

NAME OF FACULTY---SACHIN

DISCIPLINE----- CHEMICAL

SEMESTER----- 3rd

SUBJECT----- MO

LESSON PLAN DURATION -15 WEEKS (FROM 01 OCT 2021 TO 28 JAN. 2022)

WEEK	THEORY	
	LECTURE DAY	TOPIC
1st	1 st	Particle shape
	2 nd	Particle size
	3 rd	Mixed particle sizes and size analysis
2nd	1 st	Specific surface of mixture
	2 nd	Average particle size
	3 rd	Number of particles in mixture
3rd	1 st	Energy and power requirements in crushing
	2 nd	crushing efficiency
	3 rd	Mechanicaefficiency
4th	1 st	Expression for power required by machines
	2 nd	Rittinger's law,
	3 rd	Bond's law and Kick's law
5th	1 st	Blake Jaw crusher,
	2 nd	Dodge Jaw crusher
	3 rd	Grinding rolls
6th	1 st	Roll crusher
	2 nd	Attrition mill
	3 rd	Ball mill
7th	1 st	Fluid energy mill
	2 nd	Colloid mill
	3 rd	Rotary knife cutter
8th	1 st	Screen analysis, Tyler standard screen series
	2 nd	material balances over screen capacity and screen effectiveness
	3 rd	Gyrating screens
9th	1 st	Stationary screens
	2 nd	Grizzlies, vibrating screens
	3 rd	classification of filtration
10th	1 st	Filtermedia, filter aids
	2 nd	Mechanisms of filtration
	3 rd	Discontinuous pressure filters
11 th	1 st	Filter press
	2 nd	Shell and leaf filter
	3 rd	Vacuumfilters
12 th	1 st	cyclone
	2 nd	Centrifugal filters
	3 rd	Suspended batch centrifuges
13th	1 st	Clarifying filters.
	2 nd	Gravity classifiers
	3 rd	Sorting classifier; Thickeners
14th	1 st	sedimentation centrifugal settling process
	2 nd	Cyclone, Hydro cyclone
	3 rd	Tabular centrifuge
15th	1 st	Disk centrifuge, Nozzle discharge centrifuge
	2 nd	Mixing of solids and pastes, Change can mixer
	3 rd	Two arm Kneader, Kneader and disperser blades

NAME OF FACULTY-----RAJESH KUMAR CHAWLA

DISCIPLINE----- CHEMICAL

SEMESTER-----3rd

SUBJECT-----CHEMICAL PROCESS CALCULATION

LESSON PLAN DURATION -15 WEEKS (FROM JULY TO NOV. 2019)

WEEK	THEORY	
	LECTURE DAY	TOPIC
1st	1st	Introduction to chemical engineering
	2nd	History of chemical engineering
	3rd	Future of chemical engineering
	4th	Career of chemical engineering
2nd	1st	Unit Operations and their type
	2nd	Unit Processes and their type
	3rd	Difference between Unit Operations and Unit Processes
	4th	Difference between Unit Operations and Unit Processes
3rd	1st	Units and their type
	2nd	inter conversion of units
	3rd	inter conversion of units
	4th	inter conversion of units
4th	1st	Numerical
	2nd	Numerical
	3rd	Numerical
	4th	Numerical
5th	1st	Boyle's law, Charle's Law
	2nd	ideal gas equation, Dalton's law
	3rd	Dalton's law, Amagat's law
	4th	Relation between Vol% = Mole% = Press%
6th	1st	Relation between Vol% = Mole% = Press%
	2nd	Numerical
	3rd	Numerical
	4th	Numerical
7th	1st	Concept of mole, gm moles, gm atoms,
	2nd	molarity, molality and normality
	3rd	Numerical
	4th	mass%, mass fraction,
8th	1st	Numerical
	2nd	volume%, volume fraction
	3rd	Numericals
	4th	Definition and meaning of material balance
9th	1st	Material balance calculation,
	2nd	Material balance calculation,
	3rd	Numerical on material balance without chemical reaction
	4th	Numerical on material balance without chemical Reaction
10th	1st	Numerical on material balance without chemical reaction
	2nd	Material balance on distillation,
	3rd	Material balance on drying
	4th	Material balance on evaporation
11 th	1st	Material balance recycle and purge system
	2nd	Material balance recycle and purge system
	3rd	Definition and meaning of energy balance,
	4th	standard heat of reaction and formation
	1st	sensible heat, latent heat, heat capacity at constant pressure

12th	2nd	relation between C_p and C_v ,
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	3rd	standard heat of reaction
	4th	heat of formation
13th	1st	heat of combustion,
	2nd	Hess's law of constant heat summation
	3rd	Numerical
	4th	Numerical
14th	1st	Definition of combustion,
	2nd	heat of combustion,
	3rd	Air requirement
	4th	theoretical air
15th	1st	Excess air
	2nd	theoretical oxygen requirement
	3rd	Numerical
	4th	Numerical

NAME OF FACULTY-----RAKESH KUMAR

DISCIPLINE----- CHEMICAL

SEMESTER-----3rd

SUBJECT-----PULPING PROCESSES

LESSON PLAN DURATION -15 WEEKS (FROM 01 OCT 2021 TO 28 JAN. 2022)

WEEK	THEORY		PRACTICALS	
	LECTURE DAY	TOPIC	PRACTICAL(GROUP)	PRACTICAL NAME
1st	1 st	Introduction to paper on network of cellulosic fibrers	1 st	Determination of moisture content in bamboo/wood/bagasse pulp
	2 nd	Introduction to paper on network of cellulosic fibrers	2 nd	Determination of moisture content in bamboo/wood/bagasse pulp
	3 rd	Brief study of fibrous raw materials	3 rd	Determination of moisture content in bamboo/wood/bagasse pulp
2nd	1 st	Brief study of fibrous raw materials	1st	Determination of basic and bulk density of chips
	2 nd	Classification, their sources	2nd	Determination of basic and bulk density of chips
	3 rd	Classification, their sources	3rd	Determination of basic and bulk density of chips
3rd	1 st	Availability in the context of Indian paper industry.	1st	Preparation and analysis of sulfate cooking liquor
	2 nd	Availability in the context of Indian paper industry.	2nd	Preparation and analysis of sulfate cooking liquor
	3 rd	Introduction to pulp and paper making with block diagram	3rd	Preparation and analysis of sulfate cooking liquor
4th	1 st	Introduction to pulp and paper making with block diagram	1st	Determination of alcohol benzene solubility of pulp
	2 nd	Introduction to pulp and paper making with block diagram	2nd	Determination of alcohol benzene solubility of pulp
	3 rd	Introduction to pulp and paper making with block diagram	3rd	Determination of alcohol benzene solubility of pulp
5th	1 st	Introduction to pulp and paper making with block diagram	1st	Determination of Holocellulose content
	2 nd	Definition of pulping	2nd	Determination of Holocellulose content
	3 rd	Morphological analysis of fiber	3rd	Determination of Holocellulose content
6th	1 st	Morphological analysis of fiber	1st	Determination of Ash conent of raw materials/pulp
	2 nd	Brief description of cellulose, hemi cellulose, lignin and extractives	2nd	Determination of Ash conent of raw materials/pulp
	3 rd	Brief description of lignin and extractives	3rd	Determination of Ash conent of raw materials/pulp
7TH	1 st	Importance	1st	Determination of hot water solubility of pulp
	2 nd	Brief study of debarking: physical debarking (drum and disk de-barker)	2nd	Determination of hot water solubility of pulp
	3 rd	Hydraulic and mechanical de-barker, Chemical debarking	3rd	Determination of hot water solubility of pulp
8TH	1 st	Chipping: definition, purpose and equipment	1st	Determination of cold-water solubility of pulp
	2 nd	Description of Drum & Disk Chipper)	2nd	Determination of cold-water solubility of pulp
	3 rd	Chip screening: different types of chip screens	3rd	Determination of cold-water solubility of pulp
		Description of vibrating typesof chip screens	1st	Determination of one per cent NaOH solubility of pulp
9TH	1 st	Description of gyratory types of chip screens	2nd	Determination of one per cent NaOH solubility of pulp
	2 nd	Chip storage: open and close	3rd	Determination of one per cent NaOH solubility of pulp
	3 rd	Active Alkali (AA), Total Alkali (TA), Total titrable alkali, effective alkali,	1st	Determination of KMnO ₄ , number of unbleached pulp
10TH	1 st	white liquor, black liquor and green liquor, sulphidity, causticity and causticizing efficiency	2nd	Determination of KMnO ₄ , number of unbleached pulp

	2 nd	Types of pulping: (a) Chemical pulping: Alkaline pulping (soda and sulphate pulping process)	3 rd	Determination of KMnO ₄ number of unbleached pulp
	3 rd	(a) Chemical pulping: Acidic pulping (very brief review)	1 st	Determination of kappa number of unbleached pulp
11 TH	1 st	(b) Mechanical pulping: Stone ground wood, process description	2 nd	Determination of kappa number of unbleached pulp
	2 nd	(b) Mechanical pulping: Factors affecting stone ground wood	3 rd	Determination of kappa number of unbleached pulp
	3 rd	(c) Semi-Chemical pulping: Brief description of process (excluding types of semi-chemical pulping)	1 st	Cooking of given raw material (soda process)

12 TH	1 st	(d) Scope and significance of bio-pulping, anthraquinon pulping	2 nd	Cooking of given raw material (soda process)
	2 nd	(e) Extended delignification etc.	3 rd	Cooking of given raw material (soda process)
	3 rd	Pulping Equipment	1 st	Cooking of given raw materials (sulphate process)
13 TH	1 st	Different types of digestors: Continuous digestors (Kamyar digester),	2 nd	Cooking of given raw materials (sulphate process)
	2 nd	Different types of digestors: Continuous digestors (Pandia digester),	3 rd	Cooking of given raw materials (sulphate process)
	3 rd	Importance of digestors: Continuous digestors (Kamyar & Pandia)	1 st	
14 TH	1 st	advantages of continuous digestors: Continuous digestors (Kamyar & Pandia),	2 nd	
	2 nd	Batch digestors (Rotary and Stationary)	3 rd	
	3 rd	Simple calculations based on yield, Consistency and other chest capacity.	1 st	
15 TH	1 st	Brief study of fibrous raw materials	2 nd	
	2 nd	Introduction to pulp and paper making with block diagram	3 rd	
	3 rd			

Name of Faculty		ARVIND
Discipline		Chemical Engineering
Semester		3 rd
Subject		Pulp Washing and Cleaning
Lesson plan duration		15weeks
Week	Lecture Day	Theory
1 st	1 st	Introduction to pulp washing
	2 nd	Introduction to pulp washing
	3 rd	Objective of pulp washing
2 nd	1 st	Objective of pulp washing
	2 nd	Introduction to brown stock washing
	3 rd	Introduction to brown stock washing
3 rd	1 st	Working of brown stock washer
	2 nd	Working of brown stock washer
	3 rd	Multistage brown stock washer
4 th	1 st	Multistage brown stock washer
	2 nd	Operating procedure of washer
	3 rd	Operating procedure of washer
6 th	1 st	Variable affecting the washer
	2 nd	Variable affecting the washer
	3 rd	Variable affecting the washer
7 th	1 st	Introduction to high efficiency washer
	2 nd	Introduction to high efficiency washer
	3 rd	Heat diffusion washing in continuous digester
8 th	1 st	Heat diffusion washing in continuous digester
	2 nd	Generation of vacuum
	3 rd	Generation of vacuum
9 th	1 st	Concept of diffusion factor
	2 nd	Concept of diffusion factor
	3 rd	Displacement rates
10 th	1 st	Thickening factor
	2 nd	Thickening factor
	3 rd	Soda loss and their importance
11 th	1 st	Soda loss and their importance
	2 nd	Washing equipment
	3 rd	Washing equipment
12 th	1 st	Washing equipment
	2 nd	Screening
	3 rd	Various types of screens
13 th	1 st	Centri-cleaner
	2 nd	Centri-cleaner
	3 rd	Simple numerical problem
14 th	1 st	Simple numerical problem
	2 nd	Simple numerical problem

	3 rd	Simple numerical problem
15 th	1 st	Revision
	2 nd	Revision
	3 rd	Revision

Name of Faculty		ARVIND
Discipline		Chemical Engineering
Semester		3 rd
Subject		Pulp Bleaching
Lesson plan duration		15weeks
Week	Lecture Day	Theory
1 st	1 st	General principal and objective of bleaching
	2 nd	General principal and objective of bleaching
	3 rd	General principal and objective of bleaching
2 nd	1 st	Single stage bleaching process
	2 nd	Single stage bleaching process
	3 rd	Multiple stage bleaching process
3 rd	1 st	Multi stage bleaching process
	2 nd	Alkali extraction
	3 rd	Alkali extraction
4 th	1 st	Hypochlorite and chlorine dioxide
	2 nd	Hypochlorite and chlorine dioxide
	3 rd	Hypochlorite and chlorine dioxide
6 th	1 st	Process variables for bleaching stages
	2 nd	Process variables for bleaching stages
	3 rd	Other bleaching agent used in industry
7 th	1 st	Peroxide
	2 nd	Oxygen
	3 rd	Concept of ECF
8 th	1 st	Concept of TCF
	2 nd	Ozone bleaching
	3 rd	Ozone bleaching
9 th	1 st	Ozone bleaching
	2 nd	Preparation of bleaching chemicals
	3 rd	Preparation of bleaching chemicals
10 th	1 st	Preparation of bleaching chemicals
	2 nd	Preparation of chlorine dioxide
	3 rd	Preparation of chlorine dioxide
11 th	1 st	Important bleaching equipment
	2 nd	Important bleaching equipment
	3 rd	Important bleaching equipment
12 th	1 st	Brightness reversion for bleached pulp
	2 nd	Brightness reversion for bleached pulp
	3 rd	Post color number
13 th	1 st	Post color number

	2 nd	Post color number
	3 rd	Simple numerical problem
14 th	1 st	Simple numerical problem
	2 nd	Simple numerical problem
	3 rd	Simple numerical problem
15 th	1 st	Revision
	2 nd	Revision
	3 rd	Revision