LESSON PLAN OF 3rd SEMESTER(2022-2023) CHEMICAL ENGINEERING

Discipline :- CHEMICAL	Semester:-3RD	Name of the Teaching Faculty Yayati Kishore Mohanta		
Subject:- PHYSICAL CHEMISTRY	No of Days/per Week Class Allotted :-04	Semester From:- 15th September 2022 To:- 22 January 2023		

Week	Class Day	Theory/ Practical Topics
1st	1st	**PHYSICAL PROPERTIES OF LIQUIDS** Intermolecular forces in liquid
	2nd	Vapour pressure and its Effect on Temperature and Boiling point
	3rd	Surface Tension
	4th	Viscosity, Measurement of viscosity by Ostwald Method
2nd	1st	Refractive Index, specific Refraction
	2nd	Determination of Refractive index by Refractometer
	3rd	Optical Activity, measurement of Optical Activity
	4th	Measurements of Optical Activity
3rd	1st	Solved problems based on physical properties of liquids
	2nd	Chapterwise Test
	3rd	**SOLUTIONS** Solution and types of solutions
	4th	Ways of Expressing concentration
4th	1st	Solved numerical related to concentration
	2nd	Solutions in Gases in Gases
	3rd	Henry's law and solved problems
	4th	**Solution in liquids in liquids**
5th	1st	Solubility of partially miscible liquids
	2nd	Solubility of solid in liquid
	3rd	Equilibrium concept, solubility curve
	4th	Raoult's law, ideal solution
6th	1st	Explanation of lowering of vapour pressure and its measurements
	2nd	Concept of elevation of boiling point and depression of freezing point
	3rd	**OSMOSIS AND OSMOTIC PRESSURE** Osmosis and Osmotic Pressure with Example
	4th	Function of semi-permeable Membrane
7th	1st	Osmotic pressure and Isotonic pressure
	2nd	Theories of osmosis
	3rd	Reverse osmosis
	4th	The laws of Osmotic Pressure
8th	1st	Solved problems on Osmosis

	2nd	Relation betwwen Vapour pressure & Osmotic pressure
	3rd	Relation between Vapour pressure & Osmotic Pressure
	4th	Simple problems
9th	1st	Surprise Test on chapter-1,2,3
	2nd	**DISTRIBUTION LAW** Introduction
	3rd	Nernst's Distribution Law
	4th	Equilibrium constant from distribution law
10th	1st	Solvent Extraction
	2nd	Multiple Extraction
	3rd	Concept of liquid-liquid Chromatography
	4th	Application of Distribution law
11th	1st	Application of Distribution law
	2nd	Application of Distribution law
	3rd	Numerical problems related to Distribution law
	4th	**COLLOIDS** Colloids and Types of colloidal system
12th	1st	Characteristics of solutions
	2nd	Applications of colloids
	3rd	Methods of preparation of sols & purifications of sols
	4th	Optical ,kinetic and electrical properties of sols
13th	1st	Emulsion and types of emulsion
	2nd	Roles of Emulsifier
	3rd	Preparation of Emulsions and there properties
	4th	Gel, types of gel,
14th	1st	Properties and Application of gel
	2nd	**ADSORPTION** Introduction
	3rd	Types of Adsorption
	4th	Physical adsorption and Chemisorption
15th	1st	Application of Adsorption
	2nd	Ion – exchange adsorption
	3rd	Compare absorption and adsorption
	4th	Ion – exchange application.

LESSON PLAN OF 3rd SEMESTER(2022-23) CHEMICAL ENGINEERING

DISCIPLINE: CHEMICAL	Semester:-3RD	NAME OF THE TEACHING FACULTY **Sibasish Mahapatra**
SUBJECT: FLUID MECHANICS	No of days per Week Allotted : 04	Semester from: 15th September 2022 TO 22nd December 2022 No of Weeks:- 15

Week	Class/ Day	Theory/ Practical Topics
1st	1st	Units And Dimensions; Fluid and its classification
	2nd	Properties of fluid and its units
	3rd	Newton's law of viscosity
	4th	Newtonian & Non-Newtonian fluid
2nd	1st	Hydrostatic equilibrium and pressure head
	2nd	Fluid pressure measuring devices
	3rd	Different types of manometers and its applications
	4th	Derivation of manometric equation
3rd	1st	Problems on Manometric Equation
	2nd	Equation of continuity
	3rd	Problems on Continuity Equation
	4th	Types of fluid flow
4th	1st	Laminar and turbulent flow
	2nd	Reynolds's number, critical velocity
	3rd	Mechanism of fluid flow in pipes
	4th	Reynolds' experiment
5th	1st	Bernoulli's theorem, pump work (solve simple problems)
	2nd	Bernoulli's theorem, pump work (solve simple problems)
	3rd	Bernoulli's theorem, pump work (solve simple problems)
	4th	Flow of incompressible fluids in pipe

6th	1st	Flow of incompressible fluids in pipe	

	2nd	Flow of incompressible fluids in pipe
	3rd	Friction factor, roughness
	4th	Estimate friction loss in pipes & coils, equivalent length
7th	1st	Fanning's equation (Solve simple problems)
	2nd	Fanning's equation (Solve simple problems)
	3rd	Friction losses through sudden enlargement in pipes
	4th	Friction losses through sudden contraction in pipes
8th	1st	Problems on friction losses through sudden enlargement in pipes
	2nd	Problems on friction losses through sudden contraction in pipes
	3rd	Flow of fluids in non-circular conduits. Water hammer
	4th	Working of flow measuring devices, advantages & disadvantages
9th	1st	Expression for flow measurement through orifice meter
	2nd	Expression for flow measurement through venturi meter
	3rd	Expression for flow measurement through pitot tube
	4th	Working of Rota meter and its calibration
10th	1st	Simple problems on flow measurement
	2nd	Simple problems on flow measurement
	3rd	Simple problems on flow measurement
	4th	Simple problems on flow measurement
11th	1st	Concept of transportation of fluid by pipes and tubes
	2nd	Different pipe fittings and its application
	3rd	Different types of valves and their applications
	4th	Classification of pumps
12th	1st	Construction and working of centrifugal pump
	2nd	Performance characteristics of centrifugal pumps
	3rd	Cavitation, Net positive suction head, Air binding & priming of pump

		4th	Centrifugal pump troubles and remedies
13th		1st	Construction and working of centrifugal pump
		2nd	Performance characteristics of centrifugal pumps

		3rd	Working of Piston pump, plunger pump, gear pump, diaphragm pump
		4th	Pumping device for gas: blower, compressor and vacuum devices
14th		1st	Pressure drop in porous medium
		2nd	Concept of fluidization
		3rd	Types of fluidization
		4th	Minimum fluidization velocity
15th		1st	Fluidized bed pressure drop
		2nd	Principle of pneumatic conveyance
		3rd	Flow through packed bed; Problems on fluidisation
		4th	Previous Year Questions Practice

LESSON PLAN OF 3rd SEMESTER (2022-2023) CHEMICAL ENGINEERING DEPARTMENT

Discipline: Chemical	Semester: 3rd	Name of The Teaching Faculty: Sanjukta Nayak
Subject: Theory-3 Mechanical Operation	No of Days per week class allotted:4	Semester From: 15 September 2022 To 22 December 2022 No of Weeks: 15

Week	Class days	Theory/Practical Topic
1st	1st	Introduction to mechanical operation
	2nd	Objectives of size reduction
	3rd	State laws of crushing like Bonds law, Rittinger's law, Kick's law
	4th	Practice numerical related to different laws
2nd	1st	Concept of Crushing efficiency, Work index
	2nd	Classification of size reduction equipment and their construction and operation
	3rd	Construction and working of Jaw crusher, Gyratory crusher
	4th	Construction and working of Smooth roll crusher, Hammer Mill, Ball Mill
3rd	1st	Closed and open circuit grinding, dry grinding
	2nd	Define wet grinding, free and choke grinding
	3rd	Practice of the chapter and solve simple problems
	4th	Practice previous years questions
4th	1st	Objectives of size separation
	2nd	Shape and size of irregular particle
	3rd	Different types of screen analysis
	4th	Define ideal screen & actual screen
5th	1st	Material balance over the screen
	2nd	Construction and operation of different types of industrial screens and their effectiveness
	3rd	Construction and operation of different types of industrial screens and their effectiveness
	4th	Construction and operation of air filters, air separator
6th	1st	Construction and working of cyclone separator, magnetic and Electromagnetic separation
	2nd	Theory of settling like free
	3rd	Hindered settling
	4th	State Stroke's law, Classification
7th	1st	Solve simple numerical based on the chapter
	2nd	Theory on Sedimentation, thickeners, clarifiers

	3rd	Theory on hydraulic classifiers, jigs, classifier riffled table and their use
	4th	Principle & operation of froth floatation and its use
8th	1st	Revision of the chapter and practice previous year question
	2nd	Types of filtrations, Theory of filtration,
	3rd	Types of cakes, cake resistance, pressure drop, filter medium
	4th	Filter Aids and related derivation
9th	1st	Classification, constructions and working principles of filtration equipments, Thickeners
	2nd	Classification, constructions and working principles of filtration equipments, Thickeners
	3rd	Batch and continuous centrifuges with their construction, operation
	4th	Uses of batch and continuous centrifuges
10th	1st	Flocculation, coagulants and role of coagulant in filtration
	2nd	Practice questions based on the chapter
	3rd	Doubt clearing class
	4th	Theory on mixing
11th	1st	Various mixing operations like Mixing of liquid with liquid
	2nd	Mixing of liquid with solid
	3rd	Mixing of viscous materials
	4th	Mixing of Solid with solid
12th	1st	Mixing of gases with liquids
	2nd	The flow pattern in agitated vessel
	3rd	Methods of prevention of swirling and vortex formation, baffling
	4th	Different impellers used in mixing operation
13th	1st	Different propellers, paddles used in mixing operation
	2nd	Revision of the chapter and practice different questions
	3rd	Introduction to transportation and storage
	4th	Objectives of transportation and storage
14th	1st	Transportation of solid by belt conveyor
	2nd	apron conveyor, screw Conveyor
	3rd	bucket elevators, scrapers and pneumatic conveyers
	4th	Storage and handling of solids
15th	1st	construction and uses of silos and bins
	2nd	Revision of the chapters
	3rd	Doubt clearing class

| | 4th | Practice question answer |

LESSON PLAN OF CHEMICAL ENGINEERING DEPARTMENT WINTER 2022

Discipline: Chemical	Semester: 3rd	Name of Faculty: Siddhibinayak Pradhan
Subject: Industrial Stoichiometry (TH-4)	No of Days per week class allotted: 4	Semester From: 15th September 2022 to 22nd December 2022

Week	Class Day	Theory Topics
1st	1st	**CHAPTER-1: UNITS AND DIMENSIONS** Introduction
	2nd	Basic and derived units used in process industry.
	3rd	Units of physical and chemical properties
	4th	Relation between units and dimension
2nd	1st	Unit conversion and solve numerical
	2nd	Concepts of unit operation and unit process
	3rd	Application of various graphs in process calculation
	4th	Solve numerical
3rd	1st	**CHAPTER-2: MOLE CONCEPT** Atomic number, atomic weight of elements
	2nd	Mol. Wt., mole unit, mole fraction (or percent) and mass fraction (or percent),
	3rd	Relation between mole and mass fraction
	4th	Mole concept with respect to chemical equation.
4th	1st	Principle of atom conservation.
	2nd	Mole calculation from reaction
	3rd	Methods of expressing composition of mixtures and solutions
	4th	**Solve related numericals**
5th	1st	**CHAPTER-3: STOICHIOMETRY** Introduction
	2nd	Concept of limiting reactant, Atomic weight,
	3rd	Concept of Molecular weight and empirical formula
	4th	Solved numerical based on limiting reactant, mass-mass and mass volumebasis
6th	1st	Concepts of Eq. weight, valence of molecule
	2nd	Solve related numerical
	3rd	Concepts of preparation of solution
	4th	Weight and volume percent of solutions
7th	1st	Basics of Normality, molarity and molality
	2nd	Numerical on solution preparation
	3rd	Solve related numerical
	4th	**CHAPTER-4: GASES AND GASEOUS MIXTURES**

			Introduction
8th		1st	Define gases, different gaseous mixture
		2nd	Derivation of Ideal gas equation
		3rd	Derive average molecular weight and Values of R
		4th	Derivation of density of gas mixture
9th		1st	Solve related numerical
		2nd	Composition by vol% and by weight % related to average molecular weight of gas mixture
		3rd	Solve the examples and exercises related to Avg. mol wt. and Ideal gas equation.
		4th	Concepts of Pressure, partial pressure and various laws related to PVT behavior.
10th		1st	Concepts of State Raoult's law and Henry's law
		2nd	**CHAPTER-5: MATERIAL BALANCE WITHOUT CHEMICAL REACTION** Introduction
		3rd	Basics of chemical equation and stoichiometry
		4th	Concepts of law of conservation of mass and material balance over the reaction.
11th		1st	Material balance problems without chemical reactions of unit operations
		2nd	Material balance of Evaporation and solve numerical
		3rd	Material balance of mixing and solve numerical
		4th	Material balance of crystalization
12th		1st	Material balance over distillation and solve numerical
		2nd	Material balance over drying and solve related numerical
		3rd	Material balance humidification and solve related numerical
		4th	Material balance over filtration
13th		1st	Material balance over absorption, extraction
		2nd	Solve numerical
		3rd	**CHAPTER-6: MATERIAL BALANCE WITH CHEMICALREACTION** Introduction
		4th	Concepts of Limiting reactant, Excess reactant
14th		1st	Concepts of Conversion, Selectivity, Yield.
		2nd	Basic concepts involved in material balance calculations.
		3rd	Material balance over combustion
		4th	Material balance over chemical reaction calculation
15th		1st	Concepts of heat of combustion and heat of formation.
		2nd	Concept of recycle and by pass, purge
		3rd	Excess air and theoretical air
		4th	Numerical based on combustion, Excess air and theoretical air

LESSON PLAN OF CHEMICAL ENGINEERING DEPARTMENT WINTER 2021

Discipline: Chemical		Semester: 3rd	Name of Faculty: Satya Sankar Raj	
Subject: Theory-5 Environmental Studies		No of Days per week class allotted	Semester From: 15th September 2022 to 22nd December 2022 No of Week-15	
Week	Class No	Class days	Chapter	Theory Topic
			Chapter -1 The Multidisciplinary nature of environmental studies	
1st	1	1st	1.1	Definition & important issues with environmental science
	2	2nd	1.2	Scope and importance of environmental studies
	3	3rd	1.3	Components of Environment and its importance
	4	4th	1.4	Need for public awareness, Institution related to environmental studies
			Chapter -2 Natural Resources, Renewable and nonrenewable resource	
2nd	5	1st	2.1.1	Forest resources: Use and over-exploitation, deforestation, case studies,
	6	2nd	2.1.1	Timber extraction, mining, dams and their effects on forests and tribal people
	7	3rd	2.1.2	Water resources: Use and over-utilization of surface and ground water, floods,
	8	4th	2.1.2	Drought, conflicts over water, dam's benefits, and problems
3rd	9	1st	2.1.3	Mineral Resources: Use and exploitation, environmental effects of extracting
	10	2nd	2.1.4	Food Resources: World food problems, changes caused by agriculture
	11	3rd	2.1.4	Effects of modern agriculture, fertilizers- pesticides problems, water logging
	12	4th	2.1.5	Energy Resources: Growing energy need, renewable and non-renewable
4th	13	1st	2.1.6	Land Resources: Land as a resource, soil erosion, and desertification
	14	2nd	2.2-2.3	Role of individual in conservation of natural resources, sustainable lifestyles
			Chapter -3 Systems	
	15	3rd	3.1	Concept of an eco-system, understanding Eco system, Resource Utilization
	16	4th	3.2	Structure and function of an eco-system- Structural & functional aspects
5th	17	1st	3.3	Producers, consumers, decomposers- Examples in eco system
	18	2nd	3.4	Energy flow in the eco system- examples of different cycles
	19	3rd	3.5	Ecological succession-examples in eco system
	20	4th	3.6	Food chains, food webs and ecological pyramids
6th	21	1st	3.7	Introduction characteristic function of eco system: ☐ Forest ecosystem
	22	2nd	3.8	Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)
			Chapter -4 Biodiversity and it's Conservation	
	23	3rd	4.1	Introduction-Definition: genetics, species, and ecosystem diversity
	24	4th	4.2	Biogeographically classification of India

Week	Class No	Class days	Chapter	Theory Topic
7th	25	1st	4.3	Value of biodiversity: consumptive use, productive use
	26	2nd	4.3	Social ethical, aesthetic and Option values
	27	3rd	4.4	Biodiversity at global, national, and local level
	28	4th	4.5	Threats to biodiversity: Habitats loss, Hot spot of biodiversity
8th	29	1st	4.5	poaching of wildlife, man wildlife conflicts, India as megadiversity nation
	30	2nd	4.5	Conservation of biodiversity-In situ Conservation, Ex situ Conservation
			Chapter -5 Environmental Pollution	
	31	3rd	5.1.1	Definition Causes, effects, and control measures of air pollution
	32	4th	5.1.2	Definition Causes, effects, and control measures of water pollution
9th	33	1st	5.1.3	Definition Causes, effects, and control measures of soil pollution
	34	2nd	5.1.4	Definition Causes, effects, and control measures of marine pollution
	35	3rd	5.1.5	Definition Causes, effects and control measures of noise pollution
	36	4th	5.1.5	Definition Causes, effects and control measures of thermal pollution
10th	37	1st	5.1.6	Definition Causes, effects and control measures of nuclear hazards
	38	2nd	5.2	Solid waste Management: Causes, effects, and management
	39	3rd	5.2	Control measures of urban and industrial wastes
	40	4th	5.3	Role of an individual in prevention of pollution
11th	41	1st	5.4	Disaster management: Floods, earthquake and its mitigation measure
	42	2nd	5.4	cyclone and landslides its mitigation measure
			Chapter -6 Social Issues and the Environment	
	43	3rd	6.1	Form unsustainable to sustainable development
	44	4th	6.2	Urban problems related to energy
12th	45	1st	6.3	Water conservation, rainwater harvesting, water shed management
	46	2nd	6.4	Resettlement and rehabilitation of people; its problems and its concern
	47	3rd	6.5	Environmental ethics: issue and possible solutions
	48	4th	6.6	Climate change, global warming, acid rain, ozone layer depletion,
13th	49	1st	6.6	Nuclear accidents and holocaust, case studies
	50	2nd	6.7	Air (prevention and control of pollution) Act
	51	3rd	6.8	Water (prevention and control of pollution) Act
	52	4th	6.9	Public awareness, Issues related to Environment legislation
			Chapter -7 Human population and the environment	
14th	53	1st		Population growth and variation among nations
	54	2nd		Population explosion- family welfare program
	55	3rd		Environment and human health, Environmental Health, Climate health

Week	Class No	Class days	Chapter	Theory Topic
	56	4th		Human rights, issues connected with environment and human rights
15th	57	1st		Value education, Environmental value, valuing nature, valuing culture
	58	2nd		Social Justice, Human heritage, Equitable use of resources
	59	3rd		Common Property resources, Equitable use of resources
	60	4th		Role of information technology in environment and human health

LESSON PLAN OF 3rd SEMESTER (2022-2023) CHEMICAL ENGINEERING DEPARTMENT		
Discipline: Chemical	**Semester: 3rd**	**Name of The Teaching Faculty: Sanjukta Nayak**
Subject: Practical 5 **Chemical Engg. Drawing**	**No of Days per week class allotted:4**	**Semester From: 15 September 2022 To 22 December 2022** **No of Weeks: 15**
Week	**Practical days**	**Practical Topic**
1st	1st	1.1 Draw symbols of equipment used in chemical industries
	2nd	Draw symbols of equipment used in chemical industries
	3rd	**1.2 Draw symbol of** pipe line
	4th	Valves
2nd	1st	Pumps
	2nd	Compressor
	3rd	heating cooling arrangements
	4th	Furnaces
3rd	1st	Boilers
	2nd	Practice symbols
	3rd	process vessels
	4th	Storage vessels
4th	1st	Driers
	2nd	Separators
	3rd	Filters
	4th	Centrifuge
5th	1st	Stirrer
	2nd	Feeder
	3rd	Conveyor
	4th	Practice all the symbols
6th	1st	**2. Draw sketch of Chemical Engineering Equipment like** Heat exchanger (double pipe and shell)
	2nd	Heat exchanger (tube type)
	3rd	Distillation column

	4th	Dryer
7th	1st	Evaporator
	2nd	Ball mill
	3rd	Practice the chemical engineering equipments
	4th	Cyclone Separator
8th	1st	Crystalliser
	2nd	Absorber
	3rd	Extractor
	4th	**3.1 PROCESS INSTRUMENTATION DIAGRAM** Draw symbols of flow rate indictor
9th	1st	flow recorder
	2nd	Draw symbols of level indicator
	3rd	pH recorder
	4th	level controller
10th	1st	Class test related to symbols
	2nd	**3.2 Draw P.I. diagrams of** Cooler temperature control
	3rd	Reactor temperature control
	4th	Heater temperature control
11th	1st	Hot fluid temperature control
	2nd	Practice different control system
	3rd	Evaporator circulation control
	4th	Evaporator circulation control
12th	1st	Tray dryer control
	2nd	Class test
	3rd	Top temperature control of distillation column
	4th	Top temperature control of distillation column
13th	1st	Control of level
	2nd	reflux condenser
	3rd	Steam flow rate
	4th	level control of reboiler
14th	1st	Practice previous diagram
	2nd	Class test

	3rd	**3.3 Utility Line diagram** Service fluid code for piping
	4th	Utility block diagram for steam
15th	1st	Utility block diagram for chilled water
	2nd	Practice the diagram
	3rd	Practice the diagram
	4th	Practice the diagram

Discipline: Chemical		Semester: 5th – Group-A	Name of Faculty: YAYATI KISHORE MOHANTA	
		No of Days per week class allotted-03	Semester From: 15th September 2022 to 22nd December 2022 No of Week-15	
Week	Class No	Class days		
1st	1	1st	September 4th Week	Orientation Program and Mentor Mentee Meet
	2	2nd		
	3	3rd		
2nd	4	1st	October 2nd week	Poster Making on Emerging trends in different Chemical Industry/Energy Conservation/
	5	2nd		
	6	3rd		
3rd	7	1st	October 3rd week	Seminar by Industry Expert- latest trend in Plastic Processing- Proprietor Sree Plast Limited or Functioning of State Pollution Control Board- RO Regional Office OSPCB
	8	2nd		
	9	3rd		
4th	10	1st	October 4th week	Laboratory Maintenance- 1.Cleaning of equipment,2. Lubrication 3. Running of equipment 4.Removal of residue material 5.Pianting of parts, 6.Arranging glass ware, Chemicals 7. Minor maintenance of equipment
	11	2nd		
	12	3rd		
5th	13	1st	November 1st week	Creativity & Idea Presentation-
	14	2nd		
	15	3rd		
6th	16	1st	November 2nd week	Seminar by Industry Expert- Pharmaceutical Intermediate Processing- Dept of Pharmacy BU/ Roland Institute of pharmacy
	17	2nd		
	18	3rd		
7th	19	1st	November 4th week	Field Visit or Industry visit- JK paper/ Waste Treatment plant Mahuda/Sree Plast limited
	20	2nd		
	21	3rd		
8th	22	1st	December 1st week	CV/ Interview preparation/Career Counseling Program
	23	2nd		
	24	3rd		
9th	25	1st	December 2nd week	Laboratory Maintenance-1.Cleaning of equipment,2. Lubrication 3. Running of equipment 4.Removal of residue material 5.Pianting of parts, 6.Arranging glass ware, Chemicals 7. Minor maintenance of equipment
	26	2nd		
	27	3rd		
10th	28-30	1st - 3rd	December 3rd week	Seminar by Industry Expert- From IISER/ CoE BU in the latest area of research

LESSON PLAN OF 3rd SEMESTER (2022-2023) CHEMICAL ENGINEERING DEPARTMENT

Discipline: Chemical	Semester: 3rd	Name of The Teaching Faculty: Sanjukta Nayak
Subject: Practical-3 Mechanical Operation	No of Days per week class allotted:3	Semester From: 15 September 2022 To 22 December 2022 No of Weeks: 15

Week	Practical days	Practical Topic
1st	1st	Demonstrate operation of a Blake type jaw crusher and Verify Rittinger's Law and the capacity of jaw crusher
	2nd	
	3rd	
2nd	1st	a. Demonstrate operation of a Ball mill b. Find-out the critical speed of a ball mill and compare with the actual speed
	2nd	
	3rd	
3rd	1st	Determine the effect the number of balls and time of grinding and plot a graph between the no. of balls Vs. Time
	2nd	
	3rd	
4th	1st	Demonstrate operation of sieve shaker
	2nd	
	3rd	
5th	1st	determine the average size of the product after performing separation size separation by screen analysis
	2nd	
	3rd	
6th	1st	Demonstrate operation of vibrating screen & find-out its screen efficiency
	2nd	
	3rd	
7th	1st	Demonstrate operation of froth flotation cell and Concentrate the given coal sample and find out the ash present after and before concentration
	2nd	
	3rd	
8th	1st	Perform the batch sedimentation test and plot a graph between height of the dead zone and time
	2nd	
	3rd	

9th	1st	Demonstrate operation of a magnetic separator
	2nd	
	3rd	
10th	1st	Demonstrate operation of cyclone separator and estimate its efficiency
	2nd	
	3rd	
11th	1st	Demonstrate operation of Wilflay table
	2nd	
	3rd	
12th	1st	Demonstrate operation of a centrifuge
	2nd	
	3rd	
13th	1st	Demonstrate operation of a classifier
	2nd	
	3rd	
14th	1st	Determine operation of a paddle mixer
	2nd	
	3rd	
15th	1st	Demonstrate operation of filter press
	2nd	
	3rd	

Discipline: Chemical		Semester: 3rd	Name of Faculty: Satya Sankar Raj	
Subject: Practical-1 Physical Chemistry Laboratory		No of Days per week class allotted-04	Semester From: 15th September 2022 to 22nd December 2022 No of Week-15	
Week	Class No	Class days	Chapter	Practical Topic
			Experiment no-1 Preparation of standard solution of an acid and alkali	
1st	1	1st	1.1	To acquaint with safety and SOP of Chemistry laboratory
	2	2nd	1.2	To understand the concept of Normality, Molarity and standard solution
	3	3rd	1.3	Demonstration of experiment
	4	4th	1.4	Practice on preparation of standard solution
2nd	5	1st	1.4	Practice on preparation of standard solution
	6	2nd	1.4	Determine the strength of standard solution
			Experiment no-2 Determine the viscosity of a liquid by Red wood viscometer at different temperatures and plotting graph between viscosity and temperature	
	7	3rd	2.1	Concept of viscosity and theory of viscosity measurement
	8	4th	2.2	Description of Viscometer and demonstration of working of viscometer
3rd	9	1st	2.3	Demonstration of experiment
	10	2nd	2.4	Practice on Determination of viscosity of standard oil
	11	3rd	2.4	Practice on preparation of viscosity of standard oil at different temperature
	12	4th	2.5	Calculation of viscosity and plotting of graph
			Experiment no-3 To determine the partition coefficient of iodine between water and carbon tetrachloride at room temperature	
4th	13	1st	3.1	Study of solubility of solvent in different solvent and its behavior
	14	2nd	3.2	Nernst's distribution law- statement and explanation, limitation
	15	3rd	3.3	Demonstration of solvent extraction
	16	4th	3.4	Determine the partition coefficient of iodine between water and CCl_4
5th	17	1st	3.4	Practice on experimental technique of solvent extraction
	18	2nd	3.5	Calculation, Result, and discussion on partition coefficient of iodine
			Experiment no-4 To determine the partition coefficient of benzoic acid between water and benzene at room temperature and molecular state of Benzoic acid in benzene as compared to its solution in water.	
	19	3rd	4.1	Study of behavior of benzoic acid between water and benzene
	20	4th	4.2	Demonstration of Experiment on solvent extraction
Week	Class No	Class days	Chapter	Practical Topic
6th	21	1st	4.3	Determine partition coefficient of Benzoic acid between water and Benzene

Week	Class No	Class days	Chapter	Practical Topic
	22	2nd	4.4	Practice on experimental technique of solvent extraction
	23	3rd	4.4	Practice on experimental technique of solvent extraction
	24	4th	4.5	Calculation, Result, and discussion on partition coefficient of benzoic acid
			Experiment no-5 To prepare colloidal solution of starch.	
7th	25	1st	5.1	Study on Colloidal state, colloid and types of colloidal system
	26	2nd	5.2	Study on classification of colloids
	27	3rd	5.3	Demonstration of Preparation of colloidal solution of starch
	28	4th	5.4	Preparation of colloidal solution of starch
8th	29	1st	5.4	Practice on Preparation of colloidal solution of starch
	30	2nd	5.5	Result, and discussion, application on colloidal system
			Experiment no-6 To prepare colloidal solution of egg albumin	
	31	3rd	6.1	Study of characteristic of lyophilic sol and lyophobic sol
	32	4th	6.2	Discussion on different methods of preparation of sols, purification of sols
9th	33	1st	6.3	Demonstration of Preparation of colloidal solution of starch
	34	2nd	6.4	Preparation of colloidal solution of starch
	35	3rd	6.4	Practice on Preparation of colloidal solution of starch
	36	4th	6.5	Result, and discussion, application on colloidal system
			Experiment no-7 Determine the solubility of a given salt at room temperature and draw its solubility curve.	
10th	37	1st	7.1	Study of solution, solubility, Types, Solution of solids in liquids
	38	2nd	7.2	Discussion on determination of solubility and solubility curve
	39	3rd	7.3	Demonstration of the experiment on solubility of a given salt
	40	4th	7.4	Practice on determine solubility at different temperature
11th	41	1st	7.4	Practice on determine solubility at different temperature
	42	2nd	7.5	Result, and discussion, application of solubility curve
			Experiment no-8 To determine the adsorption isotherm of acetic acid by activated charcoal.	
	43	3rd	8.1	Study of Principle of adsorption, type, Comparison
	44	4th	8.2	Study of adsorption isotherm, plotting, limitations, and assumption
12th	45	1st	8.3	Demonstration of the experiment on adsorption of acetic acid by charcoal.
	46	2nd	8.4	Practice on adsorption of acetic acid by charcoal
	47	3rd	8.4	Practice on adsorption of acetic acid by charcoal
	48	4th	8.5	Result, and discussion, application of adsorption isotherm of acetic acid
Week	Class No	Class days	Chapter	Practical Topic

			Experiment no-9 To investigate the adsorption of oxalic acid from aqueous solution of activated charcoal and examines the validity of Freundlich and Langmuir's adsorption isotherm	
13th	49	1st	9.1	Study of characteristic of Freundlich and Langmuir's adsorption isotherm
	50	2nd	9.2	Study of plotting of Freundlich and Langmuir's adsorption isotherm
	51	3rd	9.3	Demonstration of the experiment on adsorption of oxalic acid by charcoal.
	52	4th	9.4	Practice on adsorption of oxalic acid by charcoal
14th	53	1st	9.4	Practice on adsorption of oxalic acid by charcoal
	54	2nd	9.5	Result, and discussion, application of adsorption isotherms of oxalic acid
			Experiment no-10 To determine the rate constant for hydrolysis of ethyl acetate catalyzed by hydrochloric acid	
	55	3rd	10.1	
	56	4th	10.2	
15th	57	1st	10.3	Demonstration of the experiment on hydrolysis of ethyl acetate.
	58	2nd	10.4	Practice on hydrolysis of ethyl acetate
	59	3rd	10.4	Practice on hydrolysis of ethyl acetate at different time interval
	60	4th	10.5	Result, and discussion, application of adsorption isotherms of oxalic acid

LESSON PLAN OF CHEMICAL ENGINEERING DEPARTMENT WINTER 2022

Discipline: Chemical	Semester: 5th	Name of Faculty: Siddhibinayak Pradhan	
Subject: Practical-4 Environmental Engineering Laboratory	No of periods per week allotted:3	Semester From: 15th September 2022 to 22nd December 2022	
Week	Experiment	Experiment Topic	
1st	1	Collection of sample of waste water	
2nd	2	Analyze a given sample of waste water for estimation of dissolved chloride	
3rd	2	Analyze a given sample of waste water for estimation of dissolved chloride	
4th	3	Determine the dissolved oxygen content of water by Winkler's method	
5th	3	Determine the dissolved oxygen content of water by Winkler's method	
6th	4	Determine the chemical oxygen demand (BOD) exerted by a given sample of waste water	
7th	4	Determine the chemical oxygen demand (BOD) exerted by a given sample of waste water	
8th	5	Determine the chemical oxygen demand (COD) of a given sample of waste water	
9th	5	Determine the chemical oxygen demand (COD) of a given sample of waste water	
10th	6	Determine the turbidity of a given sample of waste water	
11th	7	Determine the total dissolved solid in a given sample of waste water	
12th	7	Determine the total dissolved solid in a given sample of waste water	
13th	8	Determine the optimum amount of Coagulant required to treat to turbid water	
14th	8	Determine the optimum amount of Coagulant required to treat to turbid water	
15th	9	Determine the amount of sulphate in a given sample of water.	