

SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIO AND CHEMICAL ENGINEERING

Department of Chemical Engineering

MINUTES OF BOARD OF STUDIES 24th June 2022

Venue: Presentation Hall, Department of Chemical Engineering, Sathyabama Institute of Science and Technology

The following members were present in the meeting:

1. Dr.Vignesh Muthu Vijayan – Associate Professor – IIT Madras – External member
2. Dr.K.Sathish Kumar – Associate Professor – SSN college of Engineering – External member
3. Dr.S.Sathish – Associate Professor – Head of the Department
4. Dr.D.Prabu – Associate Professor – Internal member
5. Dr.A. Annam Renita – Professor – Internal member
6. Dr. S.S.Dawn – Professor – Head (Centre for Waste Management) – Internal member
7. Dr.D.Venkatesan – Associate Professor – Internal member
8. Dr.M.Karthikeyan – Asst. Professor – Internal member
9. Mr.Michel Rahul Soosai– Asst. Professor – Internal member

Chairperson welcomed the members to give their valuable suggestions for enhancing the syllabus. The minutes of BoS meeting was held on 24th June 2022, were reviewed and approved by the members. The comments were placed in 15th Academic Council and the same was approved.

1. Agenda item # 1 Wide scope of open electives provided

Head of the Department proposed inclusion of many open electives in order to facilitate students from entire institute to have interdisciplinary knowledge and proposed a total of 25 open electives

Recommendations: The External members thoroughly discussed the syllabus of open electives and resolved to approve the same.



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CHEMICAL ENGINEERING

2. Agenda item # 2 Introduction of new courses

The Head of the department highlighted the introduction of new courses as per the current scenario

- **Recommendations:** The BOS members suggested to introduce the new courses in the curriculum.

3. Agenda item # 3 Introduction of Petroleum Chemistry (SCHA3014)

Petroleum Chemistry encompassing the core aspects of petroleum engineering was proposed for Department of Chemical Engineering

Resolutions: Approved as recommended.

4. Agenda item # 4 HSE & FE IN PETROLEUM INDUSTRY(SCHA3015)

HSE & FE IN PETROLEUM INDUSTRY encompassing the core aspects of health safety and environment and fire explosion was proposed for Department of Chemical Engineering

Resolutions: Approved as recommended.

5. Agenda item # 5 Introduction of Synthesize and Characterization of Nanomaterials (SCHA3016)

Synthesize and Characterization of Nanomaterials encompassing the core aspects of Preparation and characterization of nanomaterials was proposed for Department of Chemical Engineering.

Resolutions: Approved as recommended

6. Agenda item # 6 Included 4 new experiments in Technical Analysis and Instrumentation Lab (SCHA2203) To upgrade the syllabus some core techniques like testing pH, conductivity, TDS, turbidity and the refractive index of the samples was proposed for Technical analysis and instrumentation lab.

Resolutions: Approved as recommended



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CHEMICAL ENGINEERING

7. Agenda item # 7 proposed new experiments in **Unit Operation Lab (SCHA2307)** To upgrade the syllabus some core operations comparison of screen effectiveness by mechanical and manual, pressure drop calculation in packed bed followed by size reduction using hammer mill and jaw crusher was proposed for Unit operation lab.

Resolutions: Approved as recommended

8. Agenda item # 8 proposed new experiments in **Chemical Reaction Engineering Lab (SCHA2505)** To upgrade the curriculum, photochemical reactor and packed bed reactor performance study was proposed for chemical reaction engineering laboratory..

Resolutions: Approved as recommended

Meeting ended with a vote of thanks by the Chair Person.

S.No	Name	Designation	Signature
1	Dr.Vignesh Muthu Vijayan	Associate Professor – IIT Madras – External member	M. Vignesh
2	Dr.K.Sathish Kumar	Associate Professor – SSN college of Engineering – External member	K. Sathish Kumar
3	Dr.S.Sathish	Associate Professor – Head of the Department	S. Sathish
4	Dr.A. Annam Renita	Professor – Internal member	A. Annam Renita
5	Dr.D.Prabu	Associate Professor – Internal member	D. Prabu
6	Dr.D.Venkatesan	Associate Professor – Internal member	D. Venkatesan 29/6
7	Dr. S.S.Dawn	Professor – Head (Centre for Waste Management) – Internal member	S. S. Dawn
8	Dr.M.Karthikeyan	Asst. Professor – Internal member	M. Karthikeyan
9	Mr.Michel Rahul Soosai	Asst. Professor – Internal member	M. Michel Rahul Soosai



S. Sathish
CHEMICAL ENGINEERING

SCHA3014	PETROLEUM CHEMISTRY	L	T	P	EL	Credits	Total Marks
		3	1	0	0	3	100

Course Objective

- Understand factors that affect the choice of production chemicals including greener chemicals.
- Understand the control of production chemicals for the oil & gas industry

UNIT I Introduction

9hr

Composition of Petroleum – separation by molecular weight, type; Composition maps; Petroleum analysis and evaluation – ASTM evaluation, spectroscopic methods

UNIT II Composition

9hr

Metals and heteroatom's in heavy crude oil – heteroatom's concentrations, structure of heteroatom functions; Asphaltenes and structure of petroleum

UNIT

III

Chemistry

9hr

Thermal chemistry of petroleum constituents – visbreaking, coking, hydro treating, Hydrocracking

UNIT IV Heavy oil

9hr

Heavy oil up gradation processes- carbon rejection, hydrogen addition; Hydrocracking – reactions, catalysts, process configurations

UNIT V Residual Products

9hr

Instability of petroleum products – distillate and residual products; Incompatibility in refining Operations

Max: 45 hrs

COURSE OUTCOMES:

to be done

On completion of the course, student will able to

- CO1 - Convert the Composition of Petroleum
- CO2 - Construct the Metals and heteroatoms in heavy crude oil.
- CO3 - Examine Thermal chemistry of petroleum constituents.
- CO4 - Analyze the Heavy oil up gradation processes and its applications
- CO5 - Evaluate Hydrocracking systems
- CO6 - Apply the concept of Instability of petroleum products

TEXT BOOK REFERENCE

1. Speight, J.G., The chemistry and technology of petroleum, Marcel Dekker, New York, 1998
2. Speight, J.G., Petroleum chemistry and refining Taylor and Francis, London, 1998
3. Production Chemicals for the Oil & Gas Industry, 2 nd Edition, CRC Press, Malcolm A. Kelland
4. The Chemistry and Technology of Petroleum, by James G. Speight, Fourth Edition, 4th Edition., 2010

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3 Hrs.

PART A : 10 Questions of 2marks each-No choice

20 MARKS

PART B : 2 Questions from each unit of internal choice, each carrying 16marks

80 MARKS



D. Vignesh
Srinivas

SCHA3015	HSE & FE IN PETROLEUM INDUSTRY	L	T	P	EL	Credits	Total Marks
		3	1	0	0	3	100

Course objectives

- Knowledge of environment issues and all related acts, drilling fluids and its toxic effects with environment.
- Treatment of produced water and makeup water and its disposal as per state pollution control board norms, oil mines regulations and proper implementation in drilling & production mines as per Act.

UNIT I Introduction

9hr

Introduction to environmental control in the petroleum industry: Overview of environmental issues- A new attitude. Drilling and production operations

UNIT II

Impact of drilling and production operations

9hr

: Measuring toxicity- Hydrocarbons- Salt-Heavy metals- Production chemicals- Drilling fluids- Produced water, Air pollution- Acoustic impacts- Effects of offshore platforms- Risk assessment. Environmental transport of petroleum wastes.

UNIT III

Oil mines regulations

9hr

Introduction-Returns, Notices and plans- Inspector, management and duties- Drilling and work over- Production- Transport by pipelines- Protection against gases and fires- Machinery, plants and equipment- General safety provisions.

UNIT IV Risk analysis

9hr

Toxicity, physiological, respiratory, skin effect of petroleum hydrocarbons and their mixture. Guidelines for occupational health monitoring in oil and gas industry. Corrosion in petroleum industry- Additives during acidizing, sand control and fracturing.

UNIT V Hazards

9hr

Hazard identification- Hazard evaluation- Hazop and what if reviews- Developing a safe process and safety management- Personal protection systems and measures. Guidelines on internal safety audits (procedures and checklist). Work permits systems. Well blowout fires and their control- Fire fight equipment- Suppression of hydrocarbons fires.

Max: 45hrs

TEXT BOOKS REFERENCE:

1. Environmental Control in Petroleum Engineering, John C. Reis, Gulf Publishing Company, 1996.
2. Application of HAZOP and What if Reviews to the Petroleum, Petrochemical and Chemical Process Industries, Dennis P. Nolan, Noyes Publications, 1994.
3. Oil Industry Safety Directorate (OISD) Guidelines, Ministry of Petroleum & Natural Gas, Government of India and Oil Mines Regulations-1984, Directorate General of Mines Safety, Ministry of Labor and Employment, Government of India.
4. Guidelines for Process Safety Fundamentals in General Plant Operations Centre for Chemical Process Safety, American Institute of Chemical Engineers, 1995.
5. Guidelines for Fire Protection in Chemical, Petrochemical and Hydrocarbon Processing Facilities, Centre for Chemical Process Safety, American Institute of Chemical Engineers, 2003.

COURSE OUTCOMES:

On completion of the course, student will be able to

- CO1 - Convert to be conversant with the knowledge of various Acts related to safety
- CO2 - Construct the various drilling fluids handling.
- CO3 - Examine Hazop to petroleum equipment operation.
- CO4 - Mitigate occupational health hazards in the industry
- CO5 - Evaluate Hydrocracking systems
- CO6 - Apply the concept of Instability of petroleum products



D. Vignesh
Srinivas

SCHA3016	SYNTHESIS AND CHARACTERIZATION OF NANOMATERIALS	L	T	P	EL	Credits	Total Marks
		3	1	0	0	3	100

Course Objective

- To impart knowledge on the nanomaterials
- To understand the methods of synthesizing nanomaterials
- To understand the characterization of nanomaterials

UNIT I Classification

9hr

Classifications and types of nanomaterials as nano particles and 1D 2D 3D, nanomaterials. Concept of bulk versus nanomaterials and dependence of properties on size. Introduction to 'Top down' vs. 'Bottom up' approach of synthesis with suitable examples.

UNIT II

Synthesis of nanomaterials

9hr

Nano synthesis techniques based on liquid and vapor phase as the starting material. The study of wet chemical method like sol-gel method, hydrothermal, micro emulsion technique, chemical reduction, decomposition of organometallic precursors and chemical vapor deposition, metallo-organic chemical vapor deposition.

UNIT III

Mechanical methods

9hr

Mechanical milling, laser ablation, microwave and ultrasound assisted synthesis sputtering and microwave plasma, photolysis, radiolysis, surfactant behavior, micelles, self-assembled mono layers (SAM's), Langmuir-Blodgett (LB) films.

UNIT IV QD's nanowires

9hr

Preparation of quantum dots, nanowires and films, preparation of single walled and multiwalled nanotubes

UNIT V Characterization

9hr

Techniques of characterization of size of nano powders/ particles using BET method and laser diffraction. Various spectroscopic techniques like optical spectroscopy. UV visible and infrared spectroscopy. Raman spectroscopy. X-ray photoelectron spectroscopy. Basic understanding of each technique with special emphasis on characterization at nano scale. X-ray Fluorescence (XRF), X-ray diffraction (XRD) and Small Angle X-ray Scattering principles

Max: 45hrs

TEXT BOOK REFERENCE

1. Nanomaterials Chemistry by Rao C. N., A. Muller, A. K. Cheetham, WileyVCH, 2007.
2. Nanomaterials and Nanochemistry by Brechignac C., P. Houdy, M. Lahmani, Springer publication, 2007.
3. Nanoscale materials in chemistry by Kenneth J. Klabunde, Wiley Interscience Publications, 2001.
4. Nanochemistry by Sergeev G.B., Elsevier publication, 2006.
5. Nanostructures and Nanomaterials, synthesis, properties and applications by Guozhong Cao, Imperial College Press, 2004.

COURSE OUTCOMES:

On completion of the course, student will able to

CO1 - Understand the types of nanomaterials with examples

CO2 - Study the techniques used for top down and bottom-up approach

CO3 - Production of nanoparticles by different methods *mechanical methods*

CO4 - Understand the assemblage of nanomaterials

CO5 - Understand the quantum dots, nanowires and films

CO6 - Understand the characterization of nanomaterials



D. Vignesh

S. S. S. S.

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIO AND CHEMICAL ENGINEERING

Department of Chemical Engineering

MINUTES OF BOARD OF STUDIES 23rd Jan 2023

Venue: Presentation Hall, Department of Chemical Engineering, Sathyabama Institute of Science and Technology

The following members were present in the meeting:

1. Dr.Vignesh Muthu Vijayan – Associate Professor – IIT Madras – External member
2. Dr.K.Sathish Kumar – Associate Professor – SSN college of Engineering – External member
3. Dr.S.Sathish – Associate Professor – Head of the Department
4. Dr.D.Prabu – Associate Professor – Internal member
5. Dr.A. Annam Renita – Professor – Internal member
6. Dr. S.S.Dawn – Professor – Head (Centre for Waste Management) – Internal member
7. Dr.D.Venkastesan – Associate Professor – Internal member
8. Dr.M.Karthikeyan – Asst. Professor – Internal member
9. Mr.Michel Rahul Soosai– Asst. Professor – Internal member

Chairperson welcomed the members to give their valuable suggestions for enhancing the syllabus. The minutes of BoS meeting was held on 23rd January, were reviewed and approved by the members. The comments were placed in 15th Academic Council and the same was approved.

1. Agenda item # 1

The members had a brainstorming discussion Head of the Department proposed inclusion of many open electives in order to facilitate students from entire institute to have interdisciplinary knowledge and proposed a total of 25 open electives

Recommendations: The External members thoroughly discussed the syllabus of open electives and resolved to approve the same.

2. Agenda item # 2 Introduction of new courses

The Head of the department highlighted the notification from AICTE that credits of the curriculum have to be reduced from 162 from next academic year



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CHEMICAL ENGINEERING

- **Recommendations:** The BOS members suggested to include the three new course in the curriculum while reduction of credits and to adjust the total credits to be adjusted across the semesters

Resolutions: The BoS approved the introduction of the new course.

3. Agenda item # 3 Introduction of new experiments in courses

The Head of the department highlighted the notification from AICTE that credits of the curriculum have to be reduced from 162 from next academic year

- **Recommendations:** The BOS members suggested to include the new experiments in the curriculum while reduction of credits and to adjust the total credits to be adjusted across the semesters

Resolutions: The BoS approved the introduction of the new course.

4. Agenda item # 9 proposed new exercises in **MAT LAB (SCHA2506)** To upgrade the curriculum, Arithmetic operations using LABVIEW, building VI to demonstrate conversion and subroutine for conversion of centigrade to Fahrenheit using Labview was proposed for MATLAB.

Resolutions: Approved as recommended

5. Agenda item # 10 proposed new design and drawing in **PROCESS EQUIPMENT DESIGN AND DRAWING LAB (SCHA2604)** To upgrade the design lab, design and drawing of shell and tube heat exchanger and reboiler followed by design and drawing of decantation were proposed for lab.

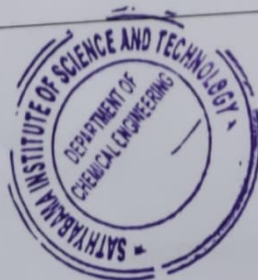
Resolutions: Approved as recommended

6. Agenda item # 11 proposed new mass transfer experiments in **MASS TRANSFER LAB (SCHA2405)** To enhance the mass transfer lab, T-x-y diagram for water -acetone system and RDC for extraction system were proposed for Mass transfer lab.

Resolutions: Approved as recommended.

Meeting ended with a vote of thanks by the Chair Person.

S.No	Name	Designation	Signature
1	Dr.Vignesh Muthu Vijayan	Associate Professor – IIT Madras – External member	M. Vignesh
2	Dr.K.Sathish Kumar	Associate Professor – SSN college of Engineering – External member	K. Sathish Kumar
3	Dr.S.Sathish	Associate Professor – Head	S. Sathish



[Signature]
CHEMICAL ENGINEERING

		of the Department	
4	Dr.A. Annam Renita	Professor – Internal member	<i>du</i>
5	Dr.D.Prabu	Associate Professor – Internal member	<i>Dr. D. Prabu</i>
6	Dr.D.Venkastesan	Associate Professor – Internal member	<i>Dr. D. Venkastesan</i>
7	Dr. S.S.Dawn	Professor – Head (Centre for Waste Management) – Internal member	<i>Dr. S.S. Dawn</i>
8	Dr.M.Karthikeyan	Asst. Professor – Internal member	<i>Dr. M. Karthikeyan</i>
9	Mr.Michel Rahul Soosai	Asst. Professor – Internal member	<i>Mr. Michel Rahul Soosai</i>





SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

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School of Bio and Chemical Engineering

Department of Chemical Engineering

New Courses Introduced in 2022- 2023

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SCHA3014	PETROLEUM CHEMISTRY	L	T	P	EL	C	Total Marks
		3	0	0	0	3	100

Course Objective:

- A discipline which studies the various problems associated with petroleum production.
- To develop greater and better ways of solving associated problems with production of petroleum products.

UNIT 1: INTRODUCTION

9 Hours

Composition of Petroleum – separation by molecular weight, type; Composition maps; Petroleum analysis and evaluation – ASTM evaluation, spectroscopic methods

UNIT 2: COMPOSITION OF CRUDES

9 Hours

Metals and heteroatom's in heavy crude oil – heteroatom's concentrations, structure of heteroatom functions; Asphaltenes and structure of petroleum

UNIT 3: HEAVIER DISTILLATES

9 Hours

Thermal chemistry of petroleum constituents – visbreaking, coking, hydro treating, Hydrocracking

UNIT 4: UPGRADATION PROCESS

9 Hours

Heavy oil up gradation processes- carbon rejection, hydrogen addition; Hydrocracking – reactions, catalysts, process configurations

UNIT 5: REFINING OPERATIONS

9 Hours

Instability of petroleum products – distillate and residual products; Incompatibility in refining Operations

Total hours: 45

COURSE OUTCOMES:

- CO1. - Utilize the Composition of Petroleum
- CO2. - Apply the Metals and heteroatoms in heavy crude oil.
- CO3. - Examine Thermal chemistry of petroleum constituents.
- CO4. - Analyze the Heavy oil up gradation processes and its applications
- CO5. - Evaluate Hydro cracking systems
- CO6. - Apply the concept of Instability of petroleum products

TEXT / REFERENCE BOOKS

1. Speight, J.G., The chemistry and technology of petroleum, Marcel Dekker, New York, 1998
2. Speight, J.G., Petroleum chemistry and refining Taylor and Francis, London, 1998
3. Production Chemicals for the Oil & Gas Industry, 2 nd Edition, CRC Press, Malcolm A. Kelland
4. The Chemistry and Technology of Petroleum, by James G. Speight, Fourth Edition, 4th Edition. 2010

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration: 3Hrs.

PartA:10 Questions of 2marks each-No choice

20 Marks

PartB:2 Questions from each unit of internal choice, each carrying 16marks

80 Marks

New Course

SCHA3015	HSE & FE IN PETROLEUM INDUSTRY	L	T	P	EL	C	Total Marks
		3	0	0	0	3	100

Course Objective:

- Knowledge of environment issues and all related acts, drilling fluids and its toxic effects with environment..
- Treatment of produced water and makeup water and its disposal as per state pollution control board norms.
- Oil mines regulations and proper implementation in drilling & production mines as per Act.

UNIT 1: INTRODUCTION

9 Hours

Introduction to environmental control in the petroleum industry: Overview of environmental issues- A new attitude .Drilling and production operations

UNIT 2: Impact of drilling and production operations

9 Hours

Measuring toxicity- Hydrocarbons- Salt-Heavy metals- Production chemicals- Drilling fluids- Produced water, Air pollution- Acoustic impacts- Effects of offshore platforms- Risk assessment. Environmental transport of petroleum wastes.

UNIT 3: Mines regulations

9 Hours

Introduction>Returns, Notices and plans- Inspector, management and duties- Drilling and work over- Production- Transport by pipelines- Protection against gases and fires- Machinery, plants and equipment- General safety provisions.

UNIT 4: RISK ANALYSIS

9 Hours

Toxicity, physiological, respiratory, skin effect of petroleum hydrocarbons and their mixture. Guidelines for occupational health monitoring in oil and gas industry. Corrosion in petroleum industry- Additives during acidizing, sand control and fracturing.

UNIT 5: HAZARDS

9 Hours

Hazard identification- Hazard evaluation- Hazop and what if reviews- Developing a safe process and safety management- Personal protection systems and measures. Guidelines on internal safety audits (procedures and checklist). Work permits systems. Well blowout fires and their control- Fire fight equipment-Suppression of hydrocarbons fires.

Total hours: 45

COURSE OUTCOMES:

- CO1. - Utilize the knowledge of various act related to safety
CO2. - Apply the concepts involved in drilling operations.
CO3. - Examine the drilling fluids and their composition
CO4. - Analyze the oil storage and transportation
CO5. - Evaluate the risk analysis
CO6. - Apply the concept safety on petroleum products

TEXT / REFERENCE BOOKS

1. Environmental Control in Petroleum Engineering, John C. Reis, Gulf Publishing Company, 1996.
2. Application of HAZOP and What if Reviews to the Petroleum, Petrochemical and Chemical Process Industries, Dennis P. Nolan, Noyes Publications, 1994.
3. Oil Industry Safety Directorate (OISD) Guidelines, Ministry of Petroleum & Natural Gas, Government of India and Oil Mines Regulations-1984, Directorate General of Mines Safety, Ministry of Labor and Employment, Government of India.
4. Guidelines for Process Safety Fundamentals in General Plant Operations Centre for Chemical Process Safety, American Institute of Chemical Engineers, 1995.
5. Guidelines for Fire Protection in Chemical, Petrochemical and Hydrocarbon Processing Facilities, Centre for Chemical Process Safety, American Institute of Chemical Engineers, 2003.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration: 3Hrs.

PartA:10 Questions of 2marks each-No choice

20 Marks

PartB:2 Questions from each unit of internal choice, each carrying 16marks

80 Marks

SCHA3016	SYNTHESIS AND CHARACTERIZATION OF	L	T	P	EL	C	Total Marks
	NANOMATERIALS	3	0	0	0	3	100

Course Objective:

- To impart knowledge on the nanomaterials
- To understand the methods of synthesizing nanomaterials
- To understand the characterization of nanomaterials

UNIT 1: CLASSIFICATIONS

9 Hours

Classifications and types of nanomaterials as nano particles and 1D 2D 3D, nanomaterials. Concept of bulk versus nanomaterials and dependence of properties on size. Introduction to 'Top down' vs. 'Bottom up' approach of synthesis with suitable examples.

UNIT 2:SYNTHESIS OF NANOMATERIALS

9 Hours

Nano synthesis techniques based on liquid and vapor phase as the starting material. The study of wet chemical method like sol-gel method, hydrothermal, micro emulsion technique, chemical reduction, decomposition of organometallic precursors and chemical vapor deposition, metallo-organic chemical vapor deposition.

UNIT 3:MECHANICAL METHODS

9 Hours

Mechanical milling, laser ablation, microwave and ultrasound assisted synthesis sputtering and microwave plasma, photolysis, radiolysis, surfactant behavior, micelles, self-assembled mono layers (SAM's), Langmuir-Blodgett (LB)films.

UNIT 4:QD'S NANOWIRES

9 Hours

Preparation of quantum dots, nanowires and films, preparation of single walled and multiwalled nanotubes

UNIT 5:CHARATERIZATION

9 Hours

Techniques of characterization of size of nano powders/ particles using BET method and laser diffraction. Various spectroscopic techniques like optical spectroscopy. UV visible and Infrared spectroscopy. Raman spectroscopy. X-ray photoelectron spectroscopy. Basic understanding of each technique with special emphasis on characterization at nano scale. X-ray Fluorescence (XRF), X-ray diffraction (XRD) and Small Angle X-ray Scattering principles

Total hours: 45

COURSE OUTCOMES:

- CO1. - Utilize the types of nanomaterials with examples
CO2. - Apply the techniques used for top down and bottom-up approach.
CO3. - Examine the production of nanoparticles by different methods.
CO4. - Analyze the assemblage of nanomaterials
CO5. - Evaluate the quantum dots, nanowires and films
CO6. - Apply the characterization of nanomaterials

TEXT / REFERENCE BOOKS

1. .Nanomaterials Chemistry by Rao C. N., A. Muller, A. K. Cheetham, WileyVCH , 2007.
2. Nanomaterials and Nanochemistry by Brechignac C., P. Houdy, M. Lahmani, Springerpublication, 2007.
3. Nanoscale materials in chemistry by Kenneth J. Klabunde, Wiley IntersciencePublications,2001.
4. Nanochemistry by Sergeev G.B., Elseiver publication,2006.
5. Nanostructures and Nanomaterials, synthesis, properties and applications by Guozhong Cao, Imperial College Press, 2004.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration: 3Hrs.

PartA:10 Questions of 2marks each-No choice

20 Marks

PartB:2 Questions from each unit of internal choice, each carrying 16marks

80 Marks

New Course

SCHA2203	TECHNICAL ANALYSIS & INSTRUMENTATION LAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Determination of Inversion of Sucrose by using Rudolf Polarimeter
2. Determination of Liquid Vapor Equilibrium in a Binary System by using Abbe' Refractometer
3. Determination of Eutectic temperature and composition of a simple Eutectic system.
4. Determination of critical solution temperature of phenol-water system.
5. Determination of molecular weight by Rast's method.
6. Determination of partition coefficient of Iodine between two immiscible solvents.
7. Determination of cell constant & to verify Ostwald's dilution law.
8. Determination of Hardness of water for the given sample.
9. Determination of available chlorine in bleaching powder.
10. Determination of Saponification value of oil.
11. Determination of TFM & Alkalinity of given soap.
12. Determination of MnO_2 in the given ore.
13. Estimation of pH of the test sample
14. Estimate the conductivity of the sample
15. Estimate the TDS and turbidity of the given sample
16. Estimate the refractive index of the sample

SCHA2307	UNIT OPERATIONS LAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Flow through Venturimeter
2. Flow through Orifice meter
3. Flow through Pitot tube
4. Characteristics of a Reciprocating pump
5. Characteristics of a Centrifugal pump
6. Characteristics of a Gear pump
7. Flow through packed bed
8. Flow through helical coil
9. Flow through V- Notches
10. Flow through annular pipe/ non circular conduits
11. Particle size distribution - differential and cumulative analysis by manual method using standard screens
12. Determination of Screen Effectiveness by Mechanical Method using Standard screens
13. Comparison of Screen Effectiveness by Mechanical Method and manual method
14. Energy requirement and crushing constants determination using Ball mill
15. Energy requirement and crushing constants determination using Drop weight crusher
15. Determination of filtration constants at constant pressure conditions using Vacuum Leaf Filter
16. Minimum thickener area calculations performing Batch Sedimentation test
17. Estimate the pressure drop through packed bed column
18. Study of size reduction in hammer mill and jaw crusher



Added content



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SCHA2505	CHEMICAL REACTION ENGINEERING LAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Interpretation of Batch Reactor Data
2. RTD Studies in Plug Flow Reactor using step input
3. RTD Studies in Mixed Flow Reactor using step input
4. Performance study on Combined Reactors (PFR Followed by MFR)
5. Performance study on Combined Reactors (MFR Followed by PFR)
6. Performance Study on Semi Batch Reactor
7. Kinetic Studies in a Mixed Flow Reactor
8. Kinetic Studies in a Plug Flow Reactor
9. Determination of Rate of Dissociation using Solid – Liquid Non Catalytic Reactor
10. Study on Packed Bed Catalytic Reactor
11. Adiabatic Reactor
12. Performance study on photochemical reactor
13. Performance study on packed bed reactor

SCHA2506	MATLAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Program to calculate the vapor pressure of water by using Antoine equation
5. Program to find the Bottoms and distillate composition in distillation column
6. Program to find out the feed and product composition in mixer
7. Estimation of average boiling point of a water /ethanol system at different water composition
8. Estimation of composition in sequence of distillation column
9. Calculation of vapor pressure vapour using pressure vs. temperature data in fourth order polynomial equation
10. Calculation of average density, conductivity and specific heat for water in various rage of temperature
11. Arithmetic operations using Labview
12. Building VI to demonstrate conversion of Centigrade to Fahrenheit and using Labview
13. Building VI to create a subroutine for conversion of Centigrade to Fahrenheit using Labview

SCHA2604	PROCESS EQUIPMENT DESIGN AND DRAWING LAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Detailed design and drawing of enclosures and supports.
2. Detailed design and drawing of agitated vessel.
3. Detailed design and drawing of basket centrifuge.
4. Detailed design and drawing of gravity thickener.
5. Detailed design and drawing of cyclone separator.
6. Detailed design and drawing of crystallizer.
7. Detailed design and drawing of cooling tower.
8. Introduction to computer aided design of equipments.
9. Detailed design and drawing of various types of heat exchangers – Shell and tube heat exchanger, Reboiler
10. Detailed design and drawing of various types of evaporators.
11. Detailed design and drawing of distillation column.
12. Detailed design and drawing of absorber.
13. Detailed design and drawing of rotary dryer.
14. Detailed design and drawing of decantation



SCHA2405	MASS TRANSFER LAB	L	T	P	C	Max. Marks
		0	0	4	2	100

1. Study the drying characteristics of calcium carbonate and find the critical moisture content and equilibrium moisture content of the sample.
2. Determine the diffusivity coefficient for the acetone - air system.
3. Determine the diffusivity coefficient for oxalic acid in water at different temperatures.
4. Verify Rayleigh's equation for the given acetone - water system by simple distillation.
5. Conduct a batch leaching test to leach out sodium carbonate from the mixture given and hence find out the percentage of sodium carbonate leached out.
6. Verify Freundlich equation for the adsorption of oxalic acid onto activated carbon.
7. Determine the liquid - liquid equilibrium of the system (Benzene - Acetic acid - Water) and hence draw the ternary graph for the system.
8. Determine the mass transfer coefficient for the given system using Wetted wall column.
9. Determine the HETP of the packed column by Fenske's method.
9. Studies on the Vapor Liquid Equilibrium (VLE) for the given system
11. Studies on the Absorption of Carbon dioxide in NaOH
12. T-x-y diagram for water-acetone system.
13. Study on RDC for extraction system