GUJARAT TECHNOLOGICAL UNIVERSITY
Diploma In Fire Technology
Semester: III

Subject Name: Fire (Applied) Chemistry - I

Sr. No.	Course Content
1	**Important Characteristics of Hazardous Chemicals** **1.1 Inorganic Chemicals** 1.1.1 Chlorine 1.1.2 Ammonia 1.1.3 Sulphur dioxide 1.1.4 Phosgene 1.1.5 Hydrogen Sulphide 1.1.6 Bromine 1.1.7 Carbon Monoxide 1.1.8 Hydrogen Fluoride 1.1.9 Caustic Soda 1.1.10 Sulphuric Acid 1.1.11 Hydrochloric Acid 1.1.12 Nitric Acid 1.1.13 Phosphoric Acid **1.2 Organic Chemicals** 1.2.1 Methyl Bromide 1.2.2 Vinyl Chloride 1.2.3 Ehtyl Bromide 1.2.4 Ehtyl Alcohol 1.2.5 Acetylene 1.2.6 Ethylene Oxide 1.2.7 Butadiene 1.2.8 Benzene
2	**Hazards, First-Aid & Medical Management** **2.1 Inorganic Chemicals** 2.1.1 Chlorine 2.1.2 Ammonia 2.1.3 Sulphur dioxide 2.1.4 Phosgene 2.1.5 Hydrogen Sulphide 2.1.6 Bromine 2.1.7 Carbon Monoxide 2.1.8 Hydrogen Fluoride 2.1.9 Caustic Soda 2.1.10 Sulphuric Acid

	2.1.11 hydrochloric Acid 2.1.12 Nitric Acid 2.1.13 Phosphoric Acid **2.2 organic Chemicals** 2.2.1 Methyl Bromide 2.2.2 Vinyl Chloride 2.2.3 Ehtyl Bromide 2.2.4 Ehtyl Alcohol 2.2.5 Acetylene 2.2.6 Ethylene Oxide 2.2.7 Butadiene 2.2.8 Benzene
3	**3.1 Elementary Thermodynamics** 3.1.1 System -Surroundings -Internal Energy -Enthalpy –Entropy 3.1.2 Free Energy -Adiabatic, Spontaneous & Non Spontaneous, 3.1.3 Processes -Thermodyemics -Zeroth, First & Second Law of 3.1.4 Thermodynamics -Limitation of First Law -Importance of Second Law 3.1.5 Carnote Theorem -Carnote Cycle **3.2 Thermo chemistry of Combustion** 3.2.1 Thermo Chemistry 3.2.2 Heat Capacity 3.2.3 Relationship between heat of reaction 3.2.4 Heat of Formation 3.2.5 Heat of Combustion 3.2.6 Energy of Ideal Gas 3.2.7 Thermodynamically Laws (First & Second) 3.2.8 Effect of Heat of Reaction i.e. The Kirchhoff Equation 3.2.9 Application of Kirchhoff Equation 3.2.10 Examples
4	**4.1 Respiratory Personal Protective Equipments** 4.1.1 Industrial Canister Type Gas Mask 4.1.2 Airline Respirator 4.1.3 Self Contained Breathing Apparatus 4.1.4 Environmental Classification for Selection of Respiratory Equipments 4.1.5 Classification of Respiratory Protective Equipments 4.1.6 Selection of Breathing Apparatus 4.1.7 Respiratory Protection Application 4.1.8 Limitations & Precautions 4.1.9 Maintenance & Check up of Equipments 4.1.10 Training & Education in Proper Use of Respirators
5	**5.1 Adiabatic Flame Temperature** 5.1.1 Maximum Reaction Temperature i.e Flame Temperature -Calculated Actual Flame Temperature

	5.2 Oxidation of Carbon & Combustion of Metals 5.2.1 Chemicals Mechanism of Combustion of Carbon 5.2.2 combustion of metal i.e. Mg, Ti, No, K, Li, Ca, Zn ,Al ,HF, Zr, Th, U & its Fire Prevention actions 5.2.3 Material Safety Data Sheet for Chemicals 5.2.4 Study of MSDS Format

Reference Books:

1. D.R.Varma, Agni Suraksha
2. Post H.S.C. Diploma inFire Service Engineering, NIFDEM-Nagpur
3. Safe handling of Hazardous Materials – A.K. Rohatagi -Mumbai
4. Physical Chemstry -- Atkins

Fire(Applied) Chemistry – I (Practical)

1. Flash point determination
2. Melting point
3. Separation of organics liquid
4. Partition Co-efficient
5. Fire point determination
6. Density determination.
7. Surfactant Analysis
8. Redox Exp.
9. Analysis of Explosives
10. Estimation of phenol
11. Estimation of Nitrate.
12. Study of smoke measurement.

Reference Books :-

1. Vogel's text book of inorganic analyses