4. Quantitative estimation of amino acid.
5. Estimation of protein by Kjeldahl method.
6. Estimation of carbohydrates e.g. Sucrose, starch etc.
7. Determination of iodine value.
8. Determination of saponification value.
9. Determination of peroxide value.
10. Qualitative determination of chlorophyll.

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01	Join M Deman	Principles of food chemistry	Springer publisher
02	Hement Panwar	Food chemistry	Neha Publisher and distributors
03	Frank lee	Basic food chemistry	Springer publisher
04	Owe R. Fennema	Food Chemistry	Marcel Dekker inc., New York
05	David H Wastson	Food chemistry safty	--
02	Maney Shakuntala	Food, Facts and Principles	New age international (P) Ltd., New Delhi
03	Meyer L.H.	Food Chemistry	CBS Publication, New Delhi
04	DeMan, J.M.	Principles of Food Chemistry	AVI, NewYork

2.

Course Name : Diploma in Food Technology

Course Code : FC

Semester : Second

Subject Title : Food Microbiology

Subject Code : 19208

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	04	03	100	25#	--	25@	150

Notes:

- **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:

Foodstuffs by their very nature provide ideal media in which all types of microorganisms can grow. It is essential for the food technologist to understand the factors influencing microbial growth in order to harness and encourage desirable organisms, and to discourage and destroy those organisms that have deleterious effect on food substrates.

There are enormous annual issues of food materials, throughout the world, which are attributable directly to spoilage by the action of "microorganisms". Such losses may have far reaching economic and political results as for example, the great potato blight in Ireland during the nineteenth century.

Many bacteria, fungi and viruses cause food poisoning infections and information which may vary in severity from the very mild to the fatal.

On the credit side, there are many microorganisms whose metabolic processes have contributed the production of foods and beverages from the earliest times. Food commodities such as bread, fermented milk and vegetables and alcoholic beverages have a significant place in the diet of today. Knowledge of the organisms responsible for such products is essential to improve or control the quality of such foods. Newer foods and food processes may depend on the use of microorganisms, the production of "single cell" protein and fermented foods being typical examples. Additionally, the use of microorganisms for the utilization of food processing waste has the greatly the food industry on economic grounds and the community at large on ecological grounds.

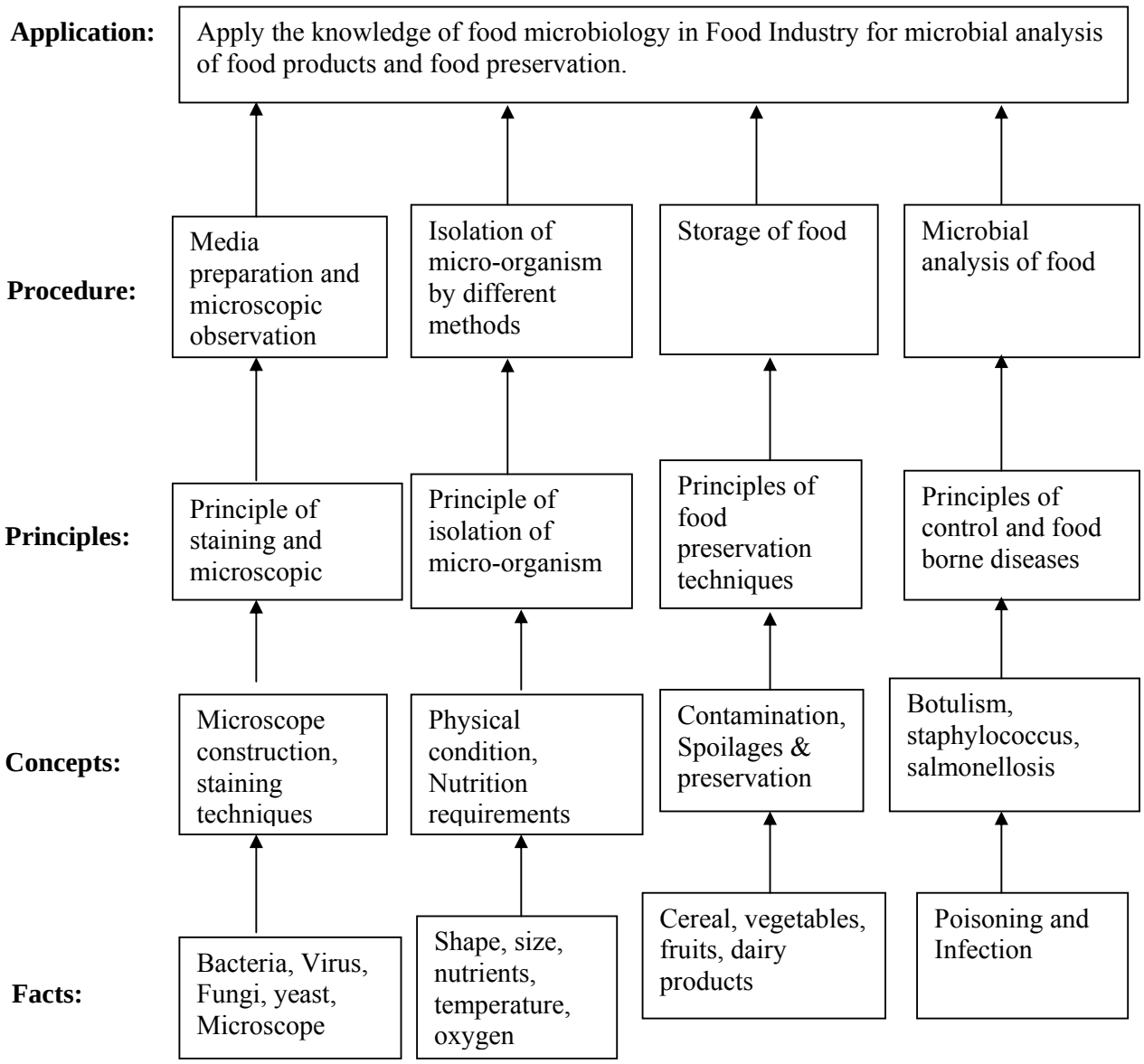
An application of microbiology is therefore essential to food technologists if they are to control or exploit the natural metabolic to the community.

General objectives:

Students will be able:

1. Know the important genera of microorganisms associated with food and their Characteristics.
2. Understand the role of microbes in fermentation, spoilage and food borne Diseases

Learning structure:



Contents: Theory

Topic and Contents	Hours	Marks
Topic 1 : GENRAL MICROBIOLOGY INTRODUCTION **Specific Objectives:** ➢ Sources of microorganism ➢ Classify microorganisms **Contents:** • History of microbiology, microorganisms and men(Louis pasture, Robert Koch and Leeuwen hoke) • Classification of microorganisms: Bacteria, Yeast Fungi, Algae, Protozoa, Viruses	10	12
Topic 2 : MICROSCOPY **Specific Objectives:** ➢ Interpret microscopic observation. ➢ Preparation of different stain and microbial analysis ➢ Identification of microorganisms. **Contents:** **2.1 Microscope:** (Marks-10) • Definition of microscope, types, construction and working of simple and compound microscope, comparison of different types of Microscope, methods of microscopic examination 2.2 Staining Techniques: (Marks-10) • Staining techniques –Definition, types, preparation of simple stain, gram positive stain, gram negative stain, acid fast stain.	10	20
Topic 3 : MORPHOLOGY AND PHYSIOLOGY OF BACTERIA **Specific Objectives:** ➢ Describe Morphological characteristics of microorganisms ➢ Describe physiology of microorganisms ➢ State growth Curve and its factor affecting. **Contents:** 3.1 Morphological of bacteria: (Marks-08) • Size , shape, and arrangement of bacterial cell, Drawing of major structure of bacterial cell wall 3.2 Physiology of bacteria: (Marks-16) • Nutritional requirement (Definition of phototrophs, chemotrophs, Autotrophs & Heterotrophs) • Physical condition required for growth -Temperature, gaseous requirement and P^H. (Aerobes & Anaerobes, microaerophilic, emosynthetic saprophytes &, parasites, pychrophiles, mesophiles and thermophiles) • Isolation of Pure culture –Streak plate technique, pour plate technique and spread plate technique Methods of isolation of pure culture.	12	24

Topic 4 : CONTAMINATION, SPOILAGE AND PREVENTION **Specific Objectives:** ➢ State different sources of food contamination ➢ List types of spoilage and preservation of food **Contents:** • Contamination, source, , spoilage causative agents and prevention of **a.** Cereal and cereal products (Marks-06) **b.** Dairy and dairy products (Marks-06) **c.** Vegetables and fruits (Marks-08) **d.** Canned foods (Marks-04)	20	24
Topic 5 : FOOD POISONING AND FOOD BORNE DISEASES **Specific Objectives:** ➢ State different sources of food Poisoning and infections ➢ State Bacterial food infection and food borne diseases **Contents:** • Bacterial - Botulism, Staphylococcus aureus, Salmonellosis, Bacillus cereus, Escherechia coli, Vibrio etc. Mycotoxins, Viral diseases • Difference between food poisoning and food infection • Air borne diseases and Water borne diseases	12	20
Total	**64**	**100**

PRACTICAL:
Skills to be developed:

Intellectual Skills

1. Understand the morphological structure of microorganisms.
2. Understand the instruments for microorganism identification.
3. Know use of microscope to observe micro organisms..
4. Enable the students to gain and inside into aspect of food microbiology

Motor Skills

1. Prepare different microbial media, their sterilization, incubation and inoculation with great care
2. Perform the staining ~~methods.~~
3. Use advance techniques in microbial food analysis.

LIST OF PRACTICALS:

1. Handle of some laboratory instruments, their requirement, use and care – Incubator,
2. Autoclave, Inoculating chamber, etc.
3. Sterilization of glassware.
4. Preparation and sterilization of standard media.
5. Plating techniques, viable counts and total counts.
6. Microscope construction, working, maintenance.
7. Microscopy of standard cultures-bacilli, cocci, fungi, yeasts, algae, protozoa.

8. Staining procedures:
    a) Simple
    b) Negative
    c) Gram
    d) acid-fast
    e) capsule
9. Microbial Examination of table, container and packaging material.
10. Microbial examination of following foods
    a) Cereal and cereal products
    b) Milk and milk products
    c) Meat and meat products

Learning Resources:

1. Books:

Sr. No.	Author	Title	Publisher
01	Michael Pelczar	Microbiology	Tata McGraw Hill, New York
02	James Jay	Modern Food Microbiology	C.B.S. Publishers, New Delhi
03	H.D. Kumar & Swati Kumar	Modern Concepts of Microbiology	Vikas Publishing House Pvt. Ltd., New Delhi
04	S.S.Purohit	Microbiology	Agro Botanical Publishers, Bikaner
05	Frobisher M. etal.	Fundamentals of Microbiology	C.B.S. Publishers, New Delhi
06	Banwart G.J	Basic Food Microbiology	AVI Publishing.
07	Adams M.R. and Moss M.O. 2000.	Food Microbiology	IInd Edition ,The Royal Society
08	Food CRC Press.	Microbiology and Analytical Methods,	Food CRC Press.
09	Willian C. Frazier	Food Microbiology	Tata Mc-craw Hill Publisher.
10	George J Banward	Basic food microbiology	CBS publisher New Delhi
11	Neelam Khetarpaul	Food Microbiology	Asta International Pub. Pvt. Ltd.
12	Adam M	Food Microbiology	Scientific International Pvt. Ltd Delhi

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

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.

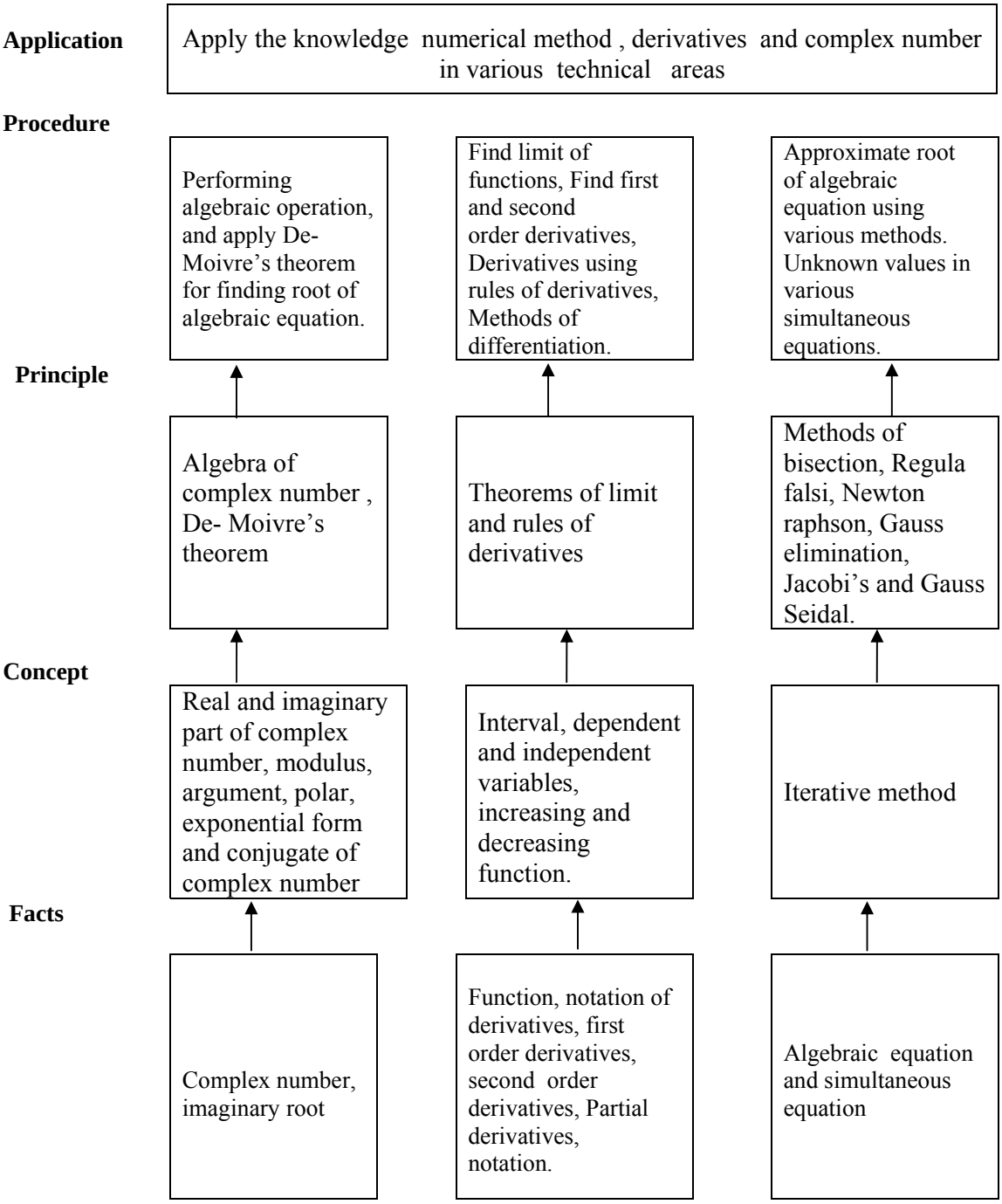
Numerical methods are used in programming as an essential part of computer engineering. For solution of problems in electrical circuits and machine performances complex number is used engineering mathematics lays the foundation to understand technical principles in various fields.

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 Food Technology

Course Code : FC

Semester : Second

Subject Title : Engineering Drawing

Subject Code : 19020

Teaching and Examination Scheme:

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

Rationale:

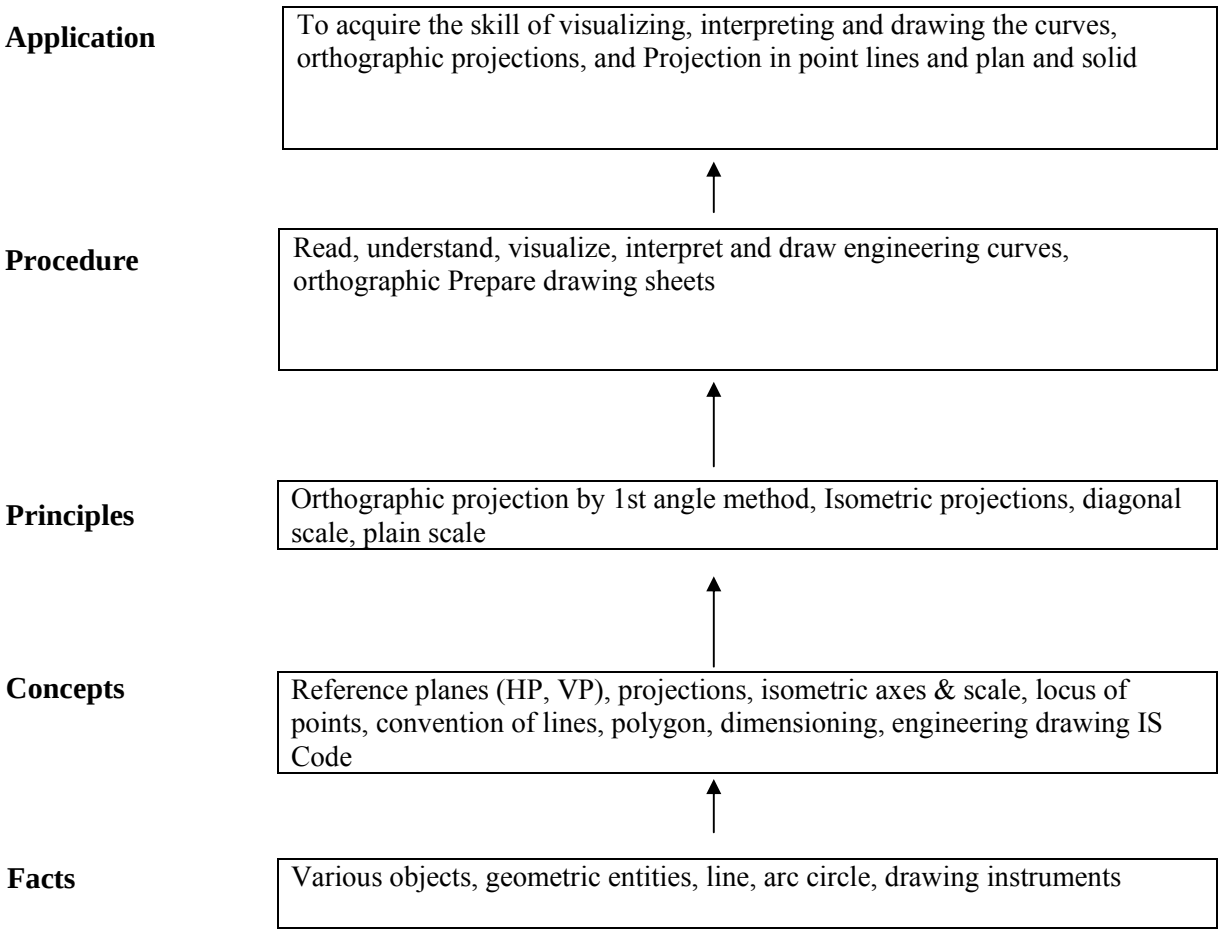
Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

General Objectives:

The student after studying this subject will be able to:

1) Draw different engineering curves and know their applications.
2) Draw orthographic projections of different objects.
3) Visualize three dimensional objects and draw Isometric Projections.

Learning Structure:



Contents: Theory

Topic and Contents	Hours
Topic 1: DRAWING OFFICE PRACTICE **Specific Objectives:** • Use Instruments for drawing & there applications. **Contents:** • Drawing instruments -T-Square, set squares, Draw the horizontal and vertical lines, draw different angles, mini drafter, compass, divider, scale, and protractor and drawing pencils. • Sizes and layout of standard drawing sheets, Sizes of drawing boards, Drafting table/board	03
Topic 2:DIFFERENT TYPES OF LINES AND LETTERING **Specific Objectives:** • Draw different lines and letters and their applications**.** **Contents:** **2.1 Different types of lines**. • Different types of Lines Different types of lines in engineering drawing as per BIS specifications Practice in free hand sketching of vertical, horizontal and inclined lines 2.2 **Lettering Techniques and Practice** • Instrumental single stroke (capital and inclined) lettering of 35 mm height in the ratios of 7:4 Instrumental double stroke lettering of 35 mm height in the ratio of 7:4, vertical, Free hand lettering (alphabet and numerals) lower case and upper case,	03
Topic 3: DIMENSIONING AND SCALES **Specific Objectives:** • Draw the different Scales and dimensions techniques **Contents:** **3.1 Dimensioning** • Necessity of dimensioning, terms and notations – methods and principles, dimensioning small simple objects **3.2. Scale** • Scales – their need and importance, Definition of representative fraction (RF); Find RF of a given scale, Types of scales, Construction of plain and diagonal scales	04
Topic 4:ENGINEERING CURVES **Specific Objectives:** • Draw Conic curves& know their applications • Draw curves from given data. **Contents:** • Ellipse –by one method • Parabolic- by one method • Hyperbola- by one method • Cycloid circle- by one method • Helix- by one method	08
Topic 5:ORTHOGRAPHIC PROJECTIONS **Specific Objectives:** ➢ Visualize, interpret & draw orthographic views simple objects. **Contents:** • Two-dimensional views vertical plane and horizontal plane, Conversion of	06

pictorial view into Orthographic Views (First Angle Projection Method Only) – elevation, plan and end view. • Procedure to draw orthographic and sectional views, draw simple object of orthographic views.	
Topic 5: PROJECTION OF LINES AND PLAIN AND SOLID **Specific Objectives:** ➢ Visualize, interpret & draw orthographic views simple objects. **Contents:** 6.1 Projection of lines • Lines inclined to one plane and parallel to the other and vice versa 6.2 Projection of Planes- • Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and parallel to the other or vice versa 6.3 Projection of solids- • such as Prism, Pyramid, Cylinder, Cone with axis parallel to one plane and inclined to another plane.	08
Total	**32**

Practical:

Skills to be developed for practical:

Intellectual skills:

1. Develop ability to solve problems on geometrical constructions.
2. Develop ability to differentiate between conic and curves
3. Interpret the given mechanisms and locus of points.
4. Interpret first angle projection method.
5. Interpret and able to solve problem on orthographic projection of given object.

Motor Skills:

1. Draw the geometrical constructions.
2. Draw different types of curves.
3. Draw orthographic projections by first angle projection method.

List of Practical:

1. Introduction of Engineering drawing - (two Sheet) Imperial Size Sheets

a) Draw the different types of line and letters

b) Draw the different types of dimension and scales.

2. Engineering curves - (one Sheet)

a) Three different curves are to be draw using any one method.

3. Orthographic Projections - (Total two Sheets)

Two simple objects by first angle projection method

a) Full orthographic views -One sheet

b) Sectional orthographic views–One sheet

4. Projection in point lines and plane and solid - (Total one sheets)

(Inclined to one reference plane)

Learning Resources:
Books:

Sr. No.	Authors	Title	Publisher
01	N. D. Bhatt	Engineering Drawing	Charotar Publishing House 2010
02	Amar Pathak	Engineering Drawing	2 Dreamtech Press, 2010
03	D. Jolhe	Engineering Drawing	Tata McGraw Hill Edu., 2010
04	M.B.Shah	Engineering Drawing	Pearson, 2010
05	P. S. Gill	Engineering Drawing	SK Kataria and sons, Delhi
06	Surjit Singh	A Text Book of Engineering Drawing	Dhanpat Rai and Co., Delhi

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/AA/FC/ML/PN /SC/TR

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.

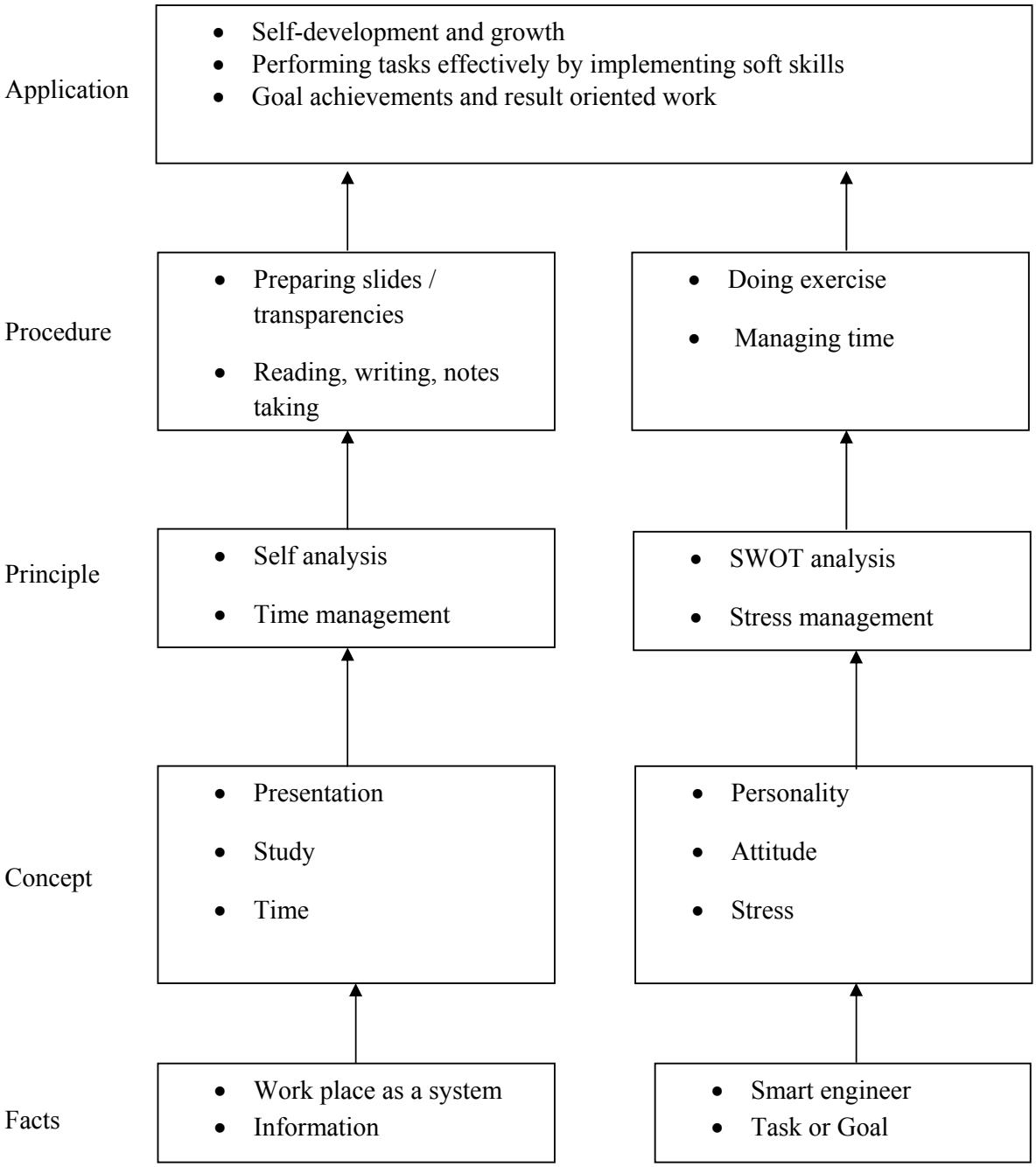
This subject aims to provide insights into various facets of developing ones personality in terms of capabilities, strengths, weakness, etc as well as to improve reading, listening and presentation skills. Also in this age fierce competition, the time and stress management techniques will immensely help 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: 5.1 Importance of presentation.	02

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