

**GOVERNMENT POLYTECHNIC JAGATSINGHPUR**

**CHEMICAL ENGINEERING DEPARTMENT  
LESSON PLAN**

Discipline :- <b>CHEMICAL</b>	Semester:-4 <sup>th</sup>	Name of the Teaching Faculty <b>Dr. SUSHANTA KUMAR BEHERA</b>
Subject:- <b>Chemical Process Industries – I</b>	No of Days/per Week Class Allotted :-04	Semester From:- <b>January</b> To:- <b>May</b>
Course Code: <b>TH 4</b>		
<b>Week</b>	<b>Class Day</b>	<b>Theory/ Practical Topics</b>
1 <sup>st</sup>	1 <sup>st</sup>	<b>CHAPTER-1: CONCEPT OF UNIT OPERATION AND PROCESS</b> Introduction
	2 <sup>nd</sup>	Concept of unit operation & unit operation
	3 <sup>rd</sup>	General principles applied in studying an industries, types of flow sheet
	4 <sup>th</sup>	Economics in Chemical process and selection of optimization process
2 <sup>nd</sup>	1 <sup>st</sup>	Concepts of batch and continuous process
	2 <sup>nd</sup>	<b>CHAPTER-2: INDUSTRIAL GASES</b> Discussion on Hydrogen, industrial uses and its properties
	3 <sup>rd</sup>	Manufacturing process of Hydrogen from propane with a flow sheet.
	4 <sup>th</sup>	Properties, application and manufacturing of producer gas
3 <sup>rd</sup>	1 <sup>st</sup>	Properties, application and manufacturing of water gas
	2 <sup>nd</sup>	Properties, application and manufacturing of Properties and application and manufacturing of ammonia
	3 <sup>rd</sup>	Properties, application and manufacturing of carbon dioxide
	4 <sup>th</sup>	Properties, application and manufacturing of Acetylene
4 <sup>th</sup>	1 <sup>st</sup>	<b>CHAPTER-3: ACIDS</b> Introduction of acids and industrial uses
	2 <sup>nd</sup>	Properties, application of sulphuric acid
	3 <sup>rd</sup>	Manufacture of sulphuric acid by contact (DCDA) process
	4 <sup>th</sup>	Properties, application of Nitric acid
5 <sup>th</sup>	1 <sup>st</sup>	Manufacture of Nitric acid by Ammonia Oxidation or Ostwald's process.
	2 <sup>nd</sup>	<b>CHAPTER-4: CHLORO-ALKALI INDUSTRY</b> Introduction of chloro-alkali industry
	3 <sup>rd</sup>	Properties, application of soda ash
	4 <sup>th</sup>	Manufacture of soda ash by Solvay's process
6 <sup>th</sup>	1 <sup>st</sup>	Properties, application of caustic soda
	2 <sup>nd</sup>	Manufacture of caustic soda by electrolysis of brine
	3 <sup>rd</sup>	Different types of electrolytic cells with their advantages & disadvantages
	4 <sup>th</sup>	Major engineering problem to chloro-alkali industries
7 <sup>th</sup>	1 <sup>st</sup>	<b>CHAPTER-5: PULP &amp; PAPER INDUSTRY</b> Introduction to pulp and paper
	2 <sup>nd</sup>	Manufacture of pulp by sulphate process

	3 <sup>rd</sup>	Manufacture of pulp by sulphite process
	4 <sup>th</sup>	Manufacture of paper by wet process
8 <sup>th</sup>	1 <sup>st</sup>	Recovery of chemicals from black liquor, by product utilization
	2 <sup>nd</sup>	Different type of paper products.
	3 <sup>rd</sup>	Additives used in paper production and their application.
	4 <sup>th</sup>	Differentiate between sulphate & sulphite process
9 <sup>th</sup>	1 <sup>st</sup>	<b>CHAPTER-6: CEMENT INDUSTRIES</b> Introduction to cement industries
	2 <sup>nd</sup>	Different types of cement
	3 <sup>rd</sup>	Constituents of cement and their characteristics, lime stone beneficiation
	4 <sup>th</sup>	Manufacture of Portland cement by wet process
10 <sup>th</sup>	1 <sup>st</sup>	Manufacture of Portland cement by dry process
	2 <sup>nd</sup>	Additives used in cement industries
	3 <sup>rd</sup>	Factors affecting cement industry
	4 <sup>th</sup>	Major application of cement and Importance of mini cement plant.
11 <sup>th</sup>	1 <sup>st</sup>	<b>CHAPTER-7: METALLURGICAL INDUSTRIES</b> Introduction to metallurgical industries
	2 <sup>nd</sup>	Methods of manufacturing cast iron
	3 <sup>rd</sup>	Properties of cast iron
	4 <sup>th</sup>	Manufacture of sponge iron, wrought iron
12 <sup>th</sup>	1 <sup>st</sup>	Different methods of steel manufacturing
	2 <sup>nd</sup>	Manufacture of alumina from bauxite by Bayer's process
	3 <sup>rd</sup>	Extraction of aluminium from alumina by Hope's process
	4 <sup>th</sup>	Manufacture of rare earth elements like thorium, & uranium and their application.
13 <sup>th</sup>	1 <sup>st</sup>	Manufacture of rare earth elements like titanium, Zirconium and their application.
	2 <sup>nd</sup>	<b>CHAPTER-8: FERTILIZERS</b> Introduction to fertilizers industries
	3 <sup>rd</sup>	Classification of fertilizers
	4 <sup>th</sup>	Properties, application of urea.
14 <sup>th</sup>	1 <sup>st</sup>	Manufacture of urea
	2 <sup>nd</sup>	Properties and application of calcium ammonium nitrate.
	3 <sup>rd</sup>	Manufacture of calcium ammonium nitrate
	4 <sup>th</sup>	Properties and application of super phosphate and ammonium phosphate,
15 <sup>th</sup>	1 <sup>st</sup>	Manufacture of super phosphate and ammonium phosphate,
	2 <sup>nd</sup>	Properties and application of nitro phosphate, sodium phosphate
	3 <sup>rd</sup>	Manufacture of nitro phosphate
	4 <sup>th</sup>	Manufacture of sodium phosphate