SETHU INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)
Pulloor, Kariapatti – 626 115, Virudhunagar District
(An Autonomous Institution affiliated to Anna University, Chennai)

Estd : 1995

CURRICULUM & SYLLABI

B.TECH. - CHEMICAL ENGINEERING

REGULATION 2019
CHOICE BASED CREDIT SYSTEM

Approved in the Academic Council Meeting on 29.10.2020

CHAIRMEN

ACADEMIC COUNCIL

CHAIRMAN
ACADEMIC COUNCIL
Sethu Institute of Technology
Pulloor, Kariapatti - 625 115

HEAD OF THE DEPARTMENT

DEPARTMENT OF CHEMICAL ENGINEERING

Chairperson
Board of Studies
Chemical Engineering
Sethu Institute of Technology,
Pulloor, Kariapatti - 626 115.

SETHU INSTITUTE OF TECHNOLOGY

VISION

- To promote excellence in technical education and scientific research for the benefit of the society

MISSION

- To provide quality technical education to fulfill the aspiration of the student and to meet the need of the industry
- To provide holistic learning ambience
- To impart skills leading to employability and entrepreneurship
- To establish effective linkage with industries
- To promote research and development activities
- To offer service for the development of society through education and technology

CORE VALUES

- Quality, Commitment, Innovation, Team work, Courtesy.

QUALITY POLICY

- To provide quality technical education to the students
- To produce competent professionals and contributing citizens
- To contribute for the up-liftment of the society

DEPARTMENT OF CHEMICAL ENGINEERING

VISION

To be an eminent department producing competent Chemical Engineers for the benefit of industry and society

MISSION

- To provide academic excellence through quality technical education to meet the needs of changing technology
- To set up state-of -the art facilities and promote teaching learning and research activities
- To develop entrepreneurial skills and employability opportunities
- To establish collaboration with industries for technology transfer
- To facilitate center of excellence in research and create an environment for nurturing innovative capabilities
- To address societal needs by imparting professional and ethical values

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO-I

Our graduates will possess strong knowledge to solve real time problems in Chemical and allied industries. **(Core Competency/Technical Accomplishments)**

PEO-II

Our graduates will have the ability to solve contemporary issues with ethical values and professional skills. **(Professionalism)**

PEO-III

Our graduates will exhibit proficiency through sustained learning to adapt changes in technologies. **(Life Long Learning)**

PROGRAMME SPECIFIC OUTCOME (PSOs)

Graduates will be able to

- Achieve deep knowledge in various unit processes and operations, reaction engineering to design chemical engineering equipment integrating safety procedures.
- Develop mathematical models of real time problems including design of experiments, study and interpretation of data to provide valid conclusions in Chemical engineering.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

- Apply the knowledge of mathematics, sciences and engineering fundamentals to solve complex engineering problems (**Engineering knowledge)**.
- Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural and engineering sciences (**Problem analysis)**.
- Design solutions for complex engineering problems and design system components that meet the specified needs with appropriate consideration for public health and safety, cultural, societal and environmental concerns (**Design/development of solutions)**.
- Conduct investigations on complex engineering problems in design and analysis of unit operations and processes using research based knowledge and methods including design of experiments, analysis and interpretation of data and synthesis of information to attain valid conclusions (**Conduct investigations of complex problems)**.
- Apply appropriate techniques and modern simulation tools to solve engineering problems (**Modern tool usage)**.
- Apply reasoning informed by the contextual knowledge to assess societal, health, safety,

legal and cultural issues and the consequent responsibilities relevant to the engineering practice (**The engineer and society)**.

- Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development (**Environment and sustainability)**.
- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice (**Ethics)**.
- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary environments (**Individual and team work)**.
- Communicate effectively with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions (**Communication)**.
- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments (**Project management and finance)**.
- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change (**Life-long learning)**.

PROGRAMME SPECIFIC CRITERIA

- The curriculum must provide a thorough grounding in basic sciences including chemistry, physics and biology, with advanced level content as appropriate to the objectives of the program.
- The curriculum must include engineering application of basic sciences to design, analyze and control physio-chemical and biological processes considering safety aspects.

Estd1995

SETHU INSTITUTE OF TECHNOLOGY

Pulloor, Kariapatti –626115

(An Autonomous Institution)

ISO 9001-2008
FS 70973

B.TECH. Degree Programme

CHOICE BASED CREDIT SYSTEM

CURRICULUM (Regulations2019)

BACHELOR OF TECHNOLOGY IN CHEMICAL ENGINEERING

OVERALL COURSE STRUCTURE COMPARISON

S.NO	CATEGORY	SIT		AICTE		ANNA UNIV R -2019	
1.	HUMANITIES & SCIENCE	9	6%	12	8%	17	10%
2.	BASIC SCIENCE	27.5	17%	25	16%	23	14%
3.	ENGINEERING SCIENCE	18	11%	24	15%	22	13%
4.	PROFESSIONAL CORE	63.5	39%	48	30%	68	40%
5.	PROFESSIONAL ELECTIVE	18	11%	18	11%	21	12%
6.	OPEN ELECTIVE	12	7%	18	11%	6	4%
7.	PROJECTS	14	9%	15	9%	13	8%
	TOTAL	**162**	**100%**	**160**	**100%**	**170**	**100%**

COURSECREDITS–SEMESTERWISE

Branch	I	II	III	IV	V	VI	VII	VIII	TOTAL
CH	**20.5**	**16.5**	**21**	**23**	**22.5**	**23**	**21.5**	**14**	**162**

Employability Courses

Skill Development Courses

Entrepreneurship Development Courses

Any two or all of the above

SEMESTER I

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UEN101	English for Technical Communication	**HS**	2	0	0	2
19UMA102	Engineering Mathematics-I	**BS**	3	1	0	4
19UPH103	Engineering Physics	**BS**	3	0	0	3
19UCY104	Engineering Chemistry	**BS**	3	0	0	3
19UCS108	Problem Solving and Python Programming	**ES**	3	0	0	3
19UME109	Engineering Graphics	**ES**	3	1	0	4
PRACTICAL						
19UGS112	Basic Sciences Laboratory	**BS**	0	0	2	1
19UME111	Engineering Practices Laboratory	**ES**	0	0	3	1.5
19UCS110	Problem Solving and Python Programming Laboratory	**ES**	0	0	3	1.5
MANDATORY						
19UGM131	Induction Programme	**HS**	0	0	0	P/F
TOTAL			**17**	**2**	**8**	**23**

SEMESTER II

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UEN201	Communication Skills for Professionals	**HS**	0	0	2	1.5
19UMA207	Calculus, Complex Analysis, Transform Techniques	**BS**	3	1	0	4
19UPH203	Material Physics	**BS**	3	0	0	3
19UCY204	Environmental Science	**BS**	3	0	0	3
19UCH205	Introduction to Chemical Engineering	**PC**	**3**	**0**	**0**	**3**
19UEE226	Basic Electrical and Electronics Engineering	**ES**	3	0	0	3
PRACTICAL						
19UGS210	Energy Science and Environmental Science Laboratory	**BS**	0	0	3	1.5
19UEE221	Basic Electrical and Electronics Engineering Laboratory	**ES**	0	0	3	1.5
TOTAL			**17**	**1**	**8**	**20.5**

SEMESTER III

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UMA326	Transform Techniques and Partial Differential Equations	**BS**	3	1	0	4
19UCH302	Process Chemistry	**ES**	3	0	3	4.5
19UCH303	Heat Power Engineering	**PC**	3	0	0	3
19UCH304	Fluid Flow Operations	**PC**	2	1	3	4.5
19UCH305	Chemical Process Calculations	**PC**	2	1	0	3
19UCH306	Engineering Materials for Process Industries	**PC**	2	0	0	2
MANDATORY						
19UGM332	Biology for Engineering Applications	**BS**	2	0	0	P/ F
		TOTAL	**17**	**3**	**6**	**21**

SEMESTER IV

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UMA423	Numerical Methods	**BS**	3	1	0	4
19UCH402	Chemical Engineering Thermodynamics	**PC**	2	1	0	3
19UCH403	Heat Transfer	**PC**	2	1	3	4.5
19UCH404	Mechanical Operations	**PC**	3	0	3	4.5
19UCH405	Chemical Process Industries	**PC**	3	0	0	3
19UCH406	Mass Transfer - I	**PC**	2	1	0	3
PRACTICAL						
19UCH407	Seminar	**P**	0	0	2	1
19UGS431	Reasoning and Quantitative Aptitude	**BS**	0	0	2	1
MANDATORY						
19UGM431	Gender Equality	**HS**	1	0	0	P/F
		TOTAL	**15**	**4**	**10**	**24**

SEMESTER V

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UCH501	Process Economics and Management	**HS**	2	0	0	2
19UCH502	Mass Transfer - II	**PC**	2	1	0	3
19UCH503	Chemical Reaction Engineering - I	**PC**	2	1	0	3
PE - I	Professional Elective - I	**PE**	3	0	0	3
PE - II	Professional Elective - II	**PE**	3	0	0	3
OE - I	Open Elective - I	**OE**	3	0	0	3
PRACTICAL						
19UCH507	Chemical Reaction Engineering Lab	**PC**	0	0	3	1.5
19UCH508	Mass Transfer Lab	**PC**	0	0	3	1.5
19UGS533	Interpersonal Skills Lab	**HS**	0	0	3	1.5
MANDATORY						
19UCH509	Creative Thinking and Innovation	**HS**	0	0	2	1
		TOTAL	**16**	**2**	**9**	**22.5**

SEMESTER VI

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UCH601	Chemical Reaction Engineering - II	**PC**	2	1	0	3
19UCH602	Process Instrumentation Dynamics and Control	**PC**	2	1	3	4.5
19UCH603	Process Equipment Design	**PC**	3	1	0	4
PE - III	Professional Elective - III	**PE**	3	0	0	3
OE - II	Open Elective - II	**OE**	3	0	0	3
PRACTICAL						
19UCH606	Process Computation Lab	**PC**	0	0	3	1.5
19UGS632	Soft Skills and Communication Lab	**HS**	0	0	3	1.5
19UCH607	Technical Project and product Development	**P**	0	0	8	4
MANDATORY						
19UGM635	Indian Constitution	**HS**	0	0	1	0
		TOTAL	**16**	**3**	**18**	**24.5**

SEMESTER VII

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
19UME701	Project Management and Finance	**PC**	3	1	0	4
19UCH702	Transport Phenomena	**PC**	3	1	0	4
19UCH703	Process Modeling and Simulation	**HS**	3	1	0	4
PE - IV	Professional Elective - IV	**PE**	3	0	0	3
PE - V	Professional Elective - V	**PE**	3	0	0	3
OE - III	Open Elective - III	**OE**	3	0	0	3
PRACTICAL						
19UCH707	Process Design and Simulation Lab	**PC**	0	0	3	1.5
19UCH708	Summer Internship	**P**	0	0	2	1
MANDATORY						
19UGM731	Professional Ethics and Human Values	**HS**	2	0	0	2
		TOTAL	**17**	**2**	**15**	**24.5**

SEMESTER VIII

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY						
PE - VI	Professional Elective - VI	**PE**	3	0	0	3
OE - IV	Open Elective - IV	**OE**	3	0	0	3
PRACTICAL						
19UCH803	Project Work	**P**	0	0	16	8
		TOTAL	**6**	**0**	**16**	**14**

HUMANITIES & SOCIAL SCIENCES (HS)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
1	**HS**	19UEN101	English for Technical Communication	2	0	0	2
2	**HS**	19UGM131	Induction Program	0	0	0	0
3	**HS**	19UEN201	Communication Skills for Professionals	0	0	2	1.5
4	**HS**	19UGM431	Gender Equality	1	0	0	0
5	**HS**	19UCH501	Process Economics and Management	2	0	0	2
6.	**HS**	19UGM507	Creative Thinking and Innovation	1	0	0	1
7	**HS**	19UGS533	Interpersonal Skills Lab	0	0	3	1.5
8	**HS**	19UGM635	Indian Constitution	0	0	1	0
9	**HS**	19UGS632	Soft Skills and Communication Lab	0	0	3	1.5
10	**HS**	19UGM731	Professional Ethics and Human Values	2	0	0	2
11	**HS**	19UME701	Project Management and Finance	3	0	0	3
						TOTAL	**14.5**

BASIC SCIENCES (BS)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
1.	**BS**	19UMA102	Engineering Mathematics-I	3	1	0	4
2	**BS**	19UPH103	Engineering Physics	3	0	0	3
3	**BS**	19UCY104	Engineering Chemistry	3	0	0	3
4	**BS**	19UGS112	Basic Sciences Laboratory	0	0	2	1
5	**BS**	19UMA207	Calculus, Complex Analysis and Transform Techniques	3	1	0	4
6	**BS**	19UPH203	Material Physics	3	0	0	3
7	**BS**	19UCY204	Environmental Science	3	0	0	3
9	**BS**	19UGS210	Energy Science and Environmental Science Lab	0	0	3	1.5
10	**BS**	19UMA326	Transform Techniques and Partial Differential Equations	3	1	0	4
11	**BS**	19UGM332	Biology for Engineering Applications	2	0	0	0
11	**BS**	19UMA423	Numerical Methods	3	1	0	4
12	**BS**	19UGS431	Reasoning and Quantitative Aptitude	0	0	2	1
						TOTAL	**31.5**

ENGINEERING SCIENCES (ES)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
1	**ES**	19UCS108	Problem Solving and Python Programming	3	0	0	3
2	**ES**	19UME109	Engineering Graphics	3	1	0	4
3	**ES**	19UME111	Engineering Practices Lab	0	0	3	1.5
4	**ES**	19UCS110	Problem Solving and Python Programming Laboratory	0	0	3	1.5
5	**ES**	19UEE226	Basic Electrical and Electronics Engineering	3	0	0	3
6	**ES**	19UEE221	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5
7	**ES**	19UCH302	Process Chemistry	3	0	3	4.5
						TOTAL	**19**

PROFESSIONAL CORE (PC)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
1	**PC**	19UCH205	Introduction to Chemical Engineering	3	0	0	3
2	**PC**	19UCH303	Heat Power Engineering	3	0	0	3
3	**PC**	19UCH304	Fluid Flow Operations	2	1	0	4.5
4	**PC**	19UCH305	Chemical Process Calculations	2	1	0	3
5	**PC**	19UCH306	Engineering Materials for Process Industries	2	0	0	2
6	**PC**	19UCH402	Chemical Engineering Thermodynamics	2	1	0	3
7	**PC**	19UCH403	Heat Transfer	2	1	3	4.5
8	**PC**	19UCH404	Mechanical Operations	3	0	3	4.5
9	**PC**	19UCH405	Chemical Process Industries	3	0	0	3
10	**PC**	19UCH406	Mass Transfer - I	2	1	0	3
11	**PC**	19UCH502	Mass Transfer - II	2	1	0	3
12	**PC**	19UCH503	Chemical Reaction Engineering - I	2	1	0	3
13	**PC**	19UCH508	Chemical Reaction Engineering Lab	0	0	3	1.5
14	**PC**	19UCH509	Mass Transfer Lab	0	0	3	1.5
15	**PC**	19UCH601	Chemical Reaction Engineering - II	2	1	0	3

16	**PC**	19UCH602	Process Instrumentation Dynamics and Control	2	1	3	4.5
17	**PC**	19UCH603	Process Equipment Design	3	1	0	4
18	**PC**	19UCH607	Process Computation Lab	0	0	3	1.5
19	**PC**	19UCH701	Transport Phenomena	3	1	0	4
20	**PC**	19UCH702	Process Modeling and Simulation	3	1	0	4
21	**PC**	19UCH708	Process Design and Simulation Lab	0	0	3	1.5
						TOTAL	**65**

PROJECT (P)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
1	**P**	19UCH409	Seminar	0	0	2	1
2	**P**	19UCH507	Creative Thinking and Innovation	0	0	2	1
3	**P**	19UCH609	Technical Project and Product Development	0	0	8	4
4	**P**	19UCH709	Summer Internship	0	0	2	1
5	**P**	19UCH803	Project Work	0	0	16	8
TOTAL							**15**

PROFESSIONAL ELECTIVE (PE)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
Chemical Engineering Allied Courses							
1	**PE**	19UCH901	Petroleum Refining Engineering	3	0	0	3
2	**PE**	19UCH902	Polymer Technology	3	0	0	3
3	**PE**	19UCH903	Fertilizer Technology	3	0	0	3
4	**PE**	19UCH904	Food Science and Technology	3	0	0	3
5	**PE**	19UCH905	Drugs and Pharmaceutical Technology	3	0	0	3
6	**PE**	19UCH906	Oil and Natural Gas Engineering	3	0	0	3
7	**PE**	19UCH907	Computational Fluid Dynamics	3	0	0	3
8	**PE**	19UCH908	Chemical Process Plant Safety	3	0	0	3
Energy and Environmental Engineering							
9	**PE**	19UCH909	Air Pollution and Control	3	0	0	3
10	**PE**	19UCH910	Waste Water Treatment and Recycling	3	0	0	3
11	**PE**	19UCH911	Solid Waste Management	3	0	0	3
12	**PE**	19UCH912	Alternative Energy Technology	3	0	0	3
13	**PE**	19UCH913	Environmental Impact Assessment	3	0	0	3
Process Engineering							
14	**PE**	19UCH914	Bio Process Engineering	3	0	0	3

15	**PE**	19UCH915	Fermentation Technology	3	0	0	3
16	**PE**	19UCH916	Process Optimization	3	0	0	3
17	**PE**	19UCH917	Data Science for Engineers	3	0	0	3
18	**PE**	19UCH918	Pilot Plant and Scale Up studies	3	0	0	3
19	**PE**	19UCH919	Quality Management for Chemical Engineers	3	0	0	3
Modern Chemical Technology							
20	**PE**	19UCH920	Fluidization Technology	3	0	0	3
21	**PE**	19UCH921	Instrumental Methods of Analysis	3	0	0	3
22	**PE**	19UCH922	Nano Technology	3	0	0	3
23	**PE**	19UCH923	Extractive Metallurgy	3	0	0	3
24	**PE**	19UCH924	Modern Separation Processes	3	0	0	3
25	**PE**	19UCH925	Electrochemical Engineering	3	0	0	3
26	**PE**	19UCH926	Nuclear Science and Technology	3	0	0	3
						TOTAL	**78**

LIST OF PROFESSIONAL ELECTIVES – PE

(SEMESTER WISE)

SL.NO.	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
Professional Elective – I (V Semester)							
1	**PE**	19UCH901	Petroleum Refining Engineering	3	0	0	3
2	**PE**	19UCH909	Air Pollution and Control	3	0	0	3
3	**PE**	19UCH915	Fermentation Technology	3	0	0	3
4	**PE**	19UCH921	Instrumental Methods of Analysis	3	0	0	3
Professional Elective – II (V Semester)							
1	**PE**	19UCH902	Polymer Technology	3	0	0	3
2	**PE**	19UCH903	Fertilizer Technology	3	0	0	3
3	**PE**	19UCH910	Waste Water Treatment and Recycling	3	0	0	3
4	**PE**	19UCH925	Electrochemical Engineering	3	0	0	3
Professional Elective – III (VI Semester)							
1	**PE**	19UCH904	Food Science and Technology	3	0	0	3
2	**PE**	19UCH917	Data Science for Engineers	3	0	0	3
3	**PE**	19UCH911	Solid Waste Management	3	0	0	3
4	**PE**	19UCH923	Extractive Metallurgy	3	0	0	3

5	**PE**	19UCH914	Bio Process Engineering	3	0	0	3
Professional Elective – IV (VII Semester)							
1	**PE**	19UCH908	Chemical Process Plant Safety	3	0	0	3
2	**PE**	19UCH905	Drugs and Pharmaceutical Technology	3	0	0	3
3	**PE**	19UCH906	Oil and Natural Gas Engineering	3	0	0	3
4	**PE**	19UCH926	Nuclear Science and Technology	3	0	0	3
Professional Elective – V (VII Semester)							
1	**PE**	19UCH924	Modern Separation Processes	3	0	0	3
2	**PE**	19UCH907	Computational Fluid Dynamics	3	0	0	3
3	**PE**	19UCH922	Nano Technology	3	0	0	3
4	**PE**	19UCH912	Alternative Energy Technology	3	0	0	3
5	**PE**	19UCH920	Fluidization Technology	3	0	0	3
Professional Elective – VI (VIII Semester)							
1	**PE**	19UCH913	Environmental Impact Assessment	3	0	0	3
2	**PE**	19UCH916	Process Optimization	3	0	0	3
3	**PE**	19UCH919	Quality Management for Chemical Engineers	3	0	0	3
4	**PE**	19UCH918	Pilot Plant and Scale Up studies	3	0	0	3

OPEN ELECTIVE (OE)

S.NO	COURSE CATEGORY	COURSE CODE	COURSE TITLE	L	T	P	C
V Semester							
1	**OE - I**	19UCH951	Corrosion Science and Engineering	3	0	0	3
VI Semester							
2	**OE - II**	19UCH952	Energy Storage Systems	3	0	0	3
VII Semester							
3	**OE - III**	19UCH953	Industrial Waste Management	3	0	0	3
VIII Semester							
4	**OE - IV**	19UCH954	Waste to Energy Conversion	3	0	0	3
						TOTAL	**12**