SYLLABUS - DIPLOMA IN CHEMICAL ENGINEERING

- **Industrial Safety:** Chemical hazards, Safety symbols, Fire prevention & fire fighting, Personal Protective Equipment (PPE), Explosion hazards.
- **Environment & Pollution control:** Environmental acts and regulations, Pollution control equipments, Effluent treatment.
- **Reaction Kinetics:** Rate of reaction, Order and molecularity, Rate equations.
- **Basics and Types of reactors:** Batch reactor, CSTR, Plug Flow Reactor (PFR), Homogeneous & heterogeneous catalysis, Industrial catalysts.
- **Chemical Engineering Thermodynamics:** System, surroundings, Zeroth law, First law (closed & open systems), Second law, Heat engines & refrigerators, Enthalpy, entropy, Steam tables & Mollier chart (basics), Vapour compression refrigeration, Rankine cycle, Otto cycle and Diesel cycle.
- **Heat & Mass Transfer :** conduction, convection, radiation, Fourier's law, Heat exchangers, Overall heat transfer coefficient, Thermal resistance/Diffusion and Fick's laws. Dimensionless numbers, Nusselt number, Prandtl number.
- **Mass transfer :** Coefficients, Absorption, Distillation (basic principles), Drying fundamentals. Adsorption, liquid-liquid extraction, leaching operations.
- **Pumps & Pipings** : Centrifugal and reciprocating pumps, Valves and fittings, Piping layout – basics.
- **Chemical Process Principles:** Mole concept, Chemical equations, Limiting reactant, Percent yield and conversion.

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- **Material Balance:** Mass balance without reaction, Mass balance with chemical reaction, Recycle, bypass, purge systems, Forms of energy, Energy balance on closed and open systems, Sensible heat & latent heat.
- **Fluid Mechanics:** Properties of fluids, Fluid statics, Fluid flow: Laminar & turbulent flow, Reynold's number, Bernoulli's theorem, Flow measurement devices.
- **Applied Chemistry / Chemical Technology:** Atomic structure, Periodic properties, Chemical bonding, States of matter, Acids, bases, salts, pH scale & buffer solutions.
- **Industrial Chemistry:** Manufacture of Sulphuric acid, Ammonia, Fertilizers, Cement, Paper, Sugar, Ethanol.
- **Petroleum:** Properties of crude oil, petroleum exploration, cracking methods, ADU, VDU, Vis breaking, coking, hydrotreating, crude oil sweetening.
- **Environmental Chemistry:** Air, water, soil pollution, Waste management, Green chemistry principles.
- **Plant Utilities:** Steam generation, Boilers and compressors, Cooling towers, Compressed air systems.
- **Instrumentation:** Temperature, Pressure, Flow, Level, Control valves, Basic process, control loops, PID controller (concept).

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