



List of Employability Courses Revised/Newly Introduced

Department : *Chemical Engineering*

Program Name : *B.Tech.*

Academic Year : 2018-19

List of Employability courses Revised/newly introduced

Sr. No.	Course Code	Name of the Course
01.	CH7TPC15	New Separation Processes
02.	CH7TPE41	Petroleum Refinery Engineering
03.	CH8TPC17	Project Engineering, Economics & Management
04.	CH8TPE51	Petrochemical Technology
05.	CH8TOE41	Optimization Techniques
06.	CH7TPC13	Process Equipment Design-II
07.	CH8TPE53	Membrane Separation Processes
08.	CH8TOE42	Process Modeling & Simulation
09.	CH02TES03	Thermodynamics



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : School of Studies of Engineering and Technology

Department : Chemical Engineering

Date and Time : May 15, 2018 - 11:00 AM

Venue : HoD room

Minutes of Meeting

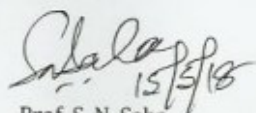
The scheduled meeting of members of Board of Studies (BOS) was held today (15th May 2018) in the office of the HoD Chemical Engineering to design and discuss the scheme and syllabus of B.Tech. (Chemical Engineering) VII and VIII Semester as per CBCS. Following members were present in the meeting :

1. Prof. S. N. Saha (HoD Chemical Engg. - cum- Chairman, BOS)
2. Dr. A. K. Chandrakar (Member BOS, Asst. Prof., Dept. of Chemical Engg.)
3. Mr. Neeraj Chandraker (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
4. Mr. Amit Jain (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
5. Mrs. A. N. Joshi (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
6. Mr. G. P. Dewangan (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
7. Mr. V. P. Yadav (Invited Member, Asst. Prof., Dept. of Chemical Engg.)

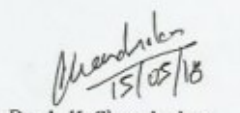
In this meeting, above mentioned members discussed and proposed the scheme and syllabus of B. Tech. (Chemical Engineering) VII and VIII semester as per CBCS as enclosed 20 pages duly signed by the chairman, member and invited members of the BOS.

By inadvertent mistake subject names of the Practical Courses of VI semester of course codes CH6PPC06 and CH6PPC07 were not mentioned, these subject names are Mass Transfer-II Lab and Process Dynamics and Control Lab, respectively.

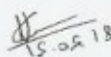
Since the member Prof. Chandan Guha (Department of Chemical Engineering, Jadavpur University, Kolkata) could not attend this meeting due to his pre-occupation, as per his suggestion on telephonic conferencing with the members, this scheme and syllabus is being sent to the external BOS member Prof. C. Guha, for his review and formal consent as on today (15th May 2018).


15/5/18

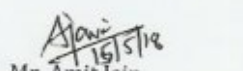
Prof. S. N. Saha
Chairman, BOS
HOD, Chemical Engg.


15/05/18

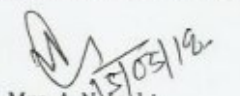
Dr. A. K. Chandrakar
Member, BOS
Asst. Prof., Chem. Engg.


15.05.18

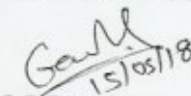
Mr. Neeraj Chandraker
Invited Member, BOS
Asst. Prof., Chem. Engg.


15/5/18

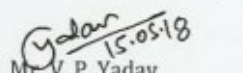
Mr. Amit Jain
Invited Member, BOS
Asst. Prof., Chem. Engg.


15/05/18

Mrs. A. N. Joshi
Invited Member, BOS
Asst. Prof., Chem. Engg.


15/05/18

Mr. G. P. Dewangan
Invited Member, BOS
Asst. Prof., Chem. Engg.


15.05.18

Mr. V. P. Yadav
Invited Member, BOS
Asst. Prof., Chem. Engg.



The following courses having focus on employability were revised in the of B. Tech. Final year (VII and VIII Semesters) :

- ❖ New Separation Processes (CH7TPC15)
- ❖ Petroleum Refinery Engineering (CH7TPE41)
- ❖ Project Engineering, Economics & Management (CH8TPC17)
- ❖ Petrochemical Technology (CH8TPE51)
- ❖ Optimization Techniques (CH8TOE41)

The following courses having focus on employability were introduced in the of B. Tech. Final year (VII and VIII Semesters):

- ❖ Process Equipment Design-II (CH7TPC13)
- ❖ Membrane Separation Processes (CH8TPE53)
- ❖ Process Modeling & Simulation (CH8TOE42)

विभागाध्यक्ष, रासायनिक अभियांत्रिकी
HoD, Chemical Engineering
प्रौद्योगिकी संस्थान/Institute of Technology
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : School of Studies of Engineering and Technology

Department : Chemical Engineering

Date and Time : 11 September, 2019 - 11:30 AM

Venue : HoD room

Minutes of Meeting

The scheduled meeting of members of Board of Studies (BOS) was held today (11th September 2018) in the office of Prof. S. N. Saha, Chemical Engineering Department to discuss mainly the VRET 2018 Syllabi, new scheme and syllabi of B.Tech. (Chemical Engineering) I and II Semester. Following members were present in the meeting :

1. Prof. S. N. Saha (Member BOS, Dept. of Chemical Engg.)
2. Dr. A. K. Chandrakar (HoD I/c, Chemical Engg. - cum- Chairman, BOS)
3. Mr. Amit Jain (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
4. Mrs. A. N. Joshi (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
5. Mr. G. P. Dewangan (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
6. Mr. Saurabh Meshram (Invited Member, Asst. Prof., Dept. of Chemical Engg.)

The scheme and syllabi of B. Tech. (Chemical Engineering) I and II semester already approved by the due committee on 31st July 2018 have been vetted and approved by the BOS Chemical Engineering committee.

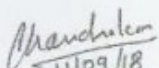
The committee has discussed and resolved to approve the syllabi of Vishwavidyalaya Research Entrance Test- 2018 (VRET-2018) for Paper-I (Research Methodology) and Paper-II (Chemical Engineering).

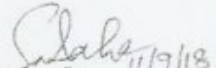
In this meeting, above mentioned members discussed and proposed the scheme and syllabus of B. Tech. (Chemical Engineering) I and II semester as per CBCS as enclosed 20 pages duly signed by the chairman, member and invited members of the BOS.

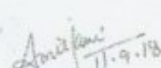
The members have opined and resolved that in the M.Tech. I semester scheme and syllabi Fluidization Engineering subject (Course No. CHPG1103) be read as Advanced Fluidization Engineering.

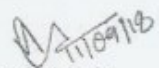
The matter related to appointment of examiners appears to be too early to recommend presently. At the time of getting the issue matured enough, the policy decision to be taken by the competent body will be deemed to be approved by BOS.

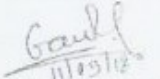
Since the external BOS member Prof. Chandan Guha from Kolkata could not attend this meeting due to his pre-occupation, as per his suggestion on telephonic conferencing with the members, this scheme and syllabus is being sent to him for his review and formal consent.

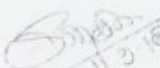

11/09/18
Dr. A. K. Chandrakar
Chairman, BOS
HOD (I/c), Chemical Engg.


11/9/18
Prof. S. N. Saha
Member, BOS
Professor, Chemical Engg.


11-9-18
Mr. Amit Jain
Invited Member, BOS
Asst. Prof., Chem. Engg.


11/09/18
Mrs. A. N. Joshi
Invited Member, BOS
Asst. Prof., Chem. Engg.


11/09/18
Mr. G. P. Dewangan
Invited Member, BOS
Asst. Prof., Chem. Engg.


11/9/18
Mr. Saurabh Meshram
Invited Member, BOS
Asst. Prof., Chem. Engg.

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur - 495009 (C.G.)

The following courses were revised in the of B. Tech. Final year (VII and VIII Semesters) :

- ❖ Thermodynamics (CH02TES03)

विभागाध्यक्ष, रासायनिक अभियांत्रिकी
HoD, Chemical Engineering
प्रौद्योगिकी संस्थान/Institute of Technology
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD



Scheme and Syllabus

**DEPARTMENT OF CHEMICAL ENGINEERING
INSTITUTE OF TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)**

**SCHEME FOR EXAMINATION
B.Tech. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING**

FOURTH YEAR, SEVENTH SEMESTER

S. No.	Course No.	Subject	Periods			Evaluation Scheme					Credits
			L	T	P	Sessional			ESE	Sub Total	
						IA	MSE	Total			
01.	CH7TPC13	Process Equipment Design- II	3	1	-	20	20	40	60	100	4
02.	CH7TPC14	Chemical Reaction Engineering-II	3	1	-	20	20	40	60	100	4
03.	CH7TPC15	New Separation Processes	3	1	-	20	20	40	60	100	4
04.	CH7TPE4X		3	1	-	20	20	40	60	100	4
05.	CH7TOE3X		3	1	-	20	20	40	60	100	4
PRACTICAL											
01.	CH7PPC08	Minor Project	-	-	6	30	-	30	20	50	3
02.	CH7PPC09	Vocational Training Viva Cum Seminar	-	-	3	50	-	50	-	50	2
TOTAL			15	5	9					600	25

**DEPARTMENT OF CHEMICAL ENGINEERING
INSTITUTE OF TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)**

**SCHEME FOR EXAMINATION
B.Tech. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING**

FOURTH YEAR, EIGHTH SEMESTER

S. No.	Course No.	Subject	Periods			Evaluation Scheme					Credits
			L	T	P	Sessional			ESE	Sub Total	
						IA	MSE	Total			
01.	CH8TPC16	Process Equipment Design- III	3	1	-	20	20	40	60	100	4
02.	CH8TPC17	Project Engineering, Economics & Management	3	1	-	20	20	40	60	100	4
04.	CH8TPE5X		3	1	-	20	20	40	60	100	4
06.	CH8TOE4X		3	1	-	20	20	40	60	100	4
PRACTICAL											
01.	CH8PPC10	Project	-	-	8	60	-	60	40	100	4
TOTAL			12	4	8					500	20

IA – Internal Assessment

MSE – Mid Semester Examination

ESE - End Semester Examination

Total Marks – 500

Total Periods - 24

Total Credits – 20



DEPARTMENT OF CHEMICAL ENGINEERING
INSTITUTE OF TECHNOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
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LIST OF PROFESSIONAL ELECTIVES OFFERED BY DEPARTMENT OF CHEMICAL ENGINEERING
FOR VII and VIII SEMESTER

Semester	Subject Code (PE)	Subject
VII	CH7TPE41	Petroleum Refinery Engineering
	CH7TPE42	Polymer Technology - I
	CH7TPE43	Design and Development of Catalyst
VIII	CH8TPE51	Petrochemical Technology
	CH8TPE52	Polymer Technology - II
	CH8TPE53	Membrane Separation Processes

DEPARTMENT OF CHEMICAL ENGINEERING
INSTITUTE OF TECHNOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
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LIST OF OPEN ELECTIVES OFFERED FOR VII and VIII SEMESTER

Semester	Subject Code (OE)	Subject
VII	CH7TOE31	Transport Phenomena
	CH7TOE32	Water Conservation and Management
VIII	CH8TOE41	Optimization Techniques
	CH8TOE42	Process Modeling & Simulation
	CH8TOE43	Renewable Energy

OE- Open Elective

Note: In addition to the open elective courses, as prescribed above, the students are free to opt for any other subject of same credit from inter/intra school duly approved by the Board of Studies of the respective departments.



B.Tech. VII Semester

CH7TPC13 : Process Equipment Design- II (3 1 0)

Design of Heat Transfer Equipments : Double Pipe Heat Exchanger, Shell and Tube Heat Exchanger, Vertical & Horizontal Condensers and Evaporators.

The candidates will be allowed to use the following reference book in the examination hall :

1. Hand book of Chemical Engineering J. H. Perry
2. Tubular Heat Exchange Manufacture Association Manual
3. ISI Codes.

Candidates have to bring their own copies of the above books and they will be not supplied by the university or the examination centers.

Text Books :

1. Process Heat Transfer by D. Q. Kern
2. Heat Transmission by McAdams
3. Unit Operations of Chemical Engineering by McCabe Warren, L Smith Julian and Harriot Peter, Fifth Edition, McGraw Hill Inc.
4. Chemical Engineering by J. M. Coulson and Richardson, Volume- I



B. Tech. Syllabus (CBCS)

Department of Chemical Engineering

20% Change

CH7TPC15 : New Separation Processes (3 1 0)

Unit I : Overview of Separation Processes: Basic Concepts of Separation Processes, Physico-Chemical Properties and Other Factors Controlling Separation, Limitations of Conventional Separation Processes and New Separation Processes, Equilibrium and Rate Governed Separation Processes and their Characteristics.

Unit II : Membrane Based Separation Processes: Principle of Membrane Separations Process, Advantages and Disadvantages, Classification, Membrane Materials, General Methods of Preparation and Characterization of Membranes, Membrane Modules, Concentration Polarization.

Unit III : Porous Membrane Based Processes: Reverse Osmosis, Ultrafiltration, Microfiltration, Nano-filtration, Dialysis, Ion-Selective Membranes and Electro-dialysis, Industrial Applications of Porous Membrane Based Processes.

Unit IV : Non-Porous Membrane Based Processes: Gas separation, Pervaporation, Liquid Membranes and their Industrial Applications, Medical Applications of Membranes, Miscellaneous Membrane Processes, Membrane Distillation, Membrane Reactors.

Unit V : Other Non-Conventional Separation Processes: Foam and Bubble Fractionation, Pressure and Temperature Swing Adsorption, Cloud Point Extraction, Centrifugal Separation Processes, Super Critical Fluid Extraction.

Text Books :

1. Separation Process Principles by J D Seader and E J Henley John Wiley & Sons, Inc.
2. Separation Processes by C J King, McGraw-Hill, Inc.
3. Membrane Separation Processes by K. Nath, PHI, New Delhi.
4. Membrane Technology and Applications by R W Baker, John Wiley and Sons, Ltd, UK.
5. Handbook of Industrial Membrane Technology by M.C. Porter, Crest Publishing House.

Handwritten signatures and dates (15/05/18) of faculty members, including names like Gaekwad, Chandan, Ajani, and Sabharwal.

BOS held on 15th May 2018



B. Tech. Syllabus (CBCS)

Department of Chemical Engineering

CH7TPE41: Petroleum Refinery Engineering (3 1 0)

20% Change

Unit I : Petroleum Crude and Refining : Origin, Formation & Occurrence of Petroleum Crude, Exploration, Drilling and Processing, Reserve and Deposit of World, Indian Petroleum Refinery, Compositions, Classification & Physical Properties of Petroleum Crude.

Unit II : Physical Properties and Testing Methods of Petroleum Products : Evaluation of Petroleum, Physico-Chemical Properties of Various Petroleum Products as Per API / ASTM / BIS Specifications.

Unit III : Crude Processing : Pre-Treatment of Crude, Heating Techniques of Crude, Types of Distillation Columns & their Efficiencies, Atmospheric and Vacuum Distillation of Crude, Blending of Gasoline.

Unit IV : Chemical Treatment & Refining Operation : Chemical Treatment of Petroleum Products, Caustic Soda Treatment, Treatment With H_2SO_4 & H_2 , Mercaptan Removal & Oxidation Process, Sulphur-Removal From Petroleum Products – Doctor's Treatment, Hydro De-Sulphurization, Dewaxing and Refining of Lubricating Oils.

Unit V : Cracking & Reforming Operation : Visbreaking, Thermal Cracking, Catalytic Cracking, Hydrocracking, Catalytic Reforming, Alkylation, Isomerization and Polymerization, Naphtha Cracking, Delayed Coking & Fluidized Coking.

Text Books :

1. Petroleum Refinery Engineering by W.L. Nelson
2. Petroleum Refining by Gary and Handwarke, Marcel Dekker
3. Petroleum Refining & Petrochemicals by N.K. Sinha, Umesh Publications New Delhi.
4. Petroleum Refining Technology by I.D. Mall, CBS Publishers & Distributors Pvt. Ltd. New Delhi.

Gandhi
15/05/18

Alexandra
15/05/18

W
15/05/18

M
15/05/18

Sham
15/05/18

Palak
15/05/18

BOS held on 15th May 2018



B. Tech. Syllabus (CBCS)

Department of Chemical Engineering

60% Change

CH8TPC17: Project Engineering, Economics & Management (3 1 0)

Unit I : Nature and Importance of Project and Project Engineering : Concept of Project and Project Management, Characteristics of Project, Introduction to Project Engineering, Role of a Project Leader, General Design Considerations, Plant Layout and Site Selection, Flow Diagram, Concept of Scale Up, Concepts of Techno-Economic Feasibility Report.

Unit II : Technical and Financial Analysis : Technical Analysis, Financial Analysis, Significance of Financial Analysis, Elementary Knowledge of Book of accounts- Journal, Ledger, Balance sheet, Profit and Loss Account. Cost Estimation, Cash Flow Investment, Production Cost, Capital Investment, Cost Indices, Production and Overhead Cost, Interest and Taxes.

Unit III : Project Financing and Value Engineering : Meaning and Importance of Project Finance, Means of Finance and Sources of Project in India, Financial Institution Structure and Financial Assistance, Norms of Finance and Term Loan Procedure, Value Engineering - Function, Aims and Procedure.

Unit IV : Capital Expenditure, Profitability & Alternative Investments : Importance and Kinds of Capital Expenditure Decision, Capital Budgeting Process, Criteria of Capital Budgeting, Depreciation and its Calculation Methods, Methods of calculating profitability, Alternative investments, Break Even Analysis.

Unit V : Network Techniques for Project Management : Introduction, Development of Project Network, Network Scheduling, Critical Path Method, Program Evaluation & Review Technique, Planning and Scheduling of Activity Networks, Time Analysis, Gantt Chart.

Text Books :

1. Plant Design & Economics for chemical Engineers by M.S. Peters & K. D. Timmerhaus.
2. Projects: Planning, Analysis, Selection, Financing, Implementation and Review by Prasanna Chandra.
3. Project Engineering of Process Plants by H. F. Rase
4. Pilot Plants and Models and Scale up Methods in Chemical Engineering by R. E. Johnston.

BOS held on 15th May 2018



B. Tech. Syllabus (CBCS)

Department of Chemical Engineering

30% Change

CH8TPE51: Petrochemical Technology (3 1 0)

Unit I : Survey of Petrochemical Industries : Petrochemical Industries in India, Plastic and Synthetic Fiber Industries, Product of Petroleum Industries, Feed Stocks for Petrochemical Production, Purification and Separation of Feed Stocks, **Chemicals from Methane.**

Unit II : Chemicals From C₂ Hydrocarbons : Chemicals from Ethane, Ethylene and Acetylene, Naphtha Cracking and Reforming, Hydrogen from Reforming of Hydrocarbons.

Unit III : Chemicals From C₃, C₄ and Higher Fractions : Chemicals from Propane, Propylene, Butanes, Butylene etc. Production of Synthesis Gases from Higher Fractions. Carbon Compound, Dehydrogenation of Hydrocarbon and Higher Paraffins.

Unit IV : Polymers of Olefins : Polymers and their Properties, Polymers from Olefins- Polyethylene (HDPE, LDPE), Polypropylene, Vinyl Polymers. Production of BTX, Benzene Derivatives, Products from Toluene, Oxidation Products of Toluene, Synthetic Fibers and their Production.

Unit V : Synthetic Rubber, Plastics and Detergents : Synthetic Rubber and its Production, Classifications of Plastics, Different types of Resin and their Production, ABS Plastics, Poly Carbonates (PC), Poly Urethanes, Polyamides, Polystyrene, Synthetic Detergents and their Production, **Petroleum Coke and Carbon Black.**

Text Books :

1. Modern Petroleum Technology by G.D. Hobson and W Pow.
2. A Textbook on Petrochemical Technology by Bhaskara Rao.

Gawli
15/05/18

Chanchale
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Ajani
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Galan
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Sabale
15/5/18

BOS held on 15th May 2018



CH8TPE53: Membrane Separation Processes (3 1 0)

Introduction to Membrane Separation Process, Principle of Membrane Separation, Physical and Chemical Properties of Membranes, Classification, Driving Forces in Membrane Separation Processes, Advantages and Limitations of Membrane Processes, Membrane Types, Materials, Preparation and Characterization, Various Methods of Membrane Manufacture, Structure and Function of Symmetric and Asymmetric Membranes, Membrane Modules, Module Cascading, Chemical Potential and Osmosis, Retention and Permeability and its Estimation, Salt Rejection, Concentration Polarization and Membrane Fouling, Concept of Zeta Potential, Major Application Areas of Membrane, Various Membrane Processes, Design, Operation, Maintenance and Industrial Applications of Membrane Based Processes.

Text Books :

1. Separation Process Principles by J. D. Seader, Ernest J. Henley, Wiley
2. Separation Process Engineering by Phillip C. Wankat, PHI
3. Membrane Technology and Applications by R W Baker, John Wiley and Sons, Ltd, UK.
4. Membrane Separation Processes by K. Nath, PHI, New Delhi

Reference :

1. Webcourse (NPTEL) Novel Separation Processes by Prof. Sirshendu De, IIT Kharagpur



B. Tech. Syllabus (CBCS)

Department of Chemical Engineering

20% Change

CH8TOE41 : Optimization Techniques (3 1 0)

System Analysis and Modeling : Introduction to Systems Analysis and Modeling with Reference to Chemical Engineering Problems, Differential Method for Solving One and Two Variable Problems With and Without Constraints, Case Studies, Application of Langrangian Multiplier Method.

Search Methods: One Dimensional Search Method- Newton's Method, Quasi Newton's Method, Polynomial Approximation Methods, Sequential Search Methods - Golden Section Method, Dichotomous Search Method, Interval Halving Method, Fibonacci Method.

Linear Programming: Modeling, Graphical Method, Single Phase Simplex Method, Two Phase Simplex Method, Duality, Dual Simplex Method.

Geometric Programming: As Applied to Chemical Engineering Problems with Degree of Difficulty Equal to Zero and One, with and without Constraints.

Dynamic Programming: Introduction to Dynamic Programming as Applied to Discrete Multistage Problems Like Cascade of CSTR, Train of Heat Exchanger etc., Computer Programming Techniques applied to Optimization.

Methods for Global Optimization.

Text Books :

1. Optimization Theory and Practice by Beveridge and Schechter
2. Optimization Techniques for chemical Engineers by Asghar Hussain
3. Optimization by S.S. Rao
4. Linear Programming by Hadley

Graed
15/05/18

Abhinav
15/05/18

M
15/05/18

Atani
15/05/18

Pran
15/05/18

Sudh
15/05/18

H
15/05/18

BOS held on 15th May 2018



CH8TOE42: Process Modeling & Simulation (3 1 0)

Introduction : Uses of Mathematical Models, Scope of Coverage, Principles of Formulations, Mathematical Modeling in Chemical Reaction Engineering: CSTR, PFR, Batch Reactor, Semibatch Reactor, Series of Isothermal CSTR, Constant Hold-Up CSTR's, CSTR's with Variable Hold Ups, Gas Phase Pressurized CSTR, Non Isothermal CSTR, Bioreactor, Trickle Bed Reactor.

Mathematical Modeling in Mass Transfer : Ideal Binary Distillation Column, Multi-Component Non-ideal Distillation Column, Batch Distillation with Hold Up, Steam Distillation, Multi-Solute Batch Liquid- Liquid Extraction, Continuous Extraction, Multistage Countercurrent Extraction, Plug Flow Type Liquid- Liquid Extraction, Reactor with Mass Transfer, Absorption, Adsorption.

Mathematical Modeling in Heat Transfer : Two Heated Tanks, Single Component Vaporizer, Double Pipe Heat Exchanger, Shell and Tube Heat Exchanger, Multicomponent Flash Drum, Cooling Towers.

Mathematical Modeling of Other Chemical Processes: Interacting and Non-Interacting Systems with and without Heaters, Isothermal Hydraulic System, Forward and Backward Feed Triple Effect Evaporator.

Introduction of MATLAB and Use of Language, Simulation, Program Development and Numerical Solutions of Above Processes.

Text Books :

1. Process Modeling, Simulation and Control for Chemical Engineers by W. L. Luyben, McGraw Hill, 1990.
2. Process Plant Simulation by B. V. Babu, Oxford University Press, 2004.
3. Optimisation Techniques for Chemical Engineers by A. Hussain and K. Gangaiah, Macmillan, 2001.
4. Process Control: Modeling, Design and Simulation by B. W. Bequette. Prentice-Hall India, 2006.
5. Elements of Chemical Reaction Engineering by Fogler, Prentice Hall of India.

Gauli 15/05/18
Chandhi 15/05/18
... 15/05/18
... 15/05/18
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... 15/05/18
... 15/05/18

BOS held on 15th May 2018



SCHEME OF EXAMINATION									
B.TECH (FOUR YEAR) DEGREE COURSE									
FIRST YEAR, CHEMICAL ENGINEERING									
SEMESTER II (COURSE-B)									
EFFECTIVE FROM SESSION 2018-19									
SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	CH02TB503	MATHEMATICS-II	3	1	0	30	70	100	4
2	CH02TB504	CHEMISTRY	3	1	0	30	70	100	4
3	CH02TES02	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	30	70	100	3
4	CH02TES03	THERMODYNAMICS	3	1	0	30	70	100	4
PRACTICAL									
1	CH02PBS02	CHEMISTRY LAB	0	0	3	30	20	50	1.5
2	CH02PES03	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	30	20	50	1.5
3	CH02PE504	WORKSHOP & MANUFACTURING PRACTICES	1	0	3	30	20	50	2.5
TOTAL									20.5
IA - INTERNAL ASSESSMENT ESE - END SEMESTER EXAM. L- LECTURE T-TUTORIAL P-PRACTICAL									

Handwritten signatures and dates:
 31/07/18
 Chandika (HOD)
 31/07/18
 (HOD)
 31/07/18
 (HOD, CE)



SUBJECT CODE/	SUBJECT	L	T	P	Credit
CH02TE103/	THERMODYNAMICS	3	1	0	4

Objectives:

Principles and application of first and second law of thermodynamics, and phase equilibria.

Contents :

1. Introduction- scope of thermodynamics, Dimensions and Units, Temperature, Pressure, Work, Energy, Heat [3L + 1T]
2. Energy conservation & first law of thermodynamics; State functions; Equilibrium; Phase Rule; Reversible process; Constant P, V, T processes; Mass and energy balances for open systems . [6L + 2T]
3. Phases, phase transitions, PVT behavior; description of materials – Ideal gas law, van der Waals, virial and cubic equations of state; Reduced conditions & corresponding states theories; correlations in description of material properties and behavior [6L + 2T]
4. Heat effects-latent heat, sensible heat, standard heats of formation, reaction and combustion. [3L + 1T]
5. Statements of the second law; Heat engines, Carnot's theorem,; Thermodynamic Temperature Scales; Entropy; Entropy changes of an ideal gas; Mathematical statement of the second law; Entropy balance for open systems; Calculation of ideal work, Lost work. (6L + 2T)
6. Thermodynamic property of fluids, Maxwell relations, 2-phase systems, graphs and tables of thermodynamic properties. (6L + 2T)
7. Application of thermodynamics to flow processes-pumps, compressors and turbines (3L +1T)
8. Thermodynamic analysis of steam power plants; Rankine cycle; Internal combustion engine, Otto engine; Diesel engine; Jet engine. (6L + 2T)
9. The Carnot refrigerator; Vapor-compression cycle; Absorption refrigeration; Heat pump, Liquefaction processes. (6L + 2T)

Suggested Text Books

1.J.M. Smith, H.C. Van Ness and M.M. Abbott, Introduction to Chemical Engineering Thermodynamics, 7th edition, McGraw-Hill International Edition, 2005.

Suggested References Books

1.M J Moran, H N Shapiro, D D Boettner and M B Bailey, Principles of Engineering

31/07/18
Chandhika
11/09/18

Chandhika
31/07/18
HOD

31/07/18
SIR
Seen Suleke 11/9/18

11/9/18
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