

BACHELOR'S DEGREE PROGRAMME

B.Tech. (Hons. / Res.)

in

CHEMICAL ENGINEERING

ACADEMIC CURRICULA

2023-2024



**Kalinga Institute of
Industrial Technology (KIIT)**

Deemed to be University
(Established U/S 3 of UGC Act, 1956)
Bhubaneswar, Odisha, India

COURSE STRUCTURE
B. Tech. in Chemical Engineering
(Students admitted in 2023 and later)

SEMESTER-I

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1	CH10001	Chemistry	3	0	0	3	3
2	MA11001	Differential Equations and Linear Algebra	3	1	0	4	4
3	HS10001	English	2	0	0	2	2
4	EC10001	Basic Electronics	2	0	0	2	2
5	ME10001	Engineering Mechanics	2	0	0	2	2
6		HASS Elective I	2	0	0	2	2
Total Credit (Theory Courses)						15	15
Practical							
1	CH19001	Chemistry Lab	0	0	2	2	1
2	EX19001	Engineering Lab	0	0	2	2	1
Sessional							
1	ME18001	Workshop	0	0	2	2	1
2	YG18001	Sports and Yoga	0	0	2	2	1
3	HS18001	Communication Lab	0	0	2	2	1
Total Credit (Practical & Sessional Courses)						10	5
Total Credit (Semester)						25	20

SEMESTER-II

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1	PH10001	Physics	3	0	0	3	3
2	MA11002	Transform Calculus and Numerical Analysis	3	1	0	4	4
3		Science Elective	2	0	0	2	2
4		Engineering Elective	2	0	0	2	2
5	LS10001	Science of Living Systems	2	0	0	2	2
6	CH10003	Environmental Science	2	0	0	2	2
Total Credit (Theory Courses)						15	15
Practical							
1	PH19001	Physics Laboratory	0	0	2	2	1
2	CS13001	Programming Laboratory	0	2	4	6	4
Sessional							
1	CE18001	Engineering Drawing & Graphics	0	0	2	2	1
Total Credit (Practical & Sessional Courses)						10	6
Total Credit (Semester)						25	21

SEMESTER-III

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1	EX20003	Scientific and Technical Writing	2	0	0	2	2
2	MA21001	Probability and Statistics	3	1	0	4	4
3	CT20001	Basics of Solid Mechanics	3	0	0	3	3
4	CT20003	Chemical Process Calculation	3	0	0	3	3
5	CT20005	Chemical Fluid Mechanics	3	0	0	3	3
6	CT21001	Chemical Engineering Thermodynamics	3	1	0	4	4
Total Credit (Theory Courses)						19	19
Practical							
1	CT29001	Chemical Fluid Mechanics Laboratory	0	0	2	2	1
2	CT29003	Chemical Thermodynamics Laboratory	0	0	2	2	1
Total Credit (Practical Courses)						4	2
Vocational Course							
1	CT28001	Good Laboratory Practices	0	0	2	2	1
Total Credit (Vocational)						2	1
Total Credit (Semester)						25	22

SEMESTER-IV

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		HASS Elective - II	3	0	0	3	3
2	MA21004	Vectors, PDEs and Complex Analysis	3	1	0	4	4
3	CT21002	Process Heat Transfer	3	1	0	4	4
4	CT21004	Process Equipment Design	3	1	0	4	4
5	CT20002	Mass Transfer Operations-I	3	0	0	3	3
6	EX20001	Industry 4.0 Technologies	2	0	0	2	2
Total Credit (Theory Courses)						20	20
Practical							
1	CT29002	Process Heat Transfer Laboratory	0	0	4	4	2
2	CT29004	Process Equipment Design Laboratory	0	0	2	2	1
Total Credit (Practical Courses)						6	3
Sessional							
1	CT28002	Seminar	0	0	2	2	1
Total Credit (Sessional Course)						2	1
Total Credit (Semester)						28	24

SEMESTER-V

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		HASS Elective - III	3	0	0	3	3
2	CT30001	Mass Transfer Operations-II	3	0	0	3	3
3	CT30003	Chemical Reaction Engineering	3	0	0	3	3
4	CT30005	Solid Fluid Operations	3	0	0	3	3
5	CT30007	Process Dynamics and Control	3	0	0	3	3
6		Professional Elective-I	3	0	0	3	3
Total Credit (Theory Courses)						18	18
Practical							
1	CT39001	Mass Transfer Laboratory	0	0	4	4	2
2	CT39003	Chemical Reaction Engineering Laboratory	0	0	4	4	2
Total Credit (Practical Courses)						8	4
Sessional							
1	CT38001	Proposal Writing	0	0	2	2	1
Total Credit (Sessional Courses)						2	1
K-Explore							
1		K-Explore (Practice-oriented Open Elective I)	0	0	0	-	1
Total Credit (K-Explore)						0	1
Total Credit (Semester)						27	24

SEMESTER-VI

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1	HS30401	Universal Human Values	3	0	0	3	3
2	CT31002	Chemical Process Technology	3	1	0	4	4
3	CT30002	Transport Phenomena	3	0	0	3	3
4		Professional Elective-II	3	0	0	3	3
5		Professional Elective-III	3	0	0	3	3
6		Open Elective II/(MI-1)	3	0	0	3	3
Total Credit (Theory Courses)						19	19
Sessional							
1	CT38002	Chemical Process Technology Lab	0	0	4	4	2
2	CT38004	Transport Phenomena Lab	0	0	2	2	1
4	CT37002	Mini Project	0	0	4	4	2
Total Credit (Sessional Courses)						10	5
Total Credit (Semester)						29	24

SEMESTER-VII (For Hons. Option Students)

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		Professional Elective-IV	3	0	0	3	3
2		Open Elective III / (MI-2)	3	0	0	3	3
3	EX40003	Engineering Professional Practice	2	0	0	2	2
(5)		(MI-3)	(3)	(0)	(0)	(3)	(3)
(6)		(MI-4)	(3)	(0)	(0)	(3)	(3)
Total Credit (Theory Courses)						8	8
Sessional							
1	CT48001	Internship	-	-	-	-	2
2	CT47001	Project – I	0	0	10	10	5
(3)		(Project//Lab-Minor)	(0)	(0)	(4)	(4)	(2)
Total Credit (Sessional Courses)						10	7
Total Credit (Semester)						18	15

SEMESTER-VIII (For Hons. Option Students)

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		Professional Elective-V	3	0	0	3	3
2		Open Elective IV/ (MI-5)	3	0	0	3	3
(3)		(MI-6)	(3)	(0)	(0)	(3)	(3)
Total Credit (Theory Courses)						6	6
Sessional							
1	CT47002	Project – II	0	0	18	18	9
Total Credit (Sessional Course)						18	9
Total Credit (Semester)						24	15

SEMESTER-VII (For Research Option Students)

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		Research Elective-I	3	0	0	3	3
2		(MI-2)	(3)	(0)	(0)	(3)	(3)
3	EX40003	Engineering Professional Practice	2	0	0	2	2
(4)	EX40001	Research Methods & Ethics	3	0	0	3	3
(5)		(MI-3)	(3)	(0)	(0)	(3)	(3)
(6)		(MI-4)	(3)	(0)	(0)	(3)	(3)
Total Credit (Theory Courses)						8	8
Sessional							
1	CT48001	Internship	-	-	-	-	2
2	CT47003	Research Project-I	0	0	10	10	5
(3)		(Project/Lab-Minor)	(0)	(0)	(4)	(4)	(2)
Total Credit (Sessional Courses)						10	7
Total Credit (Semester)						18	15

SEMESTER-VIII (For Research Option Students)

Theory							
Sl. No.	Course Code	Courses	L	T	P	Total	Credit
1		Research Elective-II	3	0	0	3	3
2		(MI-5)	(3)	(0)	(0)	(3)	(3)
(3)		(MI-6)	(3)	(0)	(0)	(3)	(3)
Total Credit (Theory Courses)						3	3
Sessional							
1	CT47004	Research Project-II	0	0	24	24	12
Total Credit (Sessional Course)						24	12
Total Credit (Semester)						27	15

ENGINEERING ELECTIVES

Sl. No.	Course Code	Courses
1	CE10001	Basic Civil Engineering
2	ME10003	Basic Mechanical Engineering
3	ME10003	Basic Mechanical Engineering [#]
4	EE10001	Elements of Machine Learning*
5	EC10003	Biomedical Engineering
6	EE10003	Basic Instrumentation

Not for students of Mechanical Engineering

* Not for students of Computer Engineering

SCIENCE ELECTIVES

Sl. No.	Course Code	Courses
1	CH10005	Nanoscience
2	PH10003	Smart Materials
3	LS10003	Molecular Diagnostics
4	PE10002	Science of Public Health
5	MA10003	Optimization Techniques

PROFESSIONAL ELECTIVES (PEs)

Professional Elective (PE)	List of Courses
PE – I	<ul style="list-style-type: none"> • Colloid and Interface Engineering (CT30021) • Membrane Separation Processes (CT30023) • Petroleum Geology (CT30029)
PE – II	<ul style="list-style-type: none"> • Biochemical Engineering (CT30022) • Environmental Pollution and Control (CT30024) • Petroleum Reservoir Engineering (CT30026)
PE – III	<ul style="list-style-type: none"> • Basics of Polymer Science (CT30025) • Chemical Process Modelling and Simulation (CT30027) • Petroleum Production Engineering (CT30031)
PE - IV	<ul style="list-style-type: none"> • Polymer Processing Technology (CT40021) • Applied Statistics for Chemical Engineers (CT40023) • Petroleum Refinery Engineering (CT40025)
PE - V	<ul style="list-style-type: none"> • Polymer Characterization Techniques (CT40022) • Plant Design and Economics (CT40024) • Petrochemicals Engineering (CT40026)

Combination of Professional Electives (PE-III, PE-IV & PE-V) for Obtaining Track

Track	PE-III		PE-IV		PE-V	
	Course code	Course	Course code	Course	Course code	Course
Chemical Process Engineering	CT30027	Chemical Process Modelling and Simulation	CT40023	Applied Statistics for Chemical Engineers	CT40024	Plant Design and Economics

Polymer Technology	CT30025	Basics of Polymer Science	CT40021	Polymer Processing Technology	CT40022	Polymer Characterization Techniques
Petroleum Engineering	CT30031	Petroleum Production Engineering	CT40025	Petroleum Refinery Engineering	CT40026	Petrochemicals Engineering

RESEARCH ELECTIVES

Research Elective-I SEMESTER-VII

Sl. No.	Course Code	Courses	Credit
1	CT40025	Materials Processing Technology	3
2	CT40027	Artificial Intelligence and Machine Learning in Chemical Engineering	3

Research Elective-II SEMESTER-VIII

Sl. No.	Course Code	Courses	Credit
1	CT40026	Paint and Surface Coating Technology	3
2	CT40028	Computational Fluid Dynamics	3

HASS ELECTIVES

HASS Elective-I SEMESTER-II

Sl. No.	Course Code	Courses	Credit
1	HS10321	Society, Science, and Technology	2
2	HS10121	Shades of Economics	2
3	HS10123	Indian Economy Post Liberalization	2
4	HS10221	Essentials of Management	2
5	HS10323	Socio-political Environment	2
6	PS10045	Creativity, Innovation and Entrepreneurship	2
7	EX17001	Community/Environment-based Group Project	2
8	PS10043	Thinking Perspectives	2

HASS Elective-II SEMESTER-IV

Sl. No.	Course Code	Courses	Credit
1	HS20220	Organizational Behavior	3
2	HS20120	Economics of Development	3
3	HS20122	International Economic Cooperation	3

HASS Elective-III SEMESTER-V

Sl. No.	Course Code	Courses	Credit
1	HS30223	Business Ethics and Corporate Governance	3
2	HS30225	Leadership and Team Effectiveness	3
3	HS30125	Market Structure and Pricing Policies	3
4	HS30127	Pragmatic Inquiry	3
5	HS30129	Economic Analysis of Decision Rules	3
6	HS30131	Economics of Health and Education	3
7	HS30421	Gender Studies	3
8	HS30423	Tribal Resource Management	3
9	HS30425	Indian Knowledge System	3