GOVERNMENT POLYTECHNIC JAGATSINGHPUR

LESSON PLAN OF 5TH SEMESTER CHEMICAL ENGINEERING

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

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

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

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

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LESSON PLAN OF 5TH SEMESTER CHEMICAL ENGINEERING		
Discipline :- **CHEMICAL**	Semester:-**5th**	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: OCTOBER TO JANUARY** **No of Weeks:- 15**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1st	**CHAPTER-1: PESTICIDES** Introduction
	2nd	Pesticides, Classification
	3rd	Manufacture of DDT
	4th	DDT flow sheet description & application
2nd	1st	**CHAPTER-2: PAINTS AND VARNISHES** Introduction about paint, varnishes, lacquers, enamels and their components
	2nd	Constituents of paints and their characteristics
	3rd	Manufacturing process of paints and varnishes.
	4th	Failure of paints
3rd	1st	Advance technologies in paint industries
	2nd	**CHAPTER-3: EXPLOSIVES** Introduction about explosives
	3rd	Classification of different explosives
	4th	Manufacture of cellulose nitrate
4th	1st	Broad application of cellulose nitrate
	2nd	Manufacture nitroglycerine and dynamite
	3rd	**CHAPTER-4: PLASTICS** Introduction about plastics, types
	4th	Differentiate between thermoplastic and thermosetting
5th	1st	Classification of plastics
	2nd	Properties and manufacture of phenol formaldehyde and its application
	3rd	Properties and manufacture of urea formaldehyde and its application
	4th	Properties and Manufacture of polyethylene and its application
6th	1st	Properties and Manufacture of P.V.C and its application
	2nd	**CHAPTER-5: SYNTHETIC FIBERS** Introduction about fibre and its classification
	3rd	Properties of polyamides
	4th	Manufacture of Nylon and its application
7th	1st	Properties and Manufacture of Viscose rayon and its application
	2nd	Properties and Manufacture of Cupro ammonium rayon and its application
	3rd	Properties and Manufacture of Acetate rayon and its application
	4th	Properties and Manufacture of Polyester and its application

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

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: OCTOBER TO JANUARY No of Weeks:- 15**
Week	**Class/ Day**	**Theory/ Practical Topics**
1ST	1st	Scope and limitations of Thermodynamics
	2nd	System, surrounding and boundary
	3rd	Different types of systems
	4th	Processes, state, properties
2ND	1st	Path and State functions
	2nd	Heat and Work
	3rd	Equilibrium state and phases
	4th	Zeroth law of Thermodynamics
3rd	1st	State and explain first law of Thermodynamics
	2nd	State and explain first law of Thermodynamics
	3rd	Concept of internal energy, Enthalpy, heat capacity
	4th	Concept of internal energy, Enthalpy, heat capacity
4th	1st	First law of thermodynamics for cyclic process, non-flow process, and flow process
	2nd	First law of thermodynamics for cyclic process, non-flow process, and flow process
	3rd	First law of thermodynamics for cyclic process, non-flow process, and flow process
	4th	Solve numerical on application of 1ST law of thermodynamics
5th	1st	Solve numerical on application of 1ST law of thermodynamics
	2nd	Constant volume process for ideal gases
	3rd	Constant pressure process for ideal gases
	4th	Constant temperature process for ideal gases
6th	1st	Adiabatic process for ideal gases
	2nd	Polytrophic process for ideal gases
	3rd	Solve simple problems
	4th	Solve simple problems
7th	1st	Solve simple problems
	2nd	Equation of state and ideal gas
	3rd	P-V-T behavior of pure fluid
	4th	P-V-T behavior of pure fluid

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

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

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