CHAITANYA BHARATI INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CHEMICAL ENGINEERING
Stake holder involvement in Curriculum Development
AY 21-22

Action taken and implementation in Curriculum

INDEX

I/c HEAD
Dept. of Chemical Engineering
Chaitanya Bharathi Institute of Technology
Gandipet, Hyderabad-75.

1) Students

S.no.	Suggestions & opinion	Actions Taken
1	New electives like Optimization in Chemical Processes, Scaleup methods needed	Included in the curriculum
2	Course syllabus can be slightly modified in line with GATE syllabus	Instrumentation and Process control is one subject modified in this manner.
3	Courses on Employability skills needed	Included in the scheme

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1) Students (Proof)

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

Choice Based Credit System (With effect from 2023-2024)

B.Tech (Chemical Engineering)

Semester VII

S. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per Week			Duration of SEE inHours	Maximum Marks		
			L	T	P/D		CIE	SEE	
THEORY									
1		**Professional Elective -IV**	3		-	3	40	60	3
		Open Elective - II	3	-	-	3	40	60	3
3		**Professional Elective – V**	3	-	-	3	40	60	3
4		Open Elective - III	3	-	-	3	40	60	3
5		Gender sensitization	2	-	-	2	0	50	NC
6	20CHI03	Internship	4-6 weeks / 180 hours						3
PRACTICAL									
8	20CHC24	Project Design Part I	-	-	4	-	50	50	2
TOTAL			**14**		**4**	-	**210**	**340**	**17**

	Course Code	**Professional Elective IV**
1	20CHE13	Biochemical Engineering
2	20CHE14	Corrosion Engineering
3	20CHE15	Optimization of Chemical Processes
4	20CHE16	Process Intensification

	Course Code	**Open Elective II**
1	20ME O01	Robotics
2	20EGO 01	Technical Writing Skills
3	20CSO 07	Basics of Machine Learning
4	20 IT O 01	Object Oriented Programmin Using JAVA

	Course Code	**Professional Elective V**
1	20CHE17	Computational Fluid Dynamics
2	20CHE18	Mineral Processing Technology
3	20CHE19	Nuclear Engineering
4	20CHE20	Sustainable Engineering

	Course Code	**Open Elective III**
1	20MEO03	Research Methodology
2	20EEO02	Energy Management Systems
3	20ITO02	Principles of IoT
4	20PYO01	Histories of Science and Technology

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20 CHC20 **INSTRUMENTATION AND PROCESS CONTROL**

Instruction	3 L+1T Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	4

Pre-requisites: Fluid Mechanics, Process Heat Transfer

Course Objectives: This course helps the students to understand:

1. The components and characteristics of industrial measurement systems
2. The transient behavior of simple chemical processes
3. Control loop - concepts, terminology, methods, and performance
4. Tuning and stability of a controllers
5. Advanced control strategies

Course Outcomes: At the end of the course, the students will be able to:

1. Understand the measurement techniques for different process variables
2. Understand the dynamic behavior of different processes
3. Analyze different components of a control loop
4. Analyze stability of feedback control system
5. Identify the suitable controller for the given processes
6. Design controllers for first and second order processes

CO-PO-PSO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	3	-	-	-	-	-	-	3	3
CO2	3	1	3	3	2	3	-	-	-	-	-	-	3	3
CO3	3	1	3	3	2	3	-	-	-	-	-	-	3	3
CO4	3	1	3	3	2	3	-	-	-	-	-	-	3	3
CO5	3	1	3	3	2	3	-	-	-	-	-	-	3	3
CO6	3	1	3	3	2	3	-	-	-	-	-		3	3

UNIT-I

Introduction to process control: process variables, Measurement of process variables, sensors and transducers, general Industrial instruments – I/P and P/I converters, pneumatic and electric actuators. P&ID diagrams and equipment symbols.

Characteristics of Measurement System: Elements of instruments, static and dynamic characteristics,

UNIT-II

Response of First order systems: Transfer Function, Transient response to step, impulse, sinusoidal forcing function, physical examples of first order systems, liquid level, mixing process, concept of time constant, linearization, response of first order systems in series, interacting and non-interacting systems

Response of Second Order Systems: Transient response of under damped, critically damped, over damped systems to step, impulse and sinusoidal forcing functions. Transportation lags. Dynamic responses of various systems, systems with inverse response

UNIT-III

Control Systems: Negative and Positive feedback control systems, Servo and Regulatory control problems, Development of Block diagram, Controllers and final control elements, Ideal transfer functions of P, PI, PD and PID controllers

Reduction of physical control systems to block diagrams: Closed loop transfer functions for servo and regulator problems. Overall Transfer functions for multi loop control systems. Transient response of simple control systems for servo and regulator problems, measurement lags. Stability of a control system by Routh's Criterion.

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CBIT(A) **with effect from 2022-23**

20EGCO3 **EMPLOYABILITY SKILLS**
(BE/BTech V & VI semester - Common to all Branches)

Instruction	2L Hours per week
Duration of SEE	2 Hours
SEE	50 Marks
CIE	50 Marks
Credits	1

Course Objectives: To help the students
1. Learn the art of communication; participate in group discussions and case studies with confidence and to make effective presentations.
2. With- resume packaging, preparing them to face interviews.
3. Build an impressive personality through effective time management, leadership qualities, self-confidence and assertiveness.
4. Understand professional etiquette and to make them learn academic ethics and value system.
5. To be competent in verbal aptitude.

Course Outcomes: By the end of the course, the students will be able to
1. Become effective communicators, participate in group discussions with confidence and be able to make presentations in a professional context.
2. Write resumes, prepare and face interviews confidently.
3. Be assertive and set short term and long-term goals, learn to manage time effectively and deal with stress.
4. Make the transition smoothly from campus to work, use media with etiquette and understand the academic ethics.
5. Enrich their vocabulary, frame accurate sentences and comprehend passages confidently.

UNIT 1
Verbal Aptitude: Error Detection, Articles, Prepositions, Tenses, Concord and Transformation of Sentences- Jumbled Words/Sentences- Vocabulary, Synonyms, Antonyms, One Word Substitutes, Idioms and Phrases, Word/Sentence/Text Completion- Reading Comprehension.

UNIT 2
Group Discussion & Presentation Skills: Dynamics of Group Discussion-Case Studies- Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Accuracy, Coherence. Elements of Effective Presentation – Structure of a Presentation – Presentation tools – Body language - Preparing an Effective PPT

UNIT 3
Behavioural Skills: Personal strength analysis-Effective Time Management- Goal Setting- Stress management- **Corporate Culture** – Grooming and etiquette-Statement of Purpose (SOP).

UNIT 4
Mini Project: Research-Hypothesis-Developing a Questionnaire-Data Collection-Analysis-General and Technical Report - Writing an Abstract –Technical Report Writing-Plagiarism-Project Seminar.

UNIT 5
Interview Skills: Cover Letter and Résumé writing – Structure and Presentation, Planning, Defining the Career Objective, Projecting ones Strengths and Skill-sets – Interviews: Concept and Process, Pre-Interview Planning, Opening Strategies, Answering Strategies, Mock Interviews.

Suggested Reading:
1. Leena Sen, "Communication Skills", Prentice-Hall of India, 2005

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Teachers

S.No	Suggestions & opinion	Action Taken
1	Instrumentation and Process Control can be clubbed to study as a single subject	Implemented in the new scheme
2	Plant Design and Economics subject can have two units of Economics and one unit of Equipment Design, with design of various Process equipment	Implemented the suggestions
3	Equipment Drawing course can be taught using CAD software, ASPEN PLUS, PRO II	These are included in the Plant Design lab in the curruculum

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CBIT(A) **with effect from 2022-23**

20CHE19 **PLANT DESIGN AND ECONOMICS**

Instruction	3 L+1T Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	4

Pre-requisites: MEBC, FM, HT, MUO

Course objectives: This course helps the students to understand the
1. Basics of plant design and plant layout.
2. Criteria of selecting process equipment, based on which optimized design can be identified.
3. Importance of process economics in process industries.

Course Outcomes: At the end of the course, the students will be able to
1. Learn the basic aspects of plant design and its elements
2. Select a suitable optimized cost-effective equipment for a given process.
3. Learn the basics of cost accounting and perform the cost analysis of a plant.
4. Identify methods of estimation of depreciation and profitability studies.
5. Design cost-effective process equipment and plants.
6. Design and optimize the process parameters

CO-PO-PSO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO	PO	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	2	-	2	1	-	1
CO2	3	1	1	-	-	-	-	-	2	-	1	1	1	1
CO3	3	2	2	-	-	-	-	-	2	-	1	1	-	2
CO4	3	2	2	-	-	-	-	-	2	-	1	1	-	2
CO5	3	2	2	-	-	-	-	-	2	-	1	1	3	2
CO6	3	2	2	-	-	-	-	-	2	-	1	1	3	2

UNIT–I
Basic Aspects of Process Design: Introduction – definitions of plant design, process synthesis, process simulation; design factors, design problem and steps; Process flow diagram and Block flow diagram; Mass and energy balances; Piping and Instrumentation diagram; Equipment Design Codes and standards.

UNIT– II
Selection of Process Equipment, Specification and Design; Process Utilities, Utility flow diagram with Examples; Materials choice; Plant location – general site considerations, Site layout and Plant layout, Ethics in Engineering design. Safety factors.

UNIT– III
Process Economics –Cost Accounting – Capitalinvestment, cost index, Equipment cost; Elements of cost; Expenses; Project cost and cost of production, Various components of cost of production and their estimation, Various components of project cost, variable cost, fixed cost, break even point and their estimation. Estimation of Working Capital. Balance sheets, Project financing, concept of interest, (Present Worth, Future Worth) time value of money, Margin of Safety.

UNIT – IV
Depreciation – Types, Methods of determining Depreciation
Profitability Analysis of Projects, Alternatives Investment, Replacements, Payout time and Rate of return, Total annualized cost, cost indices, payback period, discounted cash flow; Sensitivity analysis, Inflation.

UNIT –V
Design of Fluid Transport Equipment and costs–Pumps, Pressure vessels.
Design of Heat Transport equipment and costs– Heat exchangers, Evaporators
Design of Reactors and cost analysis
Design of Separation Equipment and costs– Distillation, Absorption, Stripping.
Optimization in Design – general procedures.

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20CHE22 **PLANT DESIGN LAB**

Instruction	3P Hours per week
Duration of SEE	3 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1.5

Pre-requisites: MEBC, FM, HT, MUO

Course Objectives: This course will

1. Provide students the opportunity to acquire simulation skills in Chemical Plant equipment design.
2. Introduce students to the importance and principles of design of a plant
3. Provide an overall view of design concepts of various unit operations and processes.
4. Demonstrate the overview of plant layout, flow sheeting and perform economic evaluation and sensitivity analysis of the plant
5. Help students to develop simulation skills using various chemical Engineering software like Aspen Plus, Aspen Hysys software, CAD, Pro-II etc.

Course Outcomes: At the end of the course, the student will be able to:

1. Acquire simulation skills in Chemical Plant equipment design.
2. Understand and apply the design concepts to various unit operations and processes.
3. Design various Heat and mass transfer equipment.
4. Design pumps, pressure vessels and reactors.
5. Analyze the performance of a process plant using economic evaluation and sensitivity analysis.
6. Perform simulation of design case studies in Aspen Plus/Aspen Hysys software/CAD/Pro-II.

CO-PO-PSO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO11	PO12	PSO11	PSO12
CO1	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO2	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO3	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO4	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO5	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO6	3	2	2	2	2	-	-	-	2	-	-	2	3	2

LIST OF EXERCISES (Minimum of 10 experiments in the list are to be performed)

1. Symbols for Piping and Instrumentation, Flow sheet symbols for unit operations.
2. Design and analysis of pumps and pressure vessels.
3. Design of Heat Transfer Equipment - Shell and Tube Heat Exchanger
4. Design of Heat Transfer Equipment - Condensers/Evaporators
5. Design of Reactors - 1
6. Design of Reactors - 2
7. Design of Mass Transfer Equipment - 1
8. Design of Mass Transfer Equipment - 2
9. Economic Evaluation Analysis in Aspen Plus - Case Study 1
10. Economic Evaluation Analysis in Aspen Plus - Case Study 2
11. Performing Sensitivity Analysis in Aspen Plus - Case Study 1
12. Performing Sensitivity Analysis in Aspen Plus - Case Study 2
13. Overall Plant layout and Design - Case Study

Text Books

1. Vilbrandt, C.T. and Dryden, C.E., "Chemical Engineering plant design", 4th Ed., Kogakusha, 1979.
2. Joshi, M.V. "Process Equipment Design", 2nd Ed., MeMillan Co. of India Limited, Madras, 1976.

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CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

Choice Based Credit System (With effect from 2022-2023)

B.Tech (Chemical Engineering)

Semester VI

S. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per Week			Duration of SEE inHours	Maximum Marks		
			L	T	P/D		CIE	SEE	
THEORY									
1	20CHC18	Chemical Reaction Engineering II	3		-	3	40	60	3
2	20CHC19	Plant Design &Economics	3	1	-	3	40	60	4
3	20CHC20	Instrumentation &Process Control	3	1	-	3	40	60	4
4	20 CHC21	Transport Phenomena	3	1	-	3	40	60	4
5		Professional Elective – III *	3	-	-	3	40	60	3
PRACTICAL									
6	20EGC03	Employability Skills			2	2	50	50	1
7									

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3) Employer

S.no.	Suggestions & opinion	Action taken
1	More of CAD and simulation courses are required.	Included in the curriculum in Plant Design Lab
2	Sustainable Engineering and Waste Management courses needed.	Included as electives in the curriculum
3	Skills related to employability required	Employability skills course included in the curriculum

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Employer Proofs

CBIT(A) **with effect from 2022-23**

20EGCO3 **EMPLOYABILITY SKILLS**
(BE/BTech V & VI semester - Common to all Branches)

Instruction	2L Hours per week
Duration of SEE	2 Hours
SEE	50 Marks
CIE	50 Marks
Credits	1

Course Objectives: To help the students

1. Learn the art of communication; participate in group discussions and case studies with confidence and to make effective presentations.
2. With- resume packaging, preparing them to face interviews.
3. Build an impressive personality through effective time management, leadership qualities, self-confidence and assertiveness.
4. Understand professional etiquette and to make them learn academic ethics and value system.
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Course Outcomes: By the end of the course, the students will be able to

1. Become effective communicators, participate in group discussions with confidence and be able to make presentations in a professional context.
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Verbal Aptitude: Error Detection, Articles, Prepositions, Tenses, Concord and Transformation of Sentences- Jumbled Words/Sentences- Vocabulary, Synonyms, Antonyms, One Word Substitutes, Idioms and Phrases, Word/Sentence/Text Completion- Reading Comprehension.

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Mini Project: Research-Hypothesis-Developing a Questionnaire-Data Collection-Analysis-General and Technical Report - Writing an Abstract –Technical Report Writing-Plagiarism-Project Seminar.

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Suggested Reading:

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CBIT(A) **with effect from 2022-23**

20CHE22 **PLANT DESIGN LAB**

Instruction	3P Hours per week
Duration of SEE	3 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1.5

Pre-requisites: MEBC, FM, HT, MUO

Course Objectives: This course will

1. Provide students the opportunity to acquire simulation skills in Chemical Plant equipment design.
2. Introduce students to the importance and principles of design of a plant
3. Provide an overall view of design concepts of various unit operations and processes.
4. Demonstrate the overview of plant layout, flow sheeting and perform economic evaluation and sensitivity analysis of the plant
5. Help students to develop simulation skills using various chemical Engineering software like Aspen Plus, Aspen Hysys software, CAD, Pro-II etc.

Course Outcomes: At the end of the course, the student will be able to:

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2. Understand and apply the design concepts to various unit operations and processes.
3. Design various Heat and mass transfer equipment.
4. Design pumps, pressure vessels and reactors.
5. Analyze the performance of a process plant using economic evaluation and sensitivity analysis.
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CO-PO-PSO Matrix

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CO1	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO2	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO3	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO4	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO5	3	2	2	2	2	-	-	-	2	-	-	2	3	2
CO6	3	2	2	2	2	-	-	-	2	-	-	2	3	2

LIST OF EXERCISES (Minimum of 10 experiments in the list are to be performed)

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8. Design of Mass Transfer Equipment - 2
9. Economic Evaluation Analysis in Aspen Plus - Case Study 1
10. Economic Evaluation Analysis in Aspen Plus - Case Study 2
11. Performing Sensitivity Analysis in Aspen Plus - Case Study 1
12. Performing Sensitivity Analysis in Aspen Plus - Case Study 2
13. Overall Plant layout and Design - Case Study

Text Books

1. Vilbrandt, C.T. and Dryden, C.E. "Chemical Engineering plant design", 4th Ed., Koogakusha, 1979

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20CH E 20 **SUSTAINABLE ENGINEERING** (Professional Elective V) With effect from 2023-24

Instruction	3 L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisites: Environmental Science, Organic Chemistry

Course Objectives: This course will help the students:

1. To have an increased awareness on issues in areas of sustainability
2. To understand the role of engineering & technology within sustainable development
3. To know the methods, tools and incentives for sustainable product service system development
4. To establish a clear understanding of the role and impact of various aspects of engineering decisions on environmental, societal and economic problems.
5. To communicate results related to their research on sustainable engineering

Course Outcomes: At the completion of this course students will be able:

1. To relate sustainability concepts and ethical principles towards environment
2. To understand the different types of environmental pollution problems and their respect sustainable solutions.
3. To become aware of concepts, analytical methods/models, and resources for evaluating and comparing sustainability implications of engineering activities
4. To critically evaluate existing and new methods
5. To develop sustainable engineering solutions by applying methods and tools to research a specific system design
6. To apply concepts of sustainable development to address sustainability challenges in a global context.

CO-PO-PSO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	3	1	1	2	3	2	1	1	1	3	2	2
CO2	2	2	3	2	1	2	3	2	1	1	1	3	2	2
CO3	2	1	3	1	2	2	3	2	1	2	1	3	2	2
CO4	3	1	3	3	1	3	3	2	2	1	1	3	2	3
CO5	3	3	3	1	2	2	3	2	1	1	2	3	3	3
CO6	3	2	3	2	1	2	3	2	2	1	1	3	3	2

UNIT- I

Introduction of sustainability- Need and concept of Sustainable Engineering, Social-environmental and economic sustainability concepts, Sustainable development and challenges, Environmental acts and protocols - Clean Development Mechanism (CDM).

UNIT- II

Economic and social factors affecting sustainability, Effects of pollution from natural sources, Solid waste-sources, impacts, 4R (Reduce, Reuse, Recycling, Recover) concept, Tools used to ensure sustainability in engineering activities such as environmental management systems and environmental impact assessment studies.

UNIT- III

Global, Regional and Local environmental issues, Carbon credits and Carbon trading, Carbon foot print, Environmental management standards, ISO 14000 series, Life cycle Analysis (LCA)-scope and goal, Procedures of EIA (Environment Impact Assessment) in India.

UNIT- IV

Basic concept of sustainable habitat-Sustainable cities, Sustainable transport, Sustainable sources of energy-conventional and renewable sources, Green Engineering: Green buildings, Green materials for sustainable design, Methods for increasing energy efficiencies of buildings.

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Alumni

S. no	Suggestions/Feedback	Action Plan
1	More Chemical Engineering related software coursed required like CAD, ASPEN	Courses containing these concepts are included in Curriculum. In R 18 scheme in PMS Lab and in R 20 Plant Design Lab Course
2	Data Science for Chemical Engineers and ML for Chemical Engineers are needed	Courses are included in the curriculum case studies or examples in chemical engineering are to be included in that.
3	Courses with Experimental and Analytical methods not needed	This course is discontinued in R 20 Curriculum

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Alumni (Proofs)

With effect from 2021-22

18CH C 25 **PROCESS MODELING AND SIMULATION LAB**

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1.5

Course Outcomes: At the end of the course, students will be able to

1. **Develop** chemical engineering process models based on fundamental laws of mass and energy transfer
2. Dynamically simulate and **interpret** two heated tanks, using MATLAB
3. Dynamically simulate and **analyze** continuous reactors in Series using MATLAB
4. **Adapt** ASPEN software to perform steady state simulation of valves
5. **Apply** ASPEN software for simulation of batch Distillation
6. **Utilize** ASPEN software to design Plug flow reactor

List of Experiments

Part I

1. Introduction to Software Packages. Understanding the basic concepts and steps involved for developing process flow sheet.

Part II

i. Setting up models for simulation

Part III: Dynamic simulation using MATLAB

1. Two-heated Tanks in series
2. Three CSTRs in series at isothermal, constant holdup condition
3. Batch Reactor
4. Vapor Liquid Equilibrium
5. Ideal Binary distillation
6. Gas-Phase Pressurized CSTR

Part IV: Steady State simulation using ASPEN

1. Simulation of reactor systems
2. Simulation of simple units like valves, pumps, flash columns, Heat exchangers
3. Simulation of Distillation columns
4. Flow-sheeting of chemical process.

Text Books:

1. Manjeet KaurBedi, Prof. Vikram Singh, A Textbook Of Simulation And Modeling, Laxmi

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CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

Choice Based Credit System (With effect from 2023-2024)

B.Tech (Chemical Engineering)

Semester VII

S. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
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PRACTICAL									
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TOTAL			**14**		**4**	**-**	**210**	**340**	**17**

	Course Code	**Professional Elective IV**
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2	20CHE14	Corrosion Engineering
3	20CHE15	Optimization of Chemical Processes
4	20CHE16	Process Intensification

	Course Code	**Open Elective II**
1	20ME O01	Robotics
2	20EGO 01	Technical Writing Skills
3	20CSO 07	Basics of Machine Learning
4	20 IT O 01	Object Oriented Programmin Using JAVA

	Course Code	**Professional Elective V**
1	20CHE17	Computational Fluid Dynamics
2	20CHE18	Mineral Processing Technology

	Course Code	**Open Elective III**
1	20MEO03	Research Methodology
2	20EEO02	Energy Management

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With effect from 2023-24

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

Choice Based Credit System (With effect from 2022-2023)

B.Tech (Chemical Engineering)

Semester VIII

S. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per Week			Duration of SEE inHours	Maximum Marks		
			L	T	P/D		CIE	SEE	
THEORY									
1		Open Elective -IV	3		-	3	40	60	3
PRACTICAL									
1	20CHC25	Technical Seminar	-	-	2				1
2	20CHC26	Project Part II	-	-	8*				4
TOTAL			**03**		**10**	-			**8**
*180 hrs for the students working on the paid internship during VIII SEM Clock Hours per week : 20									

	Course Code	**Open Elective IV**
1	20ME O04	Principles of Entrepreneurship
2	20 EC O03	Principles of Biomedical Instrumentation
3	20EE O04	Waste management
4	20ADO03	Fundamentals of Data Science

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