

LESSON PLAN OF 5TH SEMESTER CHEMICAL ENGINEERING

DISCIPLINE: CHEMICAL	Semester:-5TH	NAME OF THE TEACHING FACULTY PRATEEK KUMAR DAS
SUBJECT: CHEMICAL ENGINEERING THERMODYNAMICS	No of days per Week Allotted : 04	SEMESTER: AUGUST TO DECEMBER No of Weeks:- 15
Week	Class/ Day	Theory/ Practical Topics
1 ST	1 st	Scope and limitations of Thermodynamics
	2 nd	System, surrounding and boundary
	3 rd	Different types of systems
	4 th	Processes, state, properties
2 ND	1 st	Path and State functions
	2 nd	Heat and Work
	3 rd	Equilibrium state and phases
	4 th	Zeroth law of Thermodynamics
3 rd	1 st	State and explain first law of Thermodynamics
	2 nd	State and explain first law of Thermodynamics
	3 rd	Concept of internal energy, Enthalpy, heat capacity
	4 th	Concept of internal energy, Enthalpy, heat capacity
4 th	1 st	First law of thermodynamics for cyclic process, non-flow process, and flow process
	2 nd	First law of thermodynamics for cyclic process, non-flow process, and flow process
	3 rd	First law of thermodynamics for cyclic process, non-flow process, and flow process
	4 th	Solve numerical on application of 1ST law of thermodynamics
5 th	1 st	Solve numerical on application of 1ST law of thermodynamics
	2 nd	Constant volume process for ideal gases
	3 rd	Constant pressure process for ideal gases
	4 th	Constant temperature process for ideal gases
6 th	1 st	Adiabatic process for ideal gases
	2 nd	Polytrophic process for ideal gases
	3 rd	Solve simple problems
	4 th	Solve simple problems
7 th	1 st	Solve simple problems
	2 nd	Equation of state and ideal gas
	3 rd	P-V-T behavior of pure fluid
	4 th	P-V-T behavior of pure fluid

8 th	1 st	Concept of heat reservoir, heat engine, and heat pump
	2 nd	Concept of heat reservoir, heat engine, and heat pump
	3 rd	State and explain second law of thermodynamics
	4 th	Concept of entropy
9 th	1 st	Concept of entropy
	2 nd	Calculate change of entropy for various conditions
	3 rd	Calculate change of entropy for various conditions
	4 th	Calculate change of entropy for various conditions
10 th	1 st	Third law of Thermodynamics
	2 nd	Solve simple problems
	3 rd	Solve simple problems
	4 th	Classify thermodynamic properties
11 th	1 st	Work function and Gibb's free energy
	2 nd	Work function and Gibb's free energy
	3 rd	Gibb's phase rule
	4 th	Various relationships among thermodynamic properties
12 th	1 st	Maxwell equation
	2 nd	Maxwell equation
	3 rd	Clapeyron equation
	4 th	Entropy-heat capacity relation
13 th	1 st	Differential equation for entropy
	2 nd	Effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv
	3 rd	Effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv
	4 th	Gibb's-Helmholtz equation
14 TH	1 st	Fugacity co-efficient, effect of temperature and pressure on fugacity, fugacity of pure gases, solids and liquids
	2 nd	Fugacity co-efficient, effect of temperature and pressure on fugacity, fugacity of pure gases, solids and liquids
	3 rd	Concept of activity, Effect of pressure and temperature on activity
	4 th	Concept of activity, Effect of pressure and temperature on activity
15 TH	1 st	Concept of Refrigeration and liquefaction process
	2 nd	Objective Questions discussion
	3 rd	Objective Questions discussion
	4 th	Objective Questions discussion

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LESSON PLAN OF 5TH SEMESTER CHEMICAL ENGINEERING

Discipline :- CHEMICAL	Semester:-5 th	Name of the Teaching Faculty Dr. SUSHANTA KUMAR BEHERA
Subject:- Chemical Process Industries – II (TH 3)	No of Days/per Week Class Allotted :-04	SEMESTER: AUGUST TO DECEMBER No of Weeks:- 15
Week	Class Day	Theory/ Practical Topics
1 st	1 st	CHAPTER-1: PESTICIDES Introduction
	2 nd	Pesticides, Classification
	3 rd	Manufacture of DDT
	4 th	DDT flow sheet description & application
2 nd	1 st	CHAPTER-2: PAINTS AND VARNISHES Introduction about paint, varnishes, lacquers, enamels and their components
	2 nd	Constituents of paints and their characteristics
	3 rd	Manufacturing process of paints and varnishes.
	4 th	Failure of paints
3 rd	1 st	Advance technologies in paint industries
	2 nd	CHAPTER-3: EXPLOSIVES Introduction about explosives
	3 rd	Classification of different explosives
	4 th	Manufacture of cellulose nitrate
4 th	1 st	Broad application of cellulose nitrate
	2 nd	Manufacture nitroglycerine and dynamite
	3 rd	CHAPTER-4: PLASTICS Introduction about plastics, types
	4 th	Differentiate between thermoplastic and thermosetting
5 th	1 st	Classification of plastics
	2 nd	Properties and manufacture of phenol formaldehyde and its application
	3 rd	Properties and manufacture of urea formaldehyde and its application
	4 th	Properties and Manufacture of polyethylene and its application
6 th	1 st	Properties and Manufacture of P.V.C and its application
	2 nd	CHAPTER-5: SYNTHETIC FIBERS Introduction about fibre and its classification
	3 rd	Properties of polyamides
	4 th	Manufacture of Nylon and its application
7 th	1 st	Properties and Manufacture of Viscose rayon and its application
	2 nd	Properties and Manufacture of Cupro ammonium rayon and its application
	3 rd	Properties and Manufacture of Acetate rayon and its application
	4 th	Properties and Manufacture of Polyester and its application

8 th	1 st	CHAPTER-6: RUBBER Introduction about rubber and its classification
	2 nd	Vulcanization of rubber
	3 rd	Natural and synthetic rubber
	4 th	Manufacture of SBR and their properties
9 th	1 st	Manufacture of Nitrile rubber and their properties
	2 nd	CHAPTER-7: SUGAR Introduction
	3 rd	Manufacture of sugar from sugarcane
	4 th	Manufacture of industrial alcohol and uses
10 th	1 st	Classification of alcoholic beverages
	2 nd	Properties of Alcohols
	3 rd	Manufacture of Beer
	4 th	Cont...
11 th	1 st	CHAPTER-8: OILS AND FATS Classify different types of oil
	2 nd	Manufacture of vegetable oil
	3 rd	Differentiate edible and essential oil
	4 th	Differentiate oil and fats
12 th	1 st	Hydrogenation of oil and application
	2 nd	Advance technologies in oil production
	3 rd	CHAPTER-9: SOAPS AND DETERGENTS Introduction on soaps and detergent
	4 th	Differentiate between soap and detergent
13 th	1 st	Properties of surfactant
	2 nd	Cleaning action of soap
	3 rd	Types of soap
	4 th	Manufacture of soap and uses
14 th	1 st	Manufacture of detergent and uses
	2 nd	Industrial application of surfactants
	3 rd	CHAPTER-10: PHARMACEUTICAL INDUSTRY Classification of pharmaceutical industry
	4 th	Major pharmaceutical industry in India
15 th	1 st	Pharmaceutical industry products
	2 nd	Properties and structure of penicillin
	3 rd	Manufacture of penicillin by fermentation
	4 th	Application of penicillin

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Discipline :- CHEMICAL	Semester:-5 th	<u>Name of the Teaching Faculty</u> PRATEEK KUMAR DAS
Subject:- Entrepreneurship And Management & Smart Technology (TH 1)	No of Days per Week Allotted :-04	SEMESTER: AUGUST TO DECEMBER No of Weeks:- 15
Week	Class Day	Theory/ Practical Topics
1 st	1 st	Chapter 1: Entrepreneurship Concept /Meaning of Entrepreneurship
	2 nd	Need of Entrepreneurship
	3 rd	Characteristics, Qualities and Types of entrepreneur,
	4 th	Entrepreneur's vs. Manager
2 nd	1 st	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	2 nd	Types of Industries, Concept of Start-ups
	3 rd	Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
	4 th	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
3 rd	1 st	Functions and Barriers in entrepreneurship
	2 nd	Chapter 2: Market Survey and Opportunity Identification (Business Planning) Business Planning
	3 rd	SSI, Ancillary Units, Tiny Units, Service sector Units
	4 th	Time schedule Plan, Agencies to be contacted for Project Implementation
4 th	1 st	Assessment of Demand and supply and Potential areas of Growth
	2 nd	Identifying Business Opportunity
	3 rd	Final Product selection
	4 th	Chapter 3: Project report Preparation Preliminary project report
5 th	1 st	Detailed project report,
	2 nd	Techno economic Feasibility
	3 rd	Project Viability
	4 th	Chapter 4: Management Principles Definitions of management
6 th	1 st	Principles of management
	2 nd	Functions of management (planning, organising, staffing, directing and controlling etc.)
	3 rd	Level of Management in an Organisation
	4 th	Chapter 5: Functional Areas of Management

		Production management: Functions, Activities
7 th	1 st	Productivity Quality control Production Planning and control
	2 nd	Inventory Management
	3 rd	Need for Inventory management
	4 th	Models/Techniques of Inventory management
8 th	1 st	Financial Management
	2 nd	Functions of Financial management
	3 rd	Management of Working capital, Costing (only concept)
	4 th	Break even Analysis
9 th	1 st	Brief idea about Accounting Terminologies: Book Keeping, Journal entry
	2 nd	Marketing Management, Concept of Marketing and Marketing Management
	3 rd	Marketing Techniques, Concept of 4P s (Price, Place, Product, Promotion)
	4 th	Human Resource Management
10 th	1 st	Functions of Personnel Management
	2 nd	Manpower Planning, Recruitment, Sources of manpower,
	3 rd	Selection process, Method of Testing, Methods of Training & Development, Payment of Wages
	4 th	Chapter 6: Leadership and Motivation Definition and Need/Importance
11 th	1 st	Qualities and functions of a leader, Manager Vs Leader
	2 nd	Style of Leadership (Autocratic, Democratic, Participative)
	3 rd	Definition and characteristics of motivation, Importance of motivation
	4 th	Factors affecting motivation, Theories of motivation (Maslow)
12 th	1 st	Methods of Improving Motivation
	2 nd	Importance of Communication in Business
	3 rd	Types and Barriers of Communication
	4 th	Chapter 7: Work Culture, TQM & Safety Human relationship and Performance in Organization
13 th	1 st	Relations with Peers, Superiors and Subordinates
	2 nd	TQM concepts: Quality Policy, Quality Management, Quality system
	3 rd	Accidents and Safety, Cause, preventive measures,
	4 th	General Safety Rules , Personal Protection Equipment(PPE)
14 th	1 st	Chapter 8: Legislation Introduction
	2 nd	Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
	3 rd	Features of Factories Act 1948 with Amendment (only salient points)
	4 th	Features of Payment of Wages Act 1936 (only salient points)
15 th	1 st	Chapter 9: Smart Technology Concept of IOT, How IOT works

	2 nd	Components of IOT, Characteristics of IOT,
	3 rd	Categories of IOT
	4 th	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc

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Discipline :- CHEMICAL	Semester:-5TH	<u>Name of the Teaching Faculty</u> ADYARASHMI MOHANTY
Subject:- INSTRUMENTATION & CHEMICAL ANALYSIS (TH 5)	No of Days per Week Allotted :- 04	SEMESTER: AUGUST TO DECEMBER No of Weeks:- 15
Week	Class Day	Theory/ Practical Topics
1 st	1 st	CHAPTER 1: INSTRUMENT Instruments and its Importance
	2 nd	Standard of measurements
	3 rd	Functional Elements of Instruments
	4 th	Performance characteristics of an Instruments
2 nd	1 st	CHAPTER 2: MEASUREMENTS OF CHARACTERISTICS Measurements of Viscosity by Redwood Viscometer
	2 nd	Falling sphere viscometer
	3 rd	Principle and uses of Spectrophotometer
	4 th	Cont. Principle and uses of Spectrophotometer
3 rd	1 st	Polarimetry, Principle and uses of Polarimeter
	2 nd	Principle and uses of Polarimeter
	3 rd	Refraction, Refractive Index Measurement of Refractive index by Refraction
	4 th	Measurements of Refractive index by Refraction
4 th	1 st	Continuous Viscometer
	2 nd	CHAPTER 3: PH MEASUREMENTS Introduction
	3 rd	Measurements of PH meter
	4 th	Introduction to Electric Conductivity Introduction
5 th	1 st	Conductivity
	2 nd	Measurements of Electric Conductivity
	3 rd	CHAPTER 4: TEMPERATURE MEASUREMENTS Introduction to Temperature
	4 th	Different Temperature Scale
6 th	1 st	Different Temperature Scale
	2 nd	Different method of Temperature Measurements
	3 rd	Different method of Temperature Measurements

	4 th	Temperature measurements by Liquid in glass Thermometer
7 th	1 st	Temperature measurements by Liquid in glass Thermometer
	2 nd	CHAPTER 4: Temperature measurements by Electrical Phenomena Introduction
	3 rd	Temperature measurements by Resistance Thermometer
	4 th	Temperature measurements by Resistance Thermometer
8 th	1 st	Temperature measurements by Thermocouple
	2 nd	Cont. Temperature measurements by Thermocouple
	3 rd	Pyrometer , Introduction to Pyrometer
	4 th	Radiation Pyrometer
9 th	1 st	Cont. Radiation Pyrometer
	2 nd	Optical Pyrometer principle
	3 rd	Cont. Optical Pyrometer
	4 th	Application of Pyrometer
10 th	1 st	CHAPTER 5: PRESSURE MEASUREMENTS Introduction to Pressure
	2 nd	Different types of pressure
	3 rd	Cont. different types of pressure
	4 th	Different method of measurements of pressure
11 th	1 st	Cont. different method of measurements of pressure
	2 nd	Pressure measurements by Bourdon tube
	3 rd	Cont. Pressure measurements by Bourdon tube
	4 th	Pressure measurement by Bourdon tube
12 th	1 st	Pressure measurements by Bellows
	2 nd	Cont. Pressure measurements by Bellows
	3 rd	Maintenance and repair of pressure measuring instruments
	4 th	Cont. Maintenance and repair of pressure measuring instruments
13 th	1 st	CHAPTER 6: AUTOMATIC CONTROL Automatic control system
	2 nd	Explain the application with example
	3 rd	Elementary idea about transfer function for first order system
	4 th	Time constant and transfer function
14 th	1 st	Block diagram and components of process control system
	2 nd	Servo and regulatory type control
	3 rd	Types of control system, advantages and Dis-advantages
	4 th	Open loop and closed loop control
15 th	1 st	Elementary idea about different types of automatic controllers
	2 nd	Principle of PLC
	3 rd	Computer aided measurement and Control
	4 th	Application of PLC.

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DISCIPLINE: CHEMICAL	Semester:-5TH	NAME OF THE TEACHING FACULTY SANJUKTA NAYAK
SUBJECT: MASS TRANSFER-II (TH 2)	No of days per Week Allotted : 04	SEMESTER: AUGUST TO DECEMBER No of Weeks:- 15
Week	Class/ Day	Theory/ Practical Topics
1 ST	1 st	Define Humidification
	2 nd	Wet and dry bulb temperature
	3 rd	Principle of wet blub temperature theory
	4 th	Illustrate humidity chart
2 ND	1 st	Explain different methods of measurement of Humidity
	2 nd	Explain different methods of measurement of Humidity
	3 rd	Different methods of humidification
	4 th	Different methods of dehumidification
3 rd	1 st	The construction and working of natural and mechanical draft cooling tower
	2 nd	The construction and working of natural and mechanical draft cooling tower
	3 rd	The construction and working of natural and mechanical draft cooling tower
	4 th	The construction and working of natural and mechanical draft cooling tower
4 th	1 st	The construction and working of natural and mechanical draft cooling tower
	2 nd	Solve simple problems on Humidification
	3 rd	Define drying
	4 th	Equilibrium moisture curve
5 th	1 st	Equilibrium moisture curve
	2 nd	Moisture content-equilibrium, unbound, free moisture
	3 rd	Moisture content-equilibrium, unbound, free moisture
	4 th	The methods of removing liquids from solids
6 th	1 st	Illustrate constant rate and falling rate period (simple problems)
	2 nd	Illustrate constant rate and falling rate period (simple problems)
	3 rd	Illustrate constant rate and falling rate period (simple problems)
	4 th	Construction and working principle of tray dryer
7 th	1 st	Construction and working principle of rotary dryer

	2 nd	Construction and working principle of spray dryer
	3 rd	Construction and working principle of tunnel dryer
	4 th	Construction and working principle of flash dryer
8 th	1 st	Construction and working principle of fluidized bed dryer
	2 nd	Dryer for heat sensitive materials
	3 rd	Visual representation of different types of dryers
	4 th	Visual representation of different types of dryers
9 th	1 st	Solve simple problems on Drying
	2 nd	Solve simple problems on Drying
	3 rd	Liquid extraction and leaching
	4 th	Different types of extraction
10 th	1 st	Principle of solid liquid extraction
	2 nd	Batch and continuous leaching
	3 rd	Batch and continuous leaching
	4 th	Solid-Liquid extraction equipment
11 th	1 st	Solid-Liquid extraction equipment
	2 nd	Solid-Liquid extraction equipment
	3 rd	Solid-Liquid extraction equipment
	4 th	Principle of liquid-liquid extraction
12 th	1 st	Parameter in choice of solvent for liquid-liquid extraction
	2 nd	Construction and working principle of liquid-liquid extraction equipment
	3 rd	Construction and working principle of liquid-liquid extraction equipment
	4 th	Construction and working principle of liquid-liquid extraction equipment
13 th	1 st	Solve simple problems on extraction
	2 nd	Solve simple problems on extraction
	3 rd	Solve simple problems on extraction
	4 th	Objective questions on Extraction
14 TH	1 st	Objective questions on Extraction
	2 nd	Define crystallization
	3 rd	Principle of crystallization
	4 th	Principle of crystallization
15 TH	1 st	Construction and working of different types of batch and continuous crystallizer
	2 nd	Construction and working of different types of batch and continuous crystallizer
	3 rd	Solve simple problems on Crystallization
	4 th	Objective questions on Crystallization