CRITERION 3	Course Outcomes and Program Outcomes	175
	Marks Claimed	175

3.1. Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (PSOs) (25)

Claimed 25

Program Outcomes (POs):

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities 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.
11. **Project management and finance**: 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.

12. **Life-long learning**: 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.

Program Specific Outcomes (PSOs): As defined by the Program which is given below:

PSOs	Statement
PSO1	Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.

3.1.1. Course Outcomes (COs)

The course outcomes for each course are mentioned in syllabi of program. Course outcome formed should meet the following guidelines:

- Follows Bloom's taxonomy.
- Reflects the whole syllabus prescribed by Institute for each course.
- Key topic of each unit is taken as one course outcome.
- No. of COs for each course should be a maximum of six.

Six core courses are mentioned below for demonstration with one course per semester. On successful completion of this course, students should be able to:

S.No.	Course Code	Course Name	Course outcomes	
1	ChBC-33	Process Fluid Mechanics	CO.1	Able to understand the fundamentals and basic principles of process fluid mechanics.
			CO.2	Able to formulate and solve the fluid flow problems with the application of conservation laws.
			CO.3	Able to examine energy losses and evaluate pressure drop in pipes.
			CO.4	Able to understand and analyze the functions and performances of various equipments and flow measuring devices.
2	ChBC-45	Mass Transfer -I	CO.1	Fundamental understanding of mass transfer operation.
			CO.2	Understanding of inter phase mass transfer and coefficients of mass transfer operation.

			CO.3	Analyze gas absorption and tower characteristics.
			CO.4	Understanding of absorption, humidification, drying and crystallization operation.
3	ChBC-52	Chemical Reaction Engineering.	CO.1	Understand the different types of reactions, their kinetics and their influence on chemical equilibrium.
			CO.2	Design of single, isothermal plug-flow, CSTR, and batch reactors for a single homogeneous reaction.
			CO.3	Analyze and size reactors while accounting for non-isothermal conditions and non-ideal flow patterns.
			CO.4	Design reactors for the homogenous and heterogeneous, and understand their effect on performance equations for reactors
4	ChBC-67	Transport Phenomena	CO.1	To Identify transport properties and analyze the mechanism of momentum, energy and mass transport.
			CO.2	To Apply conservation laws to formulate differential form of equations of change for mass, momentum and heat transfer problems.
			CO.3	To solve linear partial differential equations along with appropriate boundary conditions to get the velocity, temperature and concentration profiles of different engineering problems.
			CO.4	Recognize non Newtonian fluids and apply appropriate models to solve them
5	ChBC-73	Process Dynamics & Control	CO.1	To understand and model the dynamic behavior of chemical processes based on their time domain, Laplace domain.
			CO.2	Analyze the properties e.g. speed of response, frequency response of first order and second order systems
			CO.3	Analyze the different components of a control loop
			CO.4	Understand the operation of P, I, D and PID controllers and to tune them.
6	ChBC-82	Bioresource Technology	CO.1	Fundamental understanding of the bio-resources and its applications for the attainment of social objectives (energy, environment, product, sustainability)
			CO.2	Acquire knowledge with respect to the properties of the bio-resources and the conversion technologies
			CO.3	Exhibiting knowledge of the systems used for bioresources and bioresource technology
			CO.4	Understanding about analysis of data and their applications in design of the systems and development of the bioprocess

Table B. 3.1a. Course Outcomes of Core Subjects from each Semester

The program outcomes are achieved through curriculum that offers a number of mandatory courses as well as elective courses. Each course has defined course outcomes that are mapped to the program outcomes and progam specific outcomes and a set of performance criteria that are used to provide quantitative measurement of how well course outcomes are achieved.

The Course Outcomes are mapped to the Program Outcomes and Program Specific Outcomes with three levels of attainment, viz.

a. Strongly Related, having a weightage of 3

b. Moderately Related, having a weightage of 2
c. Related, having a weightage of 1

Table B.3.1b gives the mapping of Course Outcomes with the Program Outcomes and Program Specific Outcomes

Course Articulation Matrix:

Process Fluid Mechanics														
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-33.1	3	2	3	2	1							2	3	2	1
ChBC-33.2	3	3	3	2	1							2	3	2	1
ChBC-33.3	3	3	3	2	1							2	3	2	1
ChBC-33.4	3	3	3	2	1							2	3	2	1
	3	2.8	3	2	1							2	3	2	1
Mass Transfer -I															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-45.1	3	3	2	3	1	2	2				1	3	3	2	2
ChBC-45.2	3	3	2	3	2	3	2			1	1	2	3	2	2
ChBC-45.3	3	3	3	3	2	2	2				1	1	3	1	2
ChBC-45.4	3	3	3	3	2	2	1				1	1	3	1	2
	3	3	2.5	3	1.8	2.3	1.8			1	1	1.8	3	1.5	2
Chemical Reaction Engineering.															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-52.1	3	2	2	2	1				2			2	3	1	3
ChBC-52.2	3	3	3	3	3	2	2	2	2		2	2	3	2	3
ChBC-52.3	3	2	2	2	2	2	2	2				2	3	1	3
ChBC-52.4	3	3	3	3	3	2	2					3	3	1	3
	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
Transport Phenomena															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3

ChBC_61.1	3	3	3	3	2	1	2	2				2	3	3	3
ChBC_61.2	3	3	3	2	2	2	2	2				2	3	3	3
ChBC_61.3	3	3	3	2	1	2	2					2	3	3	3
ChBC_61.4	3	3	3	2	3	2	2					2	3	3	3
	3	3	3	2.2	2	1.7	2	2				2	3	3	3
Process Dynamics & Control															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-73.1	3	3	3	3	1			1				3	3	1	3
ChBC-73.2	3	3	3	3	2	2	2	1				2	3	1	3
ChBC-73.3	3	1	2	1	1							1	3	1	1
ChBC-73.4	3	3	3	3	3	2	2	1				2	3	1	3
	3	2.5	2.8	2.5	1.8	2	2	1				2	3	1	2.5
Bioresource Technology															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-82.1	3	3	3	3	2	3	3	3	1	1		1	3	3	3
ChBC-82.2	3	3	3	3	2	3	3	2		2		2	3	3	3
ChBC-82.3	3	3	3	2	2	3	3	2	1	2		2	3	3	3
ChBC-82.4	3	3	3	3	2	3	3	2	1	2		2	3	2	3
	3	3	3	2.8	2	3	3	2.3	1	1.8		1.8	3	2.8	3

Table B. 3.1b. Course Articulation Matrix of Core Subjects from each Semester

The Course Outcome statements of all the courses are given in Criteria 2 and Program Articulation Matrix is given in below Tables of B. 3.1c, B.3.1d and B.3.1e.

Table B.3.1c , Table B.3.1d and Table B.3.1e provide the details of various courses and their COs mapping with the Program Outcomes and Program Specific Outcomes for the Academic Years 2019-2020 , 2018-2019 and 2017-2018 respectively.

Program Articulation matrix for Academic Year 2019-2020

S. No	Course Code	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2	PSO 3
1	MEL100	Elements of Mechanical Engineering	3	2	3							2		3	3	2	3
2	PHL100	Engineering Physics	3	1	1		2	2	2	2	3	2		3	2	1	1
3	CIL100	Engineering Mechanics	3	3	1.8	1.8		2	1						2	1	1.8
4	HUL100	Basic English and Communication Skills						2			2.3	3	2	2.5			
5	CYL101	Environmental Studies	2.75	2.5	3		1.75	2.75	3			2	1.5	2.25	2.25	1.5	2
6	MAL-100	Mathematics-I	2.4	1.8	2.6								1		1.6	2.4	1.2
7	HUP100	Language Laboratory									3	3	3	2			
8	PHP100	Physics Laboratory	3	2.75	2.5	1.25	1.5							1.33	2	1	1
9	WSP100	Work shop Practice	3	1	1		2	2	2	2	3	2		3	2	1	1
10	HUL101	Advanced English CommSkills & Organizational Behavior						2.5			2.3	3	2	2			
11	EEL100	Basic Electrical Engineer	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
12	TL100	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
13	CYL100	Engineering Chemistry	2	2	2.66	1		1.25	2	1	1	2	2	2.25	2.25	2.25	1.75
14	CIP100	Engineering Drawing	3	3	3	3	1.5	1.5	1.75	2			3	2	3	2	2
15	MAL101	Mathematics II	2.4	1.8	2.6								1		1.6	2.4	1.2
16	ELP100	Basic Electrical Engineer Laboratory	2.75	1.75	1.75	2.25	1.5	1.5					2	1.5	2	2	2.25
17	CYP100	Chemistry Laboratory	2	2	2	1		1.25	2	1	1	2	2	2.25	2.25	2.25	1.75
18	ITP100	Computer Programming Laboratory	1	3	2.75		3				1			1.5	1	2.5	1
19	ChBC 31	Introduction to Chemical Engineering	2	1.75	1.66		2	3	3	2			1	2	2.4	2.4	2.4
20	ChBC 32	Material and Energy Balance	3	3	3	3	3								3	3	3
21	ChBC 33	Process Fluid Mechanics	3	2.75	3	2	1							2	3	2	1
22	ChBC 34	Thermodynamics and Chemical Kinetics	3	2.25	1.75	2								2.5			
23	EEBC-31	Basic Electrical & Electronics Eng	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
24	HSBC-31	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3			
25	MTBC-31	Chemical Eng. Mathematics-I	2.25	2.5	2.5	1.25	1.5							2.25	2.25	2.75	

26	ChBC-41	Chemical Engineering thermodynamics	2.5	2.25	1.75	2								2.5	2	2.25	1
27	ChBC-42	Heat Transfer	3	3	2.75	2.25		1.5	1.5					2	2	3	1
28	ChBC 43	Mechanical Operations	3	2.4	2.2	2.2		1.6	2					1.2	2.8	2.6	2.6
29	ChBC 44P	Fluid Mechanics and Mechanical Operations Laboratory	2	2	1	3									2	1	2
30	ChBC-45	Mass Transfer – I	3	3	2.5	3	1.75	2.25	1.75			1	1.25	2	3	1.5	2
31	ChBS-41	Seminar	3	3	2.33	2.33	3	1.75	2.33	3	1	3	1.25	2.25	1.75	1	2.25
32	EEBC-41P	Basic Electrical & Electronics Eng. Laboratory.	2.75	1.75	1.75	2.25	1.5	1.5					2	1.5	2	2	2.25
33	MTBC-41	CHEMICAL ENG.METHAMATICS-II	2	1.75	1.25	1.25						1.5		2	2	1	1.75
34	ChBC 51	Process Equipment Design – I	3	2.6	2.6	1.75	2.6	1.8	2		2	2	2.75	2	3	2.4	2.8
35	ChBC52	Chemical Reaction Engg	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
36	ChBC 53	Material Science and Technology	1.75	2	2.25	2.25	1.75	1	1.75	1			1	3	1.75	2	2.5
37	ChBC 54	Chemical Technology-I	1.5	1.5	1.75	1.5	1.5	1.25	2	1			1	3	1.25		1.33
38	ChBC-56P	Heat Transfer Lab	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
39	HHBC-51	Basic Management Principles		2.75	1.75	3		2.5	3	2.75	2.75	3	3	3	3	3	3
40	MTBC-51	Numerical Methods	2.25	2.5	2.5	1.25	1.5							2.25	2.25	2.75	
41	ChBC 61	Process Equipment Design – II	3	2.6	2.6	1.75	2.6	1.8	2		2	2	2.2	2	3	2.4	2.8
42	ChBC-62	Mass Transfer-II	3	3	3	3									3	3	3
43	ChBC 63	Chemical Technology II	1.33	1.25	1.33	1	1.25	2	1.50				1	3	1.25		1.33
44	ChBC 64	Energy Engineering	3	2.5	2.5	2.5	2.5	2	2	2	2		2	2.25	3	1.25	3
45	ChBC 65	Energy Engineering Laboratory	2.25	1.25	1.25	1	2	2	3		2		2	2	1.5	2	2
46	ChBC66	Process Instrumentation	3	2	1	2	2								3	2.25	2
47	ChBC 67	Transport Phenomena	3	3	3	2.25	2	1.75	2	2				2	3	3	3
48	ChBC65P	Thermodynamics and Reaction Engineering Laboratory	2.5	2	1.5	1.25	2	2	3	1.75	2	1.75	2	2	1.75	2	2
49	ChBC 69	Industrial Training & Presentations	2.75	2.75	2.25		2	1.33	2	1.3	2	2.66	2.5	2	2.25	2.25	2
50	ChBP-71	Pre-project work	2	1.5	1.25	1.5	2	1.5	1	1	2	1.75	1.75	2	2	2.75	2.25
51	ChBC 72	Chemical Process safety	3	3	2.66	2.75	2	2.25	3	3	2.25	2.25	2.5	2.66	2.75	2.25	1.75
52	ChBC 73	Process Dynamics and Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
53	ChBC 74P	Process Dynamics and Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
54	ChBC 75	Process Economics & Plant Design	2	2.25	2	1.5								2	2.5	2.5	1.25

55	ChBC 76	Biochemical Engineering	2.75	2.75	2.75	2.75	2	3	3	2.5	1	2		2	3	3	3
56	ChBC 77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
57	HSBE 71	Human Resource Development			3			3	2.33	3	1.66	2.66	3	3			
58	MTBE 72	Numerical Analysis	2.25	2.5	2.5	1.25	1.5							2.25	3	2.75	
59	ChBE 74	Computational Fluid Dynamics	3	3	3	3	2.5				1.5	1.25	1.25	1.25	3	2	2.25
60	ChBP 81	B. Tech Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
61	ChBC82	Bio Resource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
62	ChBC83P	Biochemical Engineering Laboratory	3	2.75	2.25	2	2.5	1.75	1.5	1.5	1	1.25	1.75	2	2.25	2.25	2.5
63	ChBC84	Modelling and Simulation in Chemical Engineering	3	3	3	3	2	2						2	3	3	3
64	ChBC85	Industrial Pollution Abatement	2.5	3	2.25	3	1.75	3	3						3	3	3
65	ChBE 84	Nano-Science and Technology	2.75	1.75	1.25	1.25									1.75	1.5	1
66	ChBE 82	Petroleum Refining	3	2.25	2.25	2	2	1.75	2	1.67	1.5	1	1	2	3	1.75	3
67	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.75	3	3	3		
68	ChBE-83	Clean Technology in Process Industries	2.5	2	2.33	1	1	1	1						2.5	1.25	2

Table B.3.1c. Program Articulation Matrix for 2019-2020

Program Articulation Matrix for 2018-2019:

S. No	Course Title	Course name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	CHM-101	Chemistry-I	2.8	2.3	1.5		2	1.3	1.8		1	1.8	2	2.3	2.3	2.5	1.8
2	PHY-101	Physics-I	3	3	2.75	1.25	1	1									
3	MTH -101	Mathematics-I	2.4	1.8	2.4								1		1.6	2	1.2
4	HSS 101	Communication Skills & Oral Presentation									2.3	2.5	2.25				
5	IT-101	Computer Fundamentals And Problem Solving Techniques	2.5	3	1		2							2	3	1.5	1
6	CIV- 102	Engineering Drawing	3	3	3	3	2	2	2		3	3	2	2			
7	CHM-101 P	Chemistry-I Laboratory	2.5	1.5	1.3	1	2.4	2	2.4		2		2	1.4	2.3	2.4	1.6
8	PHY-102 P	Physics-I Laboratory	2.75	2.65	2.5	1.2	1.45							1	2	1	1
9	IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.8	2.3	2.5	3	1.8				1			2.5	3	1.5	1
10	WSP-I	Workshop Practices- I	3	1	1		2	2	2	2	3	2		3	2	1	1
11	CHM-201	Chemistry-II	2.3	1.8	2							2		1.8	2	2.3	1.3
12	PHY-201	Physics-II	3	3	2.75	1.25	1										
13	MTH-201	Mathematics-II	2.4	1.8	2.4								1		1.6	2.4	1.2
14	HSS-201	Introduction To Social Sciences						1.7	1.3	1.3	2	2	1.5				
15	CSE-201	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
16	CIV-201	Strength of Materials	3	3	1.8	1.8		2	1								
17	MED-201	Machine Drawing	2.5	1	2.5	1				1.3	1			1	2.8	1.8	0.8
18	CHM-201 P	Chemistry-II Laboratory	2.5	2	1.8			1.8	2			1.5	1.3	1.3	2.3	2.5	2
19	PHY-201 P	Physics-II Laboratory	2.72	2.75	2.52	1.25	1.35							1			
20	CSE-202 P	Computer Programming Laboratory	1	3	2.75		3								1	2.5	1
21	WSP-II	Workshop Practices-II	3	1	1		2	2	2	2	3	2		3	2	1	1
22	ChBC-31	Introduction to Chemical Eng.	2	1.8	1.7		2	3	3	2			1	2	2.4	2.4	2.4
23	ChBC-32	Material and Energy Balance	3	3	2.3	2.3	2.5	2	2	2	1		2	2.8	2.5	2	2
24	ChBC-33	Process Fluid Mechanics	3	2.8	3	2	1							2	3	2	1
25	ChBC-34	Thermodynamics and Chemical Kinetics	3	2.3	1.8	2								2.5	2	2.3	2

26	EEBC-31	Basic Electrical & Electronics Eng.	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
27	HSBC-31	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3		3	
28	MTBC-31	Chemical Eng. Mathematics-I	2.3	2.5	2.5	1.3	1.5							2.3	3	2.8	
29	ChBC-41	Chemical Eng. Thermodynamics	2.5	2.3	1.8	2								2.5	2	2.3	1
30	ChBC-42	Heat Transfer	3	3	2.8	2.3		1.5	1.5					2	2	3	1
31	ChBC-43	Mechanical Operations	3	2.4	2.2	2.2		2	2.5					1.5	2.8	2.6	2.6
32	ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2	2	1	3									2	1	2
33	ChBC-45	Mass Transfer -I	3	3	2.5	3	1.8	2.3	1.8			1	1	1.8	3	1.5	2
34	ChBS-41	Seminar	3	3	2.5	2.5	3	1.8	2.5	3	1	3	1.3	2.5	2	1	3
35	EEBC-41P	Basic Electrical & Electronics Eng. Laboratory.	2.7	1.65	1.65	2.2	1.45	1.45					2	1.45	2	2	2.2
36	MTBC-41	Chemical Eng. Mathematics –II	2	1.8	1.3	1						1.5		2	2	1	1.8
37	ChBC-51	Process Equipment Design – I (mechanical aspects)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
38	ChBC-52	Chemical Reaction Eng.	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
39	ChBC-53	Material Science & Technology	1.8	2.0	2.3	2.0	1.8	1.0	1.8	1.0			1.0	3.0	1.8	2	2.5
40	ChBC-54	Chemical Technology – I	1.3	1.5	1.8	2.0	1.8	1.3	1.3	1.0	1.0	1.0	1.5	3.0	1.5	1.3	1.5
41	ChBC-55	Mass Transfer -I	3.0	3.0	2.5	3.0	1.8	2.3	1.8			1.0	1.3	2.0	3	1.5	2
42	ChBS-56P	Heat Transfer Laboratory.	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
43	HSBC-51	Basic Management Principles		2.8	2.3	3		2.5	3	2.8	2.8	3	3	3	3	3	3
44	ChBC-61	Process Equipment Design -II (Process Aspect)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
45	ChBC-62	Mass Transfer – II	2.8	3	2.8	1	1							1	3	2.6	2.8
46	ChBC-63	Chemical Technology – II	1.5	1.5	1.8	1.5	1.5	1.3	2	1			1	3	1.3		1.3
47	ChBC-64	Energy Eng.	3	2.5	2.7	2.7	2.5	2	2.8	3	2	2	2	2	2.7	2.5	2
48	ChBC-65P	Energy Eng. Laboratory.	2.3	1.3	1.3	1	2	2	3		2		2	2	1.5	2	2
49	ChBC-66	Process Instrumentation	3	2	1	2	2								3	2.3	2
50	ChBC-67	Transport Phenomena	3	3	3		1.7	1.8	2	2				2	3	3	3
51	ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	3	3	3	2.3	2	1.8	2	2				2	3	3	3
52	ChBC-69	Industrial Training & Presentations	2.8	2.8	2.3		2	1.3	2	1.3			3	2	2.3	2.3	2
53	ChBP-71	Pre-project work	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2

54	ChBC-72	Chemical Process Safety	3	3	2.7	2.8	2	2.3	3	3	2.3	2.3	2.5	2.7	2.8	2.3	1.8
55	ChBC-73	Process Dynamics & Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
56	ChBC-74P	Process Dynamics & Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
57	ChBC-75	Process Economics & Plant Design	2	2.3	2	1.5								2	2.5	2.5	1.3
58	ChBC-76	Biochemical Eng.	2.8	2.8	2.8	2.8	2	3	3	2.5	1	2		2	3	3	3
59	ChBC-77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
60	HSBE-71	Human Resource Development			3			3	2.5	3	2	2.75	3	3	3		
61	MTBE-71	Operation Research	2	2.5	1.25	2.5						1.75		2.25	2	1.75	1.75
62	HSBE-72	Managerial Economics for Engineers			3			2.8	2.5	1.8	3	3	3	3	3		
63	ChBE-74	Computational Fluid Dynamics	3	3	3	3	2.5				1.5	1.3	1.3	1.3	3	2	2.3
64	ChBP-81	Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
65	ChBC-82	Bioresource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
66	ChBC-83P	Biochemical Eng. Laboratory.	3	2.8	2.3	2	2.5	1.8	1.5	1.3	1	1.3	1.7	2	2	2.25	2.5
67	ChBC-84	Modeling and Simulation in Chemical Eng.	3	3	3	3	2	2						2	3	3	3
68	ChBC-85	Industrial Pollution Abatement	2.5	3	2.3	3	1.8	3	3						3	3	3
69	ChBE 82	Petroleum Refining	3	2.3	2.3		1.7	1.8	2	1.7			1	2	3	1.8	3
70	ChBE 81	Process Heat Integration	3	3	2.8	2.5	1.5	2	2					2	3	2	1
71	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.8	3	3	3		
72	ChBE 82	Fuel Cell Technology	3	2	2.3	2	1.5	2	1.8	1				2	2.75	1.25	2.25

Table B.3.1d. Program Articulation Matrix for 2018-2019

Program Articulation Matrix for 2017-2018:

S.No.	Course Title	Course name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PS O 2	PSO 3
1	CHM-101	Chemistry-I	2.8	2.3	1.5		2	1.3	1.8		1	1.8	2	2.3	2.3	2.5	1.8
2	PHY-101	Physics-I	3	3	2.75	1.25	1	1									
3	MTH -101	Mathematics-I	2.4	1.8	2.4								1		1.6	2	1.2
4	HSS 101	Communication Skills & Oral Presentation									2.3	2.5	2.25				
5	IT-101	Computer Fundamentals And Problem Solving Techniques	2.5	3	1		2							2	3	1.5	1
6	CIV- 102	Engineering Drawing	3	3	3	3	2	2	2		3	3	2	2			
7	CHM-101 P	Chemistry-I Laboratory	2.5	1.5	1.3	1	2.4	2	2.4		2		2	1.4	2.3	2.4	1.6
8	PHY-102 P	Physics-I Laboratory	2.75	2.65	2.5	1.2	1.45							1	2	1	1
9	IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.8	2.3	2.5	3	1.8				1			2.5	3	1.5	1
10	WSP-I	Workshop Practices- I	3	1	1		2	2	2	2	3	2		3	2	1	1
11	CHM-201	Chemistry-II	2.3	1.8	2							2		1.8	2	2.3	1.3
12	PHY-201	Physics-II	3	3	2.75	1.25	1										
13	MTH-201	Mathematics-II	2.4	1.8	2.4								1		1.6	2.4	1.2
14	HSS-201	Introduction To Social Sciences						1.7	1.3	1.3	2	2	1.5				
15	CSE-201	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
16	CIV-201	Strength of Materials	3	3	1.8	1.8		2	1								
17	MED-201	Machine Drawing	2.5	1	2.5	1				1.3	1			1	2.8	1.8	0.8
18	CHM-201 P	Chemistry-II Laboratory	2.5	2	1.8			1.8	2			1.5	1.3	1.3	2.3	2.5	2
19	PHY-201 P	Physics-II Laboratory	2.72	2.75	2.52	1.25	1.35							1			
20	CSE-202 P	Computer Programming Laboratory	1	3	2.75		3								1	2.5	1
21	WSP-II	Workshop Practices-II	3	1	1		2	2	2	2	3	2		3	2	1	1
22	ChBC-31	Introduction to Chemical Eng.	2	1.8	1.7		2	3	3	2			1	2	2.4	2.4	2.4
23	ChBC-32	Material and Energy Balance	3	3	2.3	2.3	2.5	2	2	2	1		2	2.8	2.5	2	2

24	ChBC-33	Process Fluid Mechanics	3	2.8	3	2	1							2	3	2	1
25	ChBC-34	Thermodynamics and Chemical Kinetics	3	2.3	1.8	2								2.5	2	2.3	2
26	EEBC-31	Basic Electrical Eng.	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
27	EEBC-312P	Basic Electrical Eng. Laboratory	2.7	1.65	1.65	2.2	1.45	1.45					2	1.45	2	2	2.2
28	MTBC-31	Chemical Eng. Mathematics-I	2.3	2.5	2.5	1.3	1.5							2.3	3	2.8	
29	ChBC-41	Chemical Eng. Thermodynamics	2.5	2.3	1.8	2								2.5	2	2.3	1
30	ChBC-42	Heat Transfer	3	3	2.8	2.3		1.5	1.5					2	2	3	1
31	EEBC-41P	Basic Electronics Eng.	2.75	2.25	2.75	2	1	1	1					1.25	2.5	2	1.75
32	EEBC-41P	Basic Electronics Eng. Laboratory.	2.75	2.25	2.75	2	1	1	1					1.25	2.5	2	1.75
33	ChBC-43	Mechanical Operations	3	2.4	2.2	2.2		2	2.5					1.5	2.8	2.6	2.6
34	ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2	2	1	3									2	1	2
35	ChBS-41	Seminar	3	3	2.5	2.5	3	1.8	2.5	3	1	3	1.3	2.5	2	1	3
36	HSBC-41	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3		3	
37	MTBC-41	Chemical Eng. Mathematics –II	2	1.8	1.3	1						1.5		2	2	1	1.8
38	ChBC-51	Process Equipment Design – I (mechanical aspects)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
39	ChBC-52	Chemical Reaction Eng.	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
40	ChBC-53	Material Science & Technology	1.8	2	2.3	2	1.8	1	1.8	1			1	3	1.8	2	2.5
41	ChBC-54	Chemical Technology – I	1.3	1.5	1.8	2	1.8	1.3	1.3	1	1	1	1.5	3	1.5	1.3	1.5
42	ChBC-55	Mass Transfer -I	3	3	2.5	3	1.8	2.3	1.8			1	1.3	2	3	1.5	2
43	ChBS-56P	Heat Transfer Laboratory.	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
44	HSBC-51	Basic Management Principles		2.8	2.3	3		2.5	3	2.8	2.8	3	3	3	3	3	3
45	ChBC-61	Process Equipment Design -II (Process Aspect)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
46	ChBC-62	Mass Transfer – II	2.8	3	2.8	1	1							1	3	2.6	2.8
47	ChBC-63	Chemical Technology – II	1.5	1.5	1.8	1.5	1.5	1.3	2	1			1	3	1.3		1.3
48	ChBC-64	Energy Eng.	3	2.5	2.7	2.7	2.5	2	2.8	3	2	2	2	2	2.7	2.5	2
49	ChBC-65P	Energy Eng. Laboratory.	2.3	1.3	1.3	1	2	2	3		2		2	2	1.5	2	2

50	ChBC-66	Process Instrumentation	3	2	1	2	2								3	2.3	2
51	ChBC-67	Transport Phenomena	3	3	3		1.7	1.8	2	2				2	3	3	3
52	ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	3	3	3	2.3	2	1.8	2	2				2	3	3	3
53	ChBC-69	Industrial Training & Presentations	2.8	2.8	2.3		2	1.3	2	1.3			3	2	2.3	2.3	2
54	ChBP-71	Pre-project work	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
55	ChBC-72	Chemical Process Safety	3	3	2.7	2.8	2	2.3	3	3	2.3	2.3	2.5	2.7	2.8	2.3	1.8
56	ChBC-73	Process Dynamics & Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
57	ChBC-74P	Process Dynamics & Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
58	ChBC-75	Process Economics & Plant Design	2	2.3	2	1.5								2	2.5	2.5	1.3
59	ChBC-76	Biochemical Eng.	2.8	2.8	2.8	2.8	2	3	3	2.5	1	2		2	3	3	3
60	ChBC-77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
61	MTBE-71	Operation Research	2	2.5	1.25	2.5						1.75		2.25	2	1.75	1.75
62	HSBE-72	Managerial Economics for Engineers			3			2.8	2.5	1.8	3	3	3	3	3		
63	ChBP-81	Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
64	ChBC-82	Bioresource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
65	ChBC-83P	Biochemical Eng. Laboratory.	3	2.8	2.3	2	2.5	1.8	1.5	1.3	1	1.3	1.7	2	2	2.25	2.5
66	ChBC-84	Modeling and Simulation in Chemical Eng.	3	3	3	3	2	2						2	3	3	3
67	ChBC-85	Industrial Pollution Abatement	2.5	3	2.3	3	1.8	3	3						3	3	3
68	ChBE 82	Petroleum Refining	3	2.3	2.3		1.7	1.8	2	1.7			1	2	3	1.8	3
69	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.8	3	3	3		

Table B.3.1e.Program Articulation Matrix for 2017-2018

3.2. Attainment of Course Outcomes (75)

Claimed 75

3.2.1. Describe the assessment tools and processes used to gather the data upon which the evaluation of Course Outcome is based (10)

Claimed 10

Assessment of course outcomes is a systematic and ongoing method of collecting, analyzing and using information about a course from various sources and measuring course outcomes in order to improve student learning. For assessing the course outcomes (CO), both direct and indirect assessments methods are considered.

Direct assessment consists of midterm examination/major examination/assignments. Marks obtained by students in these examinations are used to assess the CO attainment. For Indirect assessment, course outcome surveys are carried out at the end of a course and the results are analyzed. In these surveys, responses are recorded on a 3-point scale, to get the self-assessment of students with respect to COs attainment. The record for all the internal assessments is maintained by the faculty and the department.

1. CO Assessment Rubrics

COs are evaluated based on the performance of students in a mid-term examination, one major examination and continuous assessment (in the form of assignments and quizzes). The contributions are 30%, 60% and 10% for the mid-term exam, major exam and continuous assessment, respectively.
However, the lockdowns due to abrogation of Article 370 and subsequent COVID-19, the regular pattern of examination couldn't possible and alternative evaluation schemes were adopted. For Autumn 2019, the contributions are 90% and 10% for major exam and continuous assessment respectively. In Spring 2020 the classes were held online and the evaluation was based on Mid Term (30%) as assignments and Major (40%) as Comprehensive Viva-Voce Examination (CVVE), the remaining 30% was based on the Maximum Semester Grade Point Average (SGPA) up to previous semesters. Whereas for the assessment of CO attainment purpose, the Assignments was given weightage of 40% and CVVE has been given 60% weightage.

Assessment of Course Outcomes (Upto Spring 2019)

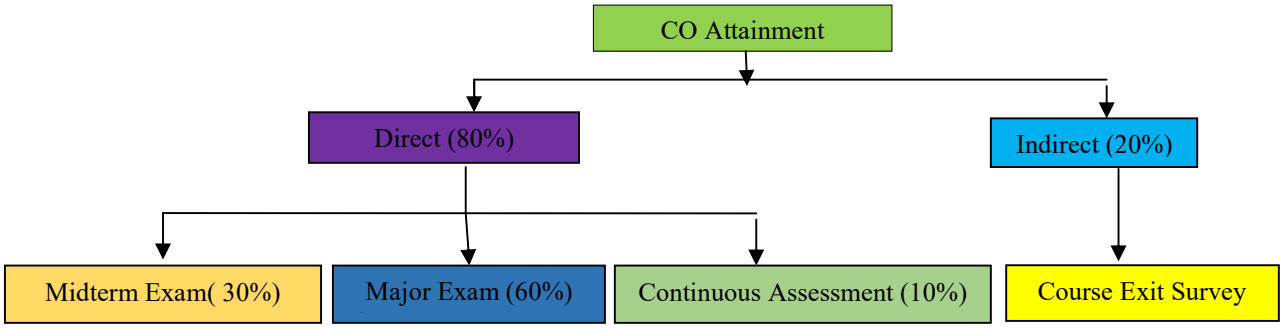

Figure B. 3.2.1a

Assessment of Course Outcomes (Autumn 2019)

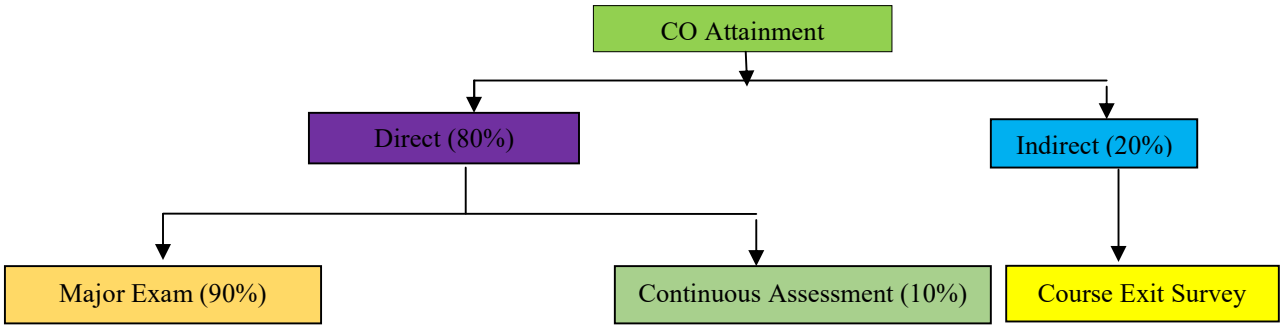

Figure B. 3.2.1b

Assessment of Course Outcomes (Spring 2020)

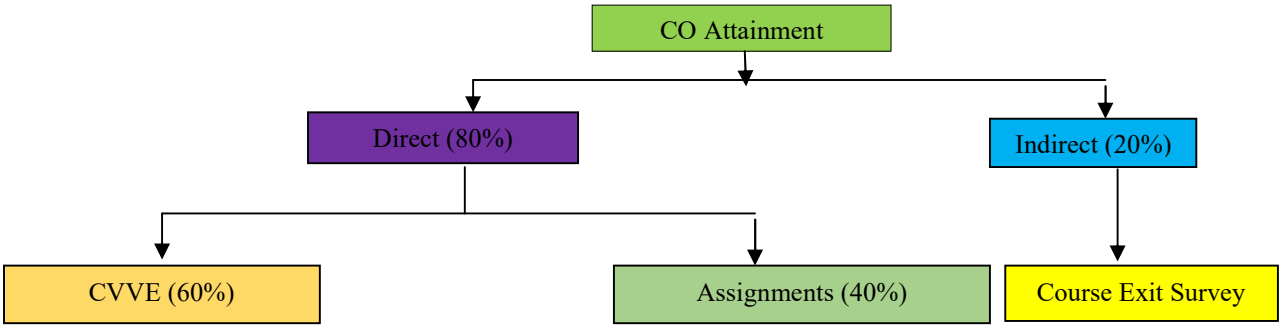

Figure B. 3.2.1c

The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed below Table B.3.2.1a.

		Assessment Method	Assessment Tool	Frequency per Semester
Theory		Direct Method (80% weightage)	Midterm Exams (30% Weightage)	1
			Assignment (10% Weightage)	1
			End Sem. Exam (60% Weightage)	once
		Indirect Method (20% weightage)	Feed back	once
Laboratory		Direct Method (80% weightage)	Continuous Assessment (Report, Experiments) (40% weightage)	After Each Experiment
			End Semester Exam (60% weightage)	once
		Indirect Method (20% weightage)	Feed back	once
Seminar		Direct method (80% weightage)	Presentation	Twice/Course
			Report	Once/course
			Viva-voce	Once/course
		Indirect Method (20% Weightage)	Feed back	once
Project	**7th Semester**	Direct method (80% weightage)	Mid-Term Evaluation	Once/course
			End- Term Evaluation	Once/course
		Indirect Method (20% Weightage)	Feed back	
	8th Semester	Direct method (80% weightage)	Mid-Term Evaluation	Once/course
			End- Term Evaluation (Demonstration and evaluation by External Examiner)	Once/course
		Indirect Method (10% Weightage)	Feed back	Once/course

Table B.3.2.1a

2. Quality / Relevance of Assessment Process

THEORY

- **Mid-Term Test:** One Mid-Term test serves to encourage students to keep up with subject matter covered in class. This test is of 1.5-hour duration and is evaluated for 30 marks. The questions are framed in such a way that they satisfy Bloom's taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels.
- **Major Test:** Major test is held once in every semester to evaluate the students' performance. The exam is of 3 hours duration and is evaluated for 60 marks. The questions are framed in such a way that they satisfy blooms taxonomy, wherein each question is mapped to the appropriate course outcome.
- **Continuous Assessment:** Continuous assessment in the form of assignments, oral quizzes, MCQ quizzes are the qualitative performance assessment tools designed to assess students' knowledge of engineering practices, framework and problem solving. Students are assigned course-related work, and their submissions are graded based on work quality and originality. Continuous assessment is evaluated for 10 marks. The questions in the assignment are mapped to the Course Outcomes of the subject.

LABORATORY

Lab courses provide students with first-hand experience with course concepts and the opportunity to explore experimental methods used in their discipline.

- **Continuous Assessment:** All the students are expected to be regular and learn the practical aspects of the subject and develop the necessary skills to become professionals. In order to facilitate interaction among the students and to develop team spirit, the students are expected to carry out experiments in groups. Performance assessment is based on the ability of the student to actively participate in the successful conduct of prescribed practical work and draw appropriate conclusions. The student submits a record of practical work performed in each class. Continuous assessment constitutes 40% of the total marks of a lab course.
- **Major Lab Exam:** A major lab exam of 3 hours duration is conducted to assess the ability of a student to perform a given task by integrating the knowledge gained from related theory course and regular lab sessions. The exam includes viva voce and performing a given experiment. The weightage for the major lab exam is 60% of the total marks of a lab course.

SEMINAR

Seminar is a part of fourth semester curriculum. The student makes two seminar presentations (preliminary and a final) on a topic of his/her choice and approved by the assigned faculty. Seminar presentation is planned for the duration of 30 minutes including a question-answer session of 5 to 10 minutes. Seminar is evaluated based on the presentation by the students before an evaluation committee consisting of three faculty members including Head of the Department. The committee evaluates seminar based on following parameters.

- **Relevance:** The seminar power point presentation is oriented at covering the fundamentals as well as advanced topics in the appropriate branch of engineering, with reference to latest international journal papers. The significance of the seminar topic and the credibility of references cited are used as parameters to assess the relevance of the seminar.
- **Presentation:** The quality of the presentation and communication skill is assessed by the evaluation committee.
- **Viva-voce:** At the end of the presentation, the assessment panel and the student audience ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.
- **Report and Documentation:** A bona fide report on the seminar topic is submitted at the end of the semester. This report includes, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references are to be given toward the end of the report. Students' ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

PROJECT

The Project is intended to be a challenge to the intellectual and innovative abilities and to give students the opportunity to synthesize and apply the knowledge and analytical skills learnt in different subjects. The project work must be started in the seventh semester and is to be continued in the eighth semester.

i. Project – 7th Semester:

Students are expected to finalize the project themes/titles with the assistance of an identified faculty member as project guide during first half of the seventh semester. During this the students are required to submit a project plan, relevance of the project proposed, literature survey, objectives, statement of how the objectives are to be tackled, time schedule and cost estimate.

Assessment tools used to evaluate project work are:

- **Mid-term Evaluation:** Mid-term evaluation is conducted at the mid of the semester and a project panel evaluates the work based on various parameters. The significance of the work in societal and environmental context is used to assess the relevance of the project. The knowledge level and presentation skills are evaluated by the panel based on their performance.
- **End term Evaluation:** End-term evaluation is conducted at the end of the semester in the form of the presentation. The evaluation panel asks questions and seeks clarifications on specific issues related to the project. The effectiveness of the individual student's response to these queries is assessed.

ii. Project –8th SEMESTER

- **Mid-term Evaluation:** The design part of the proposed work is evaluated. The students' communication skills and depth of knowledge in designing is assessed based on presentation and response to questions asked by the panel comprising of guide, Head of the Department and the project coordinator. The percentage of work completed, difficulties faced and how the students have tackled these difficulties are analyzed to evaluate project

progress. The individual involvement in project work is assessed based on response to questions asked by the panel.

- **End-Term Evaluation:** The end term evaluation includes demonstration and evaluation by the panel of examiners consisting of guide, senior professor, Head of the Department and external examiner.
- **Demonstration:** Final demonstration is conducted at the end of the semester to evaluate the comprehensiveness and excellence of work done. At the end of the demonstration, the assessment panel asks questions and seeks clarifications on specific issues related to various stages of the project. Responses from each student to these queries are assessed.
- **Evaluation by the panel:** The performance of individual student is evaluated by the panel of examiners, along with the project report submitted by a project group. The panel of examiners analyses the nature of the project and apart from the technical merit of the work, makes sure that the work is environment friendly, cost effective, ensures safety and ensures adherence to best ethical practices. The projects are classified into different areas and their relevance to PO's and PSO's are identified to ensure its quality. Viva Voce is a part of assessing students' knowledge in engineering practices involved in project work.

3.2.2. Record the attainment of Course Outcomes of all courses with respect to set attainment levels (65)

Claimed 65

3.2.2.1 Record the attainment of Course Outcomes of all courses with respect to set attainment levels.

Program shall have set Course Outcome attainment levels for all courses.

1) Course Outcome attainment levels (up to Spring semester 2018)

Assessment Method	Level	Attainment Levels
Midterm Exam	1	**50%** of students scoring more than **40%** marks
	2	**60%** of students scoring more than **40%** marks
	3	**75%** of students scoring more than **40%** marks
End Semester Exam	1	**50%** of students scoring more than **40%** marks
	2	**60%** of students scoring more than **40%** marks
	3	**75%** of students scoring more than **40%** marks
Continuous Assessment	1	**50%** of students scoring more than **50%**

		marks
	2	**60%** of students scoring more than **50%** marks
	3	**75%** of students scoring more than **50%** marks

Table B.3.2.2a

2) Course Outcome attainment levels (Autumn semester 2018 onwards)

Assessment Method	Level	Attainment Levels
Midterm Exam	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks
End Semester Exam	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks
Continuous Assessment	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks

Table B.3.2.2b

1) Lab Course Outcome attainment levels

Assessment Method	Level	Attainment Levels
End Semester Exam	1	**60%** of students scoring more than **50%** marks
	2	**70%** of students scoring more than **50%** marks

	3	**80%** of students scoring more than **50%** marks
Continuous Assessment	1	**60%** of students scoring more than **50%** marks
	2	**70%** of students scoring more than **50%** marks
	3	**80%** of students scoring more than **50%** marks

Table B.3.2.2c

2) Evaluation of Assessment tools based on the set attainment levels.

The process to evaluate each of the above components is described step by step:

A. Measuring Course Outcome attained through Semester End Examination (SEE) (weightage 60%)

This part shall be calculated using the marks obtained by students in the end semester examination. The end term examination consists of 5 questions covering all the COs, out of which only 4 questions need to be attempted by the students. The assessment shall be given in terms of marks obtained by the student in each CO.

The method used is as follows:

Step1: Check the answer sheets of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the question paper.

Step3: CO attainment percentage is calculated by counting the number of students who attempted a CO and scored above or equal to benchmark set (50% for Autumn 2018 onwards/ 40%, up to Spring 2018) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

B. Measuring Course Outcome attained through Cumulative Internal Examination (CIE)

i. Measuring Course Outcome attained through Midterm Exams (Weightage -30%).

The method used is as follows:

Step1: Check the answer sheets of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the question paper.

Step3: Calculate the CO attainment percentage for each student by counting the number of students scoring above or equal to benchmark set (50% for Autumn 2018 onwards/ 40%, up to Spring 2017) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

ii. Measuring CO Attainment through Assignments (Weightage-10%)

The assignment given includes all COs of the course. The assessment shall be given in terms of marks obtained by the student in each CO. The method used is as follows:

Step1: Check the assignment of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the assignment.

Step3: Calculate the CO attainment percentage for each student by counting the number of students scoring above or equal to benchmark set (50%) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

3) Course Outcome Attainment Calculation of a Course

Chemical Reaction Engineering (ChBC-52) **SESSION: Autumn-2018**

CO-PO/PSO MAPPING MATRIX

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	2	1				2			2	3	1	3
2	3	3	3	3	3	2	2	2	2		2	2	3	2	3
3	3	2	2	2	2	2	2	2				2	3	1	3
4	3	3	3	3	3	2	2					3	3	1	3
Average	3.0	2.5	2.5	2.5	2.3	2.0	2.0	2.0	2.0		2.0	2.3	3.0	1.3	3.0

Table B.3.2.2d

Direct assessment for course outcome (End semester examination + Mid Semester examination + Assignment)

Calculating the attainment level of Course Outcome (Direct Assessment) by considering the weight age of 60% for End Semester, weight age of 30% for Mid Semester Examinations and

weight age of 10% for Assignments

Direct CO Attainment= 60% (End Semester) + 30% (Mid Semester) + 10% (Assignment)

S. No.	Course Outcome	Major CO Attainment	Minor CO Attainment	Assignment CO Attainment	Direct CO Attainment
1	CO1	1	2		1.2
2	CO2	2.5	1		1.8
3	CO3	3		3	2.1
4	CO4	2		3	1.5

Table B.3.2.2e

Indirect assessment for course outcome

Course Exit Survey

- If maximum number of students are saying that CO is Weakly attained ----Level-1
- If maximum number of students are saying that CO is Moderately attained ----Level-2
- If maximum number of students are saying that CO is **Strongly** attained ----Level-3

Given below is result of attainment of CO's for **Chemical Reaction Engineering** based on course exit survey

Course Outcome	CO attainment
CO1	2.8
CO2	2.5
CO3	2.8
CO4	2.7

Table B.3.2.2f

CO ATTAINMENT CALCULATION(Direct Assessment + Indirect Assessment)

Calculating the attainment level of **Overall Course Outcome** (Direct Assessment + Indirect Assessment) by considering the weight age of 80% for direct assessment and weight age of 20% for indirect Assessment.

Overall Course Outcome= 80% Direct + 20% Indirect

S. No	Course Outcome	CO attainment (Direct Assessment)	CO attainment (Indirect Assessment)	Overall CO attainment = 80% Direct + 20% Indirect
1	CO1	1.2	2.8	1.5
2	CO2	1.8	2.5	1.9
3	CO3	2.1	2.8	2.2
4	CO4	1.5	2.7	1.7

Table B.3.2.2g

Attainment of Course Outcomes for all Academic Years

CO Attainment for the Academic year 2019-2020

Course Code	Course	CO1	CO2	CO3	CO4	CO5	CO6
MEL100	Elements of Mechanical Engineering	3	2.52	2.04	3		
PHL100	Engineering Physics	3	3	3	3	3	3
CIL100	Engineering Mechanics	1.16	1.36	1.16	1.16	1.36	
HUL100	Basic English and Communication Skills	2.64	2.67	2.8	2.6		
CYL101	Environmental Studies	2.91	2.89	2.9	2.91		
MAL100	Mathematics I	1.56	1.92	1.56	1.56	1.56	
HUP100	Language Laboratory	1.92	1.95	1.44	1.46		
PHP100	Physics Laboratory	3	3	3	3		
WSP100	Work shop Practice	3	3	3	3	3	
HUL101	Advanced English Comm.Skills & Organizational Behavior	2.9	2.91	2.8	1.94		
EEL100	Basic Electrical Engineer	1.61	2.72	2.22	1.57	2.7	
TL100	Computer Programming	2.1	2.2	2.1	2.2		
CYL100	Engineering Chemistry	3	3	3	3	3	
CIP100	Engineering Drawing	2.96	2.96	2.72	2.9		
MAL101	Mathematics II	3	3	3	3	3	
ELP100	Basic Electrical Engineer Lab	2.36	1.57	2.2	2.38		
CYP100	Chemistry Laboratory	3	2.8	3	2.8		
ITP100	Computer Programming Lab	2.4	2.2	2.3	2.2		
ChBC-31	Introduction to Chemical Eng.	3	3	2	3	2	
ChBC-32	Material and Energy Balance	1.51	1.52	0.79	0.76		
ChBC-33	Process Fluid Mechanics	2.45	1.48	1.48	1.48		
ChBC-34	Thermodynamics and Chem. Kinetics	2	1.57	1.47	1.56		
EEBC-31	Basic Electrical & Electronics Eng.	2.17	2.07	2.16	2.16	2.07	
HSBC-31	Ethics and Self Awareness	1.27	2.11	1.27	1.29		
MTBC-31	Chemical Eng. Mathematics-I	2.08	2.08	2.08	2.08		
ChBC-41	Chemical Eng. Thermodynamics	2.32	1.5	1.8	1.2		
ChBC-42	Heat Transfer	2.93	2.4	2.9	2.87		
ChBC-43	Mechanical Operations	2.83	2.83	2.34	0.89	1.84	
ChBC-44P	Fluid Mechanics & Mech. Operations Laboratory	2.96	2.95	2.96	2.96		
ChBC-45	Mass Transfer -I	1.44	1.59	1.44	1.44		
ChBS-41	Seminar	2.86	2.83	2.89	2.66		
EEBC-41P	Basic Elect. & Electronics Eng. Lab.	2.37	2.57	1.96	2.1		
MTBC-41	Chemical Eng. Mathematics –II	3	3	3	3		

ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.8	2.9	2.86	2.72	0.52	
ChBC-52	Chemical Reaction Eng.	2.86	2.19	2.2	1.82		
ChBC-53	Material Science & Technology	2.62	2.35	2.21	0.52		
ChBC-54	Chemical Technology – I	2.86	2.11	2.93	2.68		
ChBS-55P	Heat Transfer Lab.	2.88	2.71	2.84	2.77	2.77	
HSBC-51	Basic Management Principles	1.27	1.3	1.31	2.07		
MTBC-51	Numerical Methods	2	2.8	2.8	3		
ChBC-61	Process Equipment Design -II (Process Aspect)	0.9	2.6	1.6	2	2.3	
ChBC-62	Mass Transfer – II	2.94	2.95	2.93	2.93		
ChBC-63	Chemical Technology – II	2.38	1.472	1.73	0.52		
ChBC-64	Energy Eng.	2.94	2.95	2.93	2.93		
ChBC-65P	Energy Eng. Labortory.	2.45	2.3	2.5	2.2		
ChBC-66	Process Instrumentation	2.92	2.97	2.43	2.22		
ChBC-67	Transport Phenomena	2	2.95	1.5	0.75		
ChBC-68P	Thermodynamics and Rxn Eng. Laboratory.	2.8	2.7	2.5	2.7		
ChBC-69	Industrial Training & Presentations	2.93	2.91	2.91	2.85		
ChBP-71	Pre-project work	2.4	2.5	2.7	2.5		
ChBC-72	Chemical Process Safety	2.79	2.79	2.59	2.64		
ChBC-73	Process Dynamics & Control	1.9	1.55	2.2	1.4		
ChBC-74P	Process Dynamics & Control Laboratory	2.9	2.41	2.45	2.82		
ChBC-75	Process Economics & Plant Design	2.53	1.71	1.75	1.2		
ChBC-76	Biochemical Eng.	2.89	2.86	2.94	2.94		
ChBC-77P	Mass Transfer Laboratory.	2.81	2.78	2.73	2.84		
HSBE-71	Human Resource Development	2.88	2.1	2.9	1.3		
MTBE-72	Elective – II Numerical Analysis	3	3	3	3		
ChBE-74	Computational Fluid Dynamics	1.43	1.59	1.7	1.59		
ChBP-81	Project	2.6	2.7	2.5	2		
ChBC-82	Bioresource Technology	2.86	2.91	2.91	2.95		
ChBC-83P	Biochemical Eng. Laboratory.	2.8	2.9	2.9	2.95		
ChBC-84	Modeling and Simulation in Chem.Eng.	2.95	2.94	2.92	2.93	2.93	
ChBC-85	Industrial Pollution Abatement	1.44	2.93	2.65	2		
ChBE-84	Nano-Science and Technology	2.94	2.94	2.95	2.95		
ChBE-82	Petroleum Refining	2.86	2.83	1.93	1.71		
HSBE-82	Entrepreneurship Development	2.9	2.1	2.1	2.1		
ChBE-83	clean technology in process industries	3	2.6	1.8	2		

Table B.3.2.2h

CO Attainment for the Academic year 2018-2019

Course Code	Course Name	CO1	CO2	CO3	CO4	CO5
CHM-101	Chemistry-I	2.9	1.5	1.7	2.1	
PHY-101	Physics-I	3	2.4	2	1.3	3
MTH -101	Mathematics-I	2.5	2.5	2.2	1.2	1.3
HSS 101	Communication Skills & Oral Presentation	2.7	2.7	2.7	2.1	
IT-101	Comp. Fundam. & Prob. Solving Techn.	2.0	2.1	2.1	2.1	
CIV- 102	Engineering Drawing	0.74	0.73	0.74	0.71	
CHM-101 P	Chemistry-I Laboratory	2.8	2.9	2.8	2.9	
PHY-102 P	Physics-I Laboratory	2.9	2.8	2.9	2.8	
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.3	2.2	2.2	2.1	
WSP-I	Workshop Practices- I	3	3	2.1	3	2.5
CHM-201	Chemistry-II	2.9	2.9	2.9	2.2	
PHY-201	Physics-II	3	1.8	0.3	0.3	
MTH-201	Mathematics-II	2.1	2.5	2.1	1.5	1.6
HSS-201	Introduction To Social Sciences	2.7	2.0	2.7	2.2	2.0
CSE-201	Computer Programming	2.5	2.3	1.6	1.3	1.9
CIV-201	Strength of Materials	2.1	1.8	2.3	2.6	2.3
MED-201	Machine Drawing	1.5	1.2	0.7	1.2	
CHM-201 P	Chemistry-II Laboratory	2.9	2.9	2.9	2.9	2.9
PHY-201 P	Physics-II Laboratory	2.9	2.9	2.9	2.9	2.9
CSE-202 P	Computer Programming Laboratory	2.26	2.16	2.36	2.16	
WSP-II	Workshop Practices-II	2.4	2.1	2.9	2.9	2.9
ChBC-31	Introduction to Chemical Eng.	2.1	2.2	2.2	2.2	2.1
ChBC-32	Material and Energy Balance	2.8	2.7	2.7	2.6	
ChBC-33	Process Fluid Mechanics	1.5	2.2	1.4	2.2	
ChBC-34	Thermodyn. & Chem.Kinetics	1.9	1.5	1.3	0.6	
EEBC-31	Basic Elect. & Electronics Eng.	2.3	2.5	2.4	2.1	2.1
HSBC-31	Ethics and Self Awareness	2.1	2.9	2.1	1.3	
MTBC-31	Chemical Eng. Mathematics-I	2.6	2.0	1.8	1.3	2.6
ChBC-41	Chemical Eng. Thermodynamics	2.4	1.5	1.7	0.5	
ChBC-42	Heat Transfer	2.9	2.2	2.2	2.2	
ChBC-43	Mechanical Operations	1.4	2.9	2.2	0.5	0.8
ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2.9	2.9	2.9	2.9	
ChBC-45	Mass Transfer -I	2.7	2.5	2.5	2.5	
ChBS-41	Seminar	2.9	1.4	2.9	1.9	
EEBC-41P	Basic Ele. & Electron. Eng. Laboratory.	2.37	2.47	1.86	2.0	2.27
MTBC-41	Chemical Eng. Mathematics –II	3.0	2.8	3.0	2.3	

ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.9	2.4	0.8	2.1	2.2
ChBC-52	Chemical Reaction Eng.	1.5	1.9	2.2	1.7	
ChBC-53	Material Science & Technology	2.9	2.7	2.7	2.0	
ChBC-54	Chemical Technology – I	2.4	2.5	1.7	1.4	
ChBC-55	Mass Transfer -I	1.2	1.1	1.1	1.1	
ChBS-56P	Heat Transfer Laboratory.	2.9	2.7	2.7	2.7	2.8
HSBC-51	Basic Management Principles	2.1	2.1	2.9	2.1	
ChBC-61	Process Equipment Design -II (Process Aspect)	0.8	2.4	1.7	2.1	2.2
ChBC-62	Mass Transfer – II	2.9	2.91	2.9	2.8	
ChBC-63	Chemical Technology – II	2.9	2.9	2.9	2.2	
ChBC-64	Energy Eng.	2.9	2.1	2.2	2.1	
ChBC-65P	Energy Eng. Laboratory.	2.4	2.0	2.6	2.0	
ChBC-66	Process Instrumentation	2.9	2.0	1.0	1.9	
ChBC-67	Transport Phenomena	2.0	2.9	1.5	0.7	
ChBC-68P	Thermodynamics & Reaction Eng. Laboratory.	2.9	2.9	2.9	2.9	
ChBC-69	Industrial Training & Presentations	2.9	2.9	2.9	2.9	
ChBP-71	Pre-project work	2.8	2.9	2.9	2.5	
ChBC-72	Chemical Process Safety	2.9	2.4	1.2	2.1	
ChBC-73	Process Dynamics & Control	1.6	1.4	2.2	0.8	
ChBC-74P	Process Dynamics & Control Laboratory	2.8	2.1	2.9	2.9	
ChBC-75	Process Econ.& Plant Design	2.5	1.7	1.8	1.2	
ChBC-76	Biochemical Eng.	2.87	2.85	2.93	2.92	
ChBC-77P	Mass Transfer Laboratory.	2.7	2.7	2.7	1.6	
HSBE-71	Human Resource Development	2.9	2.1	2.9	1.3	
MTBE-71	Operation Research	2.8	3.0	3.0	2.3	
HSBE-72	Managerial Econ. for Engineers	2.9	2.1	2.1	2.1	
ChBE-74	Computational Fluid Dynamics	1.3	1.4	1.4	1.2	
ChBP-81	Project	2.8	2.9	2.9	2.5	2.8
ChBC-82	Bioresource Technology	2.8	2.9	2.9	2.9	
ChBC-83P	Biochemical Eng. Laboratory.	2.3	2.5	2.6	2.3	
ChBC-84	Modeling and Simulation in Chem. Eng.	2.9	1.7	1.5	1.7	2.4
ChBC-85	Industrial Pollution Abatement	1.1	1.7	0.7	2.1	
ChBE-82	Petroleum Refining	2.9	2.4	1.7	2.1	
ChBE 81	Process Heat Integration	3.0	3.0	2.5	1.3	
HSBE-82	Entrepreneurship Development	2.9	2.1	2.1	2.1	
ChBE-82	Fuel Cell Technology	2.3	2.7	2.8	0.8	

Table B.3.2.2i

CO Attainment for the Academic year 2017-2018

Course Code	Course Name	CO1	CO2	CO3	CO4	CO5
CHM-101	Chemistry-I	2.21	2.9	1.47	1.18	
PHY-101	Physics-I	3	2.4	2	1.3	
MTH -101	Mathematics-I	2.21	2.91	2.66	2.13	1.49
HSS 101	Communication Skills & Oral Presentation	2.08	2.11	2.07	2.09	
IT-101	Computer Fundamentals And Problem Solving Techniques	2.0	2.1	2.1	2.1	
CIV- 102	Engineering Drawing	1.45	2.16	1.2	2.12	
CHM-101 P	Chemistry-I Laboratory	2.9	2.9	2.9	2.8	
PHY-102 P	Physics-I Laboratory	2.9	2.8	2.9	2.9	
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.16	2.06	2.26	2.13	
WSP-I	Workshop Practices- I	2.2	3	1.6	3	3
CHM-201	Chemistry-II	2.93	2.43.	2.91	1.43	
PHY-201	Physics-II	3	1.8	0.3	0.3	
MTH-201	Mathematics-II	2.43	2.9	1.95	2.19	2.19
HSS-201	Introduction To Social Sciences	2.66	2.63	1.94	2.64	2.2
CSE-201	Computer Programming	1.56	2.04	2.04	1.12	1.69
CIV-201	Strength of Materials	2	3	3	2	3
MED-201	Machine Drawing	1.5	1.4	1.2	0.9	
CHM-201 P	Chemistry-II Laboratory	2.93	2.91	2.91	2.87	
PHY-201 P	Physics-II Laboratory	2.9	2.9	2.8	2.9	
CSE-202 P	Computer Programming Laboratory	1.7	1.7	1.1	1.5	
WSP-II	Workshop Practices-II	2.4	2.9	2.1	2.9	2.9
ChBC-31	Introduction to Chemical Eng.	2	1.98	2.2	2.104	1.78
ChBC-32	Material and Energy Balance	2.94	2.92	2.20	2.15	
ChBC-33	Process Fluid Mechanics	2.15	1.64	1.69	1.66	
ChBC-34	Thermodynamics and Chemical Kinetics	2.4	1.5	1.8	1.4	
EEBC-31	Basic Electrical Eng.	2.32	2.52	2.44	2.08	2.08
EEBC-32P	Basic Electrical Eng. Laboratory.	2.37	2.57	1.96	2.1	2.37
MTBC-31	Chemical Eng. Mathematics-I	2.5	1.8	2.1	1.3	
ChBC-41	Chemical Eng. Thermodynamics	2.86	1.47	2.23	0.56	
ChBC-42	Heat Transfer	2.22	1.74	1.68	2.15	
ChBC-43	Mechanical Operations	2.6	3	2.7	0.9	0.6
ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2.88	2.86	2.82	2.8	
HSBC41	Ethics and Self Awareness	2.1	2.1	2.88	1.31	
ChBS-41	Seminar	2.94	1.48	2.92	1.91	
EEBC-41	Basic Electronics Eng.	2.12	2.68	2.60	2.22	

EEBC-41P	Basic Electronics Eng. Laboratory	2.27	2.37	1.76	2.0	2.17
MTBC-41	Chemical Eng. Mathematics –II	2.3	2.8	2.5	1.8	
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	0.75	2.17	2.2	1.68	0.73
ChBC-52	Chemical Reaction Eng.	2.7	2.1	2.3	1.5	
ChBC-53	Material Science & Technology	3	3	2.76	2.08	
ChBC-54	Chemical Technology – I	2.9	2.9	2.9	1.7	
ChBC-55	Mass Transfer -I	1.25	1.36	1.36	1.17	
ChBS-56P	Heat Transfer Laboratory.	2.75	2.78	2.84	2.66	2.55
HSBC-51	Basic Management Principles	2.9	2.1	2.91	1.31	
ChBC-61	Process Equipment Design -II (Process Aspect)	2.19	2.65	2.2	1.68	2.16
ChBC-62	Mass Transfer – II	2.7	2.81	2.81	2.7	
ChBC-63	Chemical Technology – II	2.92	2.91	2.91	2.14	
ChBC-64	Energy Eng.	2.88	2.86	2.13	2.12	
ChBC-65P	Energy Eng. Laboratory.	2	2	2.1	2	
ChBC-66	Process Instrumentation	2.91	2.89	2.17	2.15	
ChBC-67	Transport Phenomena	2.43	2.41	1.96	1.68	
ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	2.9	2.9	2.9	2.9	
ChBC-69	Industrial Training & Presentations	2.91	2.89	2.92	2.88	
ChBP-71	Pre-project work	2.6	2.3	2.5	2.2	
ChBC-72	Chemical Process Safety	2.9	2.9	2.1	2.1	
ChBC-73	Process Dynamics & Control	2.8	2.4	2.1	2.2	
ChBC-74P	Process Dynamics & Control Laboratory	2.6	2	2.8	2.4	
ChBC-75	Process Economics & Plant Design	2.55	1.91	1.81	1.52	
ChBC-76	Biochemical Eng.	2.86	2.84	2.91	2.9	
ChBC-77P	Mass Transfer Laboratory.	2.65	2.35	2.35	1.67	
MTBE-71	Operation Research	3	3	3	2.3	
HSBE-72	Managerial Econ. for Engineers	2.9	2.11	2.1	2.12	
ChBP-81	Project	2.6	2.3	2.5	2.2	
ChBC-82	Bioresource Technology	2.84	2.82	2.82	2.82	
ChBC-83P	Biochemical Eng. Laboratory.	2.1	2.3	2.4	2.1	
ChBC-84	Modeling and Simulation in Chem. Eng.	2.87	2.53	2.3	1.06	1.49
ChBC-85	Industrial Pollution Abatement	2.6	2.7	2.5	2.1	
ChBE-82	Petroleum Refining)	2.9	2.9	1.8	2.1	
HSBE-82	Entrepreneurship Development	2.88	2.13	2.11	2.08	

Table B.3.2.2j

3.3. Attainment of Program Outcomes and Program Specific Outcomes (75) Claimed 75

3.3.1. Describe assessment tools and processes used for measuring the attainment of each Program Outcome and Program Specific Outcomes (10) Claimed 10

(A) List of PO and PSO assessment tools and processes

i. PO and PSO Assessment Process

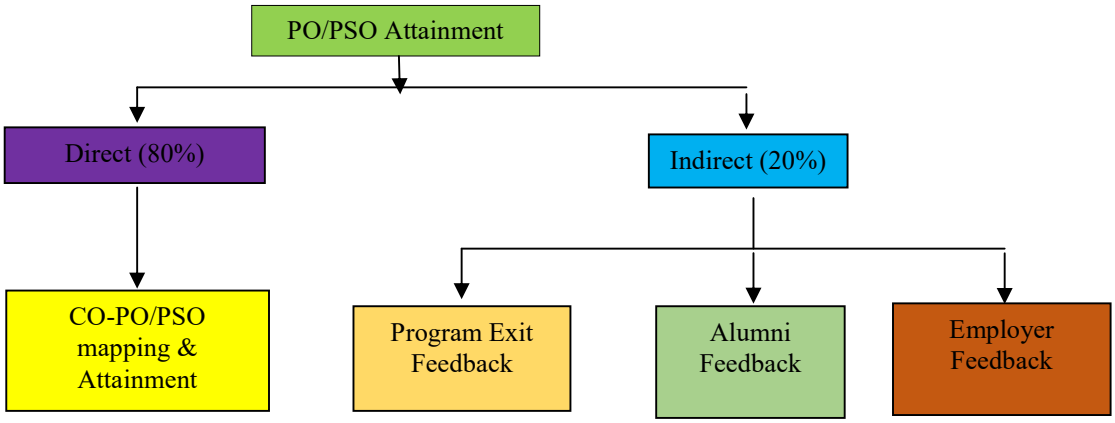

Figure B.3.3 a

PO/PSO assessment is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is based on CO attainment obtained and the corresponding CO-PO/PSO mapping (Section 3.1.2). Indirect assessment is done through Program exit survey, Alumni survey, Employer survey and Academician feedback. Program exit survey and alumni survey are given a weightage of 50% and 40%, respectively and Employer survey is given a weightage of 10% each.

ii. PO and PSO Assessment Tools

The various direct and indirect assessment tools used to evaluate POs & PSOs and the frequency with which the assessment processes are carried out are listed in Table 3.3.1a.

Table 3.3.1 (a) Assessment tools used for evaluation of PO and PSO attainment

		Course	**Assessment Tools**	**Frequency**
Direct (80% weightage)	CO Assessment	Theory	Midterm	once/course
			Continuous Assessment	Weekly
			Major	Once/course

		Laboratory		Continuous Assessment (Report, Experiments)	Daily
				Major Lab Exam (Viva Voce, perform a given experiment)	Once/lab course
		Seminar		Presentation	Twice/Course
				Report	Once/course
		Project	7^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation	Once/course
			8^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation (Demonstration and evaluation by External Examiner)	Once/course
Indirect (20% weightage)	Surveys	Program Exit Survey			Once in a year
		Employer Survey			Once in a year
		Alumni Survey			Once in a year

Table B.3.3.1a

(B) Quality / relevance of assessment tools and processes:

i. Direct Assessment Tools and Process

Direct assessment tools described in section 3.2.1 are used for the direct assessment of POs and PSOs. Initially, the attainment of each course outcome is determined as described in section 3.2.2. The attainment of each PO corresponding to a course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also determined. By factoring the attainment of Cos,

PO attainment = (PO mapping level/3) *CO attainment
PSO attainment = (PSO mapping level/3) *CO attainment

ii. PO/PSO attainment of a course (sample)

Chemical Reaction Engineering (ChBC-52) **SESSION: AUTUMN-2018**

	CO	POs																								PSOs					
COs	**Attain**	**1**	**Attain**	**2**	**Attain**	**3**	**Attain**	**4**	**Attain**	**5**	**Attain**	**6**	**Attain**	**7**	**Attain**	**8**	**Attain**	**9**	**Attain**	**10**	**Attain**	**11**	**Attain**	**12**	**Attain**	**1**	**Attain**	**2**	**Attain**	**3**	**Attain**
1.0	1.5	3	1.5	2	1	2	1	2	1	1	0.5			0				2	1					2	1	3	1.5	1	0.5	3	1.5
2.0	1.9	3	1.9	3	1.9	3	1.9	3	1.9	3	1.9	2	1.3	2	1.3	2	1.3	2	1.3			2	1.3	2	1.3	3	1.9	2	1.3	3	1.9
3.0	2.2	3	2.2	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5							2	1.5	3	2.2	1	0.7	3	2.2
4.0	1.7	3	1.7	3	1.7	3	1.7	3	1.7	3	1.7	2	1.1	2	1.1									3	1.7	3	1.7	1	0.6	3	1.7
Avg. PO Attain	1.83		1.83		1.53		1.53		1.53		1.4		1.3		1.3		1.4		1.15				1.3		1.38		1.83		0.78		1.83

PO & PSO ATTAINMENT CALCULATION
(IN-DIRECT ASSESSMENT)

Employer's feedback, Alumni Feedback & Student exit survey is considered for this purpose. In Students exit survey, a questionnaire was designed for this purpose and the average responses of the outgoing students for each PO is computed.

Given below is the indirect PO/PSO values calculated for the year 2018-2019

POs & PSOs	Attainment levels
PO1	2
PO2	1.9
PO3	1.7
PO4	1.8
PO5	1.8
PO6	1.9
PO7	2
PO8	2.1
PO9	2.1
PO10	2.2
PO11	2.2
PO12	2.2
PSO1	2.8
PSO2	2.2
PSO2	1.9

Table B.3.3.1b

OVERALL PO ATTAINMENT CALCULATIONS

Direct Assessment + In Direct Assessment

Finally, overall PO/PSO attainment values are computed by adding direct and indirect PO attainment values in the proportion of 80:20 respectively i.e. 80% weightage for direct assessment and 20% for indirect assessment

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
Indirect Attainment	2	1.9	1.7	1.8	1.8	1.9	2	2.1	2.1	2.2	2.2	2.2	2.8	2.2	1.9
Direct Attainment	1.83	1.53	1.53	1.53	1.4	1.3	1.3	1.4	1.15		1.3	1.38	1.83	0.78	1.83
Overall PO/PSO Attainment	1.9	1.6	1.6	1.6	1.5	1.4	1.4	1.5	1.3	2.2	1.5	1.5	2	1.1	1.8

Table B.3.3.1c

iii. Indirect Assessment Tools and Process

Indirect assessment is done through program exit survey, alumni survey and employer survey. Program exit survey and alumni survey are given a weightage of 50% and 40%, respectively and Employer survey, 10%.

(1) Program Exit Survey:

An exit survey is conducted for students who have graduated out of the department for that year. The questionnaire format in the exit survey form to evaluate the attainment of POs and PSOs is **given in section (a) and relation of POs & PSOs with each question is given in section (b).**

(a) Questionnaire Format.

<table>
<tr><td colspan="4"><u>National Institute of Technology, Srinagar</u>
Chemical Engineering Department
Exiting Students Survey</td></tr>
<tr><td colspan="2">Name:</td><td colspan="2">Enrol. No:</td></tr>
<tr><td colspan="2">Phone No.</td><td colspan="2">Email:</td></tr>
<tr><td colspan="4">Assessment of Abilities, Skills and Attributes acquired at NIT Srinagar.
Please rate each of the following items in terms how well your education at NIT Srinagar prepared you for them.</td></tr>
<tr><td>1</td><td colspan="3">Basic knowledge in mathematics, science, engineering and humanities.</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>2</td><td colspan="3">Ability to identify, analyse and solve chemical engineering problems</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>3</td><td colspan="3">Ability to design and develop solutions for chemical engineering problems</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>4</td><td colspan="3">Ability to investigate the complex chemical engineering problems and their solutions</td></tr>
</table>

	Extremely Satisfied	**Satisfied**	**Not Satisfied**
5	Use of modern research-based knowledge and research methods		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
6	Demonstrate the ability to apply advanced technologies to solve contemporary and new problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
7	Understanding professional engineering solutions in societal and environmental contexts		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
8	Understanding of professional and ethical responsibility		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
9	Ability to function as an effective member in multi-disciplinary teams		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
10	Proficient in English language in both communicative and technical forms		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
11	Demonstrate the ability to choose and apply appropriate resource management techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
12	Capable of self-education and clearly understand the value of updating their professional knowledge to engage in life-long learning		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

13	Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc..		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
14	Ability to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
15	Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

(b) Relation of POs and PSOs with questionnaire:

POs/PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15

(c) Evaluation Process

The questionnaire consists of 15 questions which is relevant for assessing each PO and PSO. The first 12 questions correspond to the 12 POs and the remaining 3 questions are for PSOs. Each question is having 3 options, namely, extremely contented, contented and somewhat contented, which is given marks 3, 2 and 1 respectively. The survey results are tabulated and the average values corresponding to each PO and PSO are calculated.

(2) Employer Survey:

- Provides general information on current industry trends.
- Desirable graduate attributes.
- Overall perceptions of program quality.

- Strengths and expectations of graduates.
- Typically collected every two years

Feedback is taken at a frequency of once in a years from the employers who had given jobs to our graduates. The questionnaire format in the employer survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question is given in section (b).

(a) Questionnaire Format

<table>
<tr><td colspan="4"><u>National Institute of Technology, Srinagar</u>
Chemical Engineering Department
EMPLOYER SURVEY FORM</td></tr>
<tr><td colspan="4">The purpose of this survey is to obtain Employer’s input on the quality of education of undergraduate programs in NIT, Srinagar. Your sincere cooperation would enable us to improve the quality of our graduates as per your requirements</td></tr>
<tr><td>Name of Company/ Organization</td><td colspan="3"></td></tr>
<tr><td>Mailing address</td><td colspan="3"></td></tr>
<tr><td>Sector Private/Public/Academia</td><td colspan="3"></td></tr>
<tr><td>What are the pertinent employability skills to stay updated in current industry trends and thereby improve the quality of the undergraduate program?</td><td>Logical Thinking</td><td>Good Aptitude</td><td>Excellent Communication</td></tr>
<tr><td colspan="4">Rate the NIT Srinagar Graduates working in your organization using the following criterion.
Put tick mark for Knowledge, Skills, Abilities, Attitude and other Attributes expected out of NIT Srinagar graduates.
On a scale of 1 to 3 [Excellent(3), Good(2), Satisfied(1)]</td></tr>
<tr><td>No.</td><td colspan="2">Overall, are you satisfied with</td><td>Rating</td></tr>
<tr><td>1</td><td colspan="2">Capacity for development and analysis of engineering problems and formulation of appropriate solutions, retaining professional and ethical responsibilities.</td><td></td></tr>
<tr><td>2</td><td colspan="2">Aptitude for self-education, ability to learn new skills and a clear appreciation for the value of life-long learning to update professional knowledge.</td><td></td></tr>
<tr><td>3</td><td colspan="2">Understanding professional engineering solutions for sustainable development and their application in global, national and societal contexts.</td><td></td></tr>
</table>

4	Competence for acquiring new skills and applying them in research and development by applying various physiochemical and biological techniques	
5	Fundamental knowledge in mathematics and science and professional fluency in English both communicative and technical forms.	
6	Dexterity in differentiation of management techniques and possession of leadership skills that enable successful function of multi-disciplinary teams.	
	Signature	**Name and Designation**

(b) Relation of POs and PSOs with questionnaire:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q5	Q1	Q1	Q4	Q2 &Q4	Q3	Q3	Q1	Q6	Q5	Q6	Q2

PSOs	PSO1	PSO2	PSO3
Questions	Q3	Q1	Q4

(c) Evaluation Process

The questionnaire consists of 6 questions. These questions are relevant for assessing each PO and PSO. If multiple questions satisfy a PO, then their average is taken. Similar procedure is followed for PSOs also. Each question is having 3 options namely, extremely contented, contented and somewhat contented, which is given marks 3, 2 and 1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

(3) Alumni Survey: It is done once in a year.

- Measures the degree to which past students believes they achieved program-level learning outcomes.
- Overall satisfaction with the program.
- Overall satisfaction with the program delivery.
- Information on current professional or academic status.

Feedback is taken from alumni. The questionnaire format in the alumni survey form to evaluate Attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question is given in section (b).

(a) Questionnaire Format

National Institute of Technology Srinagar **Alumni Survey Form**		
Thank you for taking the time to fill out this questionnaire. All the information will be kept confidential and will be used only for statistical purposes. As an alumnus, your opinions are valued and are utilized to help us make periodic changes and updates for continuous improvement of our undergraduate program		
Alumni name		
Year of Graduation		
Mailing address		
Placement	**Before/after graduation**	**Core/Software**
Name of the Company		
Please rate each of the following skills, abilities or attributes in terms of their importance to state how well your education at **Chemical Engineering Department, National Institute of Technology, Srinagar** prepare you for these.		
Skills, Abilities and Attributes		**Scale (1 to 3) Excellent to poor**
Apply Knowledge of mathematics, Basic sciences and Engineering		
Problem Identification and Analysis		
Design a system and develop solution to the problem		
Investigate and Handle complex problems		
Ability to use techniques and tools in engineering practice		
Understand and appreciate the impact of engineering in the societal and global contexts		
Awareness of existing issues (e.g. Economics of engineering, Environmental issues)		
Understand professional and ethical responsibilities as an engineer (e.g., safety, professional ethics, code of conduct)		
Function effectively in teams		
Proficient in English language in both communicative and technical forms		
Project Management and Finance		
Awareness of the need for life-long learning (Seeking further education, self-learning, Membership in professional societies)		
Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc		
apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts		
Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques		
Signature	**Suggestion if any:**	

(a) Relation of POs and PSOs with questionnaire

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PSOs	PSO1				PSO2				PSO3			
Questions	Q13				Q14				Q15			

(b) Evaluation Process

(c) The questionnaire consists of 15 questions which are relevant for assessing each POs and PSOs. The first 12 questions are used to evaluate POs and the remaining 3 questions are for evaluating PSOs. The marks given are tabulated and the average values corresponding to each PO and PSO are determined.

Overall indirect PO/PSO Attainment for the Academic Year 2019-2020 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
Exiting Students Survey	2.2	2.1	2.1	2.0	1.9	2.0	2.3	2.5	2.4	2.4	2.4	2.2	2.1	2.1	2.0
Alumni Survey	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.4	2.5	2.48	2.41	2.27	2.33	2.30	2.27
Employers Survey	2.2	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.1	2.22	2.11	2.33	2.33	2.44	2.44
Overall indirect PO Attainment	2.3	2.4	2.4	2.3	2.2	2.2	2.3	2.5	2.4	2.38	2.29	2.27	2.24	2.29	2.24

Table B.3.3.1d

Overall indirect PO/PSO Attainment for the Academic Year 2018-19 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
Exiting Students Survey	2.1	1.9	1.1	2	2.2	2	2.5	2.3	2.3	2.2	2.8	2	3	2.6	1.8
Alumni Survey	2.1	2.2	2.2	1.5	1.5	1.8	1.6	2.1	2	2.3	1.9	2.5	2.6	1.8	2
Employers Survey	1.1	0.7	2.7	2	1	1.8	1.1	1.1	1.5	1.8	0.4	2	2.3	2	1.9
Overall indirect PO Attainment	2	1.9	1.7	1.8	1.8	1.9	2	2.1	2.1	2.2	2.2	2.2	2.77	2.22	1.89

Table B.3.3.1e

Overall indirect PO/PSO Attainment for the Academic Year 2017-18 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
Exiting Students Survey	2	1.68	1.24	1.84	1.74	1.64	2.08	2.04	1.9	1.78	2.34	1.82	3	2.7	1.9
Alumni Survey	2.1	2.2	2.2	1.5	1.5	1.8	1.6	2.1	2.1	2.3	1.9	2.5	2.5	1.2	1.6
Employers Survey	1.1	1.1	2.2	1.8	3	2.3	2.1	2.2	2.1	3	1.2	2.2	2	1.9	1.6
Overall indirect PO Attainment	1.95	1.83	1.72	1.7	1.77	1.77	1.89	2.08	2	2.11	2.05	2.13	2.7	2.02	1.75

Table B.3.3.1f

3.3.2. Provide results of evaluation of each PO & PSO (65)

Claimed 65

For the Academic year 2019-2020

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
MEL100	Elements of Mechanical Engineering	2.57	1.91	1.91	0.46	0.44	0.45	0.47	0.49	0.47	1.92	0.46	2.53	2.53	1.90	2.53
PHL100	Engineering Physics	2.86	1.27	1.27	0.46	2.04	2.05	2.07	2.09	2.87	2.08	0.46	2.85	2.05	1.26	1.25
CIL100	Engineering Mechanics	1.45	1.46	1.07	1.06	0.44	1.11	0.79	0.49	0.47	0.48	0.46	0.45	1.11	0.73	1.05
HUL100	Basic English and Communication	0.46	0.47	0.47	0.46	0.44	1.17	0.47	0.49	1.67	2.61	1.50	1.35	0.45	0.46	0.45
CYL101	Environmental Studies	0.66	0.67	0.59	0.58	0.44	1.16	0.53	0.49	1.43	2.18	1.29	1.17	0.58	0.51	0.57
MAL100	Mathematics I	1.44	1.17	1.44	0.20	0.40	0.40	0.60	0.40	0.60	0.40	0.85	0.71	1.28	1.64	0.92
HUP100	Language Laboratory	0.46	0.47	0.47	0.46	0.44	0.45	0.47	0.49	1.05	1.83	1.03	0.84	0.45	0.46	0.45
PHP100	Physics Laboratory	0.75	0.69	0.74	0.42	0.42	0.79	0.52	0.46	1.18	1.75	1.16	1.01	0.69	0.76	0.59
WSP100	Work shop Practice	2.86	1.27	1.27	0.46	2.04	2.05	2.07	2.09	2.87	2.08	0.46	2.85	2.05	1.26	1.25
HUL101	Advanced English Comm.Skills &	0.46	0.47	0.47	0.46	0.44	1.40	0.47	0.49	1.61	2.58	1.47	1.21	0.45	0.46	0.45
EEL100	Basic Electrical Engineer	2.08	1.91	1.41	1.43	1.69	1.35	1.26	0.49	0.47	0.48	1.71	1.38	1.68	1.74	1.86
TL100	Computer Programming	1.90	1.67	1.83	1.50	1.48	0.45	0.47	0.49	0.47	0.48	0.46	1.89	2.13	1.42	1.17
CYL100	Engineering Chemistry	2.00	2.25	1.75	0.25	0.00	1.25	2.00	0.25	0.25	1.50	0.50	2.25	2.25	2.25	1.75
CIP100	Engineering Drawing	2.77	2.78	2.78	2.76	1.59	1.60	1.81	2.03	0.47	0.48	2.77	1.99	2.76	2.00	1.99
MAL101	Mathematics II	2.32	1.84	2.32	0.20	0.40	0.40	0.60	0.40	0.60	0.40	1.08	0.88	1.88	2.52	1.36
ELP100	Basic Electrical Engineer Laboratory	2.16	2.07	1.45	1.43	1.68	1.22	1.34	0.49	0.47	0.48	1.71	1.38	1.68	1.74	1.86
CYP100	Chemistry Laboratory	2.01	2.19	2.01	1.20	0.44	1.42	1.99	1.24	1.21	1.62	1.95	2.00	2.13	2.20	1.80
ITP100	Computer Programming Laboratory	1.98	1.99	2.07	1.58	1.96	0.45	0.47	0.49	1.03	0.48	0.46	1.97	1.41	1.98	1.25
ChBC-31	Introduction to Chemical Eng.	1.90	1.81	1.62	0.46	0.92	2.18	1.11	1.77	0.47	0.48	1.10	1.09	2.15	2.16	2.10
ChBC-32	Material and Energy Balance	1.38	1.39	1.39	1.38	1.36	0.45	0.47	0.49	0.47	0.48	0.46	0.45	1.37	1.38	1.37
ChBC-33	Process Fluid Mechanics	1.83	1.68	1.84	1.36	0.89	0.45	0.47	0.49	0.47	0.48	0.46	1.37	1.82	1.37	0.90
ChBC-34	Thermodynamics and Chem.	1.78	1.45	1.21	1.34	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.57	1.33	1.43	1.33
EEBC-31	Basic Electrical & Electronics Eng.	2.16	2.06	1.49	1.36	1.79	1.45	1.26	0.49	0.49	0.47	1.79	1.3	1.65	1.7	1.8
HSBC-31	Ethics and Self Awareness	0.458	0.472	1.654	0.456	0.438	1.632	1.426	1.676	1.374	1.58	1.642	1.638	0.448	0.458	0.448
MTBC-31	Chemical Eng. Mathematics-I	1.71	1.86	1.72	1.7	0.44	0.45	0.47	0.49	0.47	1.03	0.46	0.73	1.14	1.84	1
ChBC-41	Chemical Eng. Thermodynamics	1.55	1.52	1.26	1.37	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.66	1.36	1.51	0.90
ChBC-42	Heat Transfer	2.67	2.68	2.49	2.14	0.44	1.54	1.56	0.49	0.47	0.48	0.46	1.93	1.93	2.67	1.18
ChBC-43	Mechanical Operations	2.17	1.84	1.69	1.62	0.44	1.5	1.9	0.49	0.47	0.48	0.46	1.29	2.07	1.98	1.97

ChBC-44P	Fluid Mechanics & Mech.	2.03	2.05	1.26	2.82	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.02	1.25	2.02
ChBC-45	Mass Transfer -I	1.33	1.34	1.34	1.03	1.3	0.93	1.1	0.99	2.35	0.75	0.74	0.97	1.32	0.89	1.03
ChBS-41	Seminar	2.71	1.58	1.78	1.77	2.69	1.77	1.78	1.60	0.66	2.62	1.40	2.14	1.76	1.21	2.13
EEBC-41P	Basic Elect. & Electronics Eng.	2.26	2.10	1.55	1.49	1.79	1.39	1.33	0.49	0.49	0.47	1.70	1.38	1.68	1.74	1.86
MTBC-41	Chemical Eng. Mathematics –II	2.26	2.47	2.27	2.26	0.44	0.45	0.47	0.49	0.47	1.28	0.46	0.85	1.45	2.46	1.25
ChBC-51	Process Equipment Design – I	2.35	2.06	2.05	1.39	2.02	1.56	1.72	0.49	0.81	0.77	1.73	1.71	2.34	1.89	2.31
ChBC-52	Chemical Reaction Eng.	2.27	1.95	1.95	1.93	1.72	1.28	1.29	1.08	1.14	0.48	0.75	1.79	2.26	1.21	2.26
ChBC-53	Material Science & Technology	1.31	1.48	1.65	1.77	1.43	0.96	1.48	0.67	0.47	0.48	0.60	2.00	1.30	1.35	1.67
ChBC-54	Chemical Technology – I	1.50	1.51	1.74	1.48	1.48	1.35	1.93	0.88	0.47	0.48	0.78	2.57	1.35	0.46	1.10
ChBS-55P	Heat Transfer Laboratory.	2.40	2.11	2.55	2.69	0.44	1.94	2.33	0.49	0.47	0.48	0.46	1.95	2.05	2.23	1.86
HSBC-51	Basic Management Principles	0.46	1.58	1.28	1.50	0.44	1.32	1.51	1.55	1.53	1.52	1.65	1.65	1.64	1.65	1.64
MTBC-51	Numerical Methods	2.19	2.41	2.21	2.2	0.44	0.45	0.47	0.49	0.47	1.25	0.46	0.84	1.41	2.38	1.22
ChBC-61	Process Equipment Design -II	1.96	1.81	1.81	1.22	1.69	1.40	1.47	0.49	0.93	0.57	1.46	1.45	1.95	1.63	1.83
ChBC-62	Mass Transfer – II	2.81	2.82	2.82	2.81	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.80	2.81	2.80
ChBC-63	Chemical Technology – II	1.28	1.30	1.37	1.18	1.29	1.14	1.55	0.84	0.47	0.48	0.65	2.05	1.14	0.46	0.93
ChBC-64	Energy Eng.	2.80	2.42	2.42	2.40	2.39	1.81	1.83	1.26	1.25	0.48	0.85	2.21	2.79	1.43	2.79
ChBC-65P	Energy Eng. Laboratory.	1.88	1.26	1.26	1.09	1.70	1.71	2.35	0.49	1.73	0.48	1.75	1.72	1.39	1.72	1.71
ChBC-66	Process Instrumentation	2.57	1.88	0.77	1.86	1.84	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.56	2.06	1.85
ChBC-67	Transport Phenomena	1.90	1.91	1.91	1.55	1.35	1.27	1.43	1.16	0.47	0.48	1.75	1.41	1.89	1.90	1.89
ChBC-68P	Thermodynamics and Rxn Eng.	2.17	1.77	1.39	1.23	1.76	1.78	2.54	1.66	1.82	1.67	1.75	1.85	1.79	1.81	1.75
ChBC-69	Industrial Training & Presentations	2.52	2.50	2.07	1.51	1.51	1.14	0.79	1.19	1.18	1.96	1.39	1.96	2.29	2.17	1.93
ChBP-71	Pre-project work	1.8	1.49	1.31	1.46	1.78	1.46	1.14	1.16	1.81	1.66	1.75	1.8	1.79	2.31	1.95
ChBC-72	Chemical Process Safety	2.62	2.63	1.89	2.43	1.86	2.05	2.63	1.01	2.07	2.12	2.25	1.92	2.44	2.08	1.69
ChBC-73	Process Dynamics & Control	1.81	1.52	1.67	1.50	1.15	0.81	0.83	0.80	0.47	0.48	1.75	1.33	1.80	0.91	1.50
ChBC-74P	Process Dynamics & Control	1.86	1.18	1.17	1.16	1.84	2.55	0.47	0.49	1.87	0.48	1.86	1.85	1.85	1.86	2.55
ChBC-75	Process Economics & Plant Design	1.42	1.54	1.37	1.18	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.45	1.60	1.65	1.05
ChBC-76	Biochemical Eng.	1.85	1.83	1.79	1.81	1.42	1.98	2.00	1.72	0.96	1.50	0.44	1.50	1.85	1.83	1.79
ChBC-77P	Mass Transfer Laboratory.	2.69	2.7	2.7	2.68	1.91	0.44	0.46	0.49	2.7	2.7	1.19	1.19	2.68	1.93	1.92
HSBE-71	Human Resource Development	0.46	0.47	2.31	0.46	0.44	2.29	1.97	2.33	1.59	2.12	2.30	2.29	0.45	0.46	0.45
MTBE-72	Elective – II Numerical Analysis	2.2	2.4	2.2	2	0.4	0.4	0.6	0.4	0.6	1.2	0.6	0.8	1.6	2.6	1.2
ChBE-74	Computational Fluid Dynamics	1.7	1.72	1.52	1.51	1.2	1.28	1.19	2.46	2.35	0.9	0.87	0.97	0.96	1.07	1.28
ChBP-81	Project	1.76	1.13	1.13	1.11	1.74	2.41	1.12	1.15	1.77	2.44	1.75	1.76	1.75	2.28	1.75

ChBC-82	Bioresource Technology	2.79	2.80	2.80	2.59	1.99	2.78	2.79	2.24	1.05	1.84	0.46	1.81	2.78	2.59	2.78
ChBC-83P	Biochemical Eng. Laboratory.	2.77	2.59	2.21	2.00	2.37	1.80	1.63	1.64	1.24	1.44	1.82	2.00	2.18	2.19	2.24
ChBC-84	Modeling and Simulation in	2.80	2.82	2.81	2.80	2.00	2.01	0.47	0.49	0.47	0.48	0.46	2.02	2.79	2.80	2.79
ChBC-85	Industrial Pollution Abatement	1.97	2.28	1.79	2.26	1.54	2.25	2.27	0.49	0.47	0.48	0.46	0.45	2.25	2.26	2.25
ChBE-84	Nano-Science and Technology	2.62	2.11	1.45	1.44	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	1.82	1.05	0.84
ChBE-82	Petroleum Refining	2.32	1.83	1.83	0.96	1.67	1.50	1.71	1.86	0.83	0.93	0.70	1.70	2.31	1.59	2.31
HSBE-82	Entrepreneurship Development	0.46	0.47	2.31	0.46	0.44	1.67	1.51	1.72	1.29	1.61	1.68	1.68	1.67	0.46	0.45
ChBE-83	clean technology in process	1.71	1.20	1.25	1.23	0.54	0.61	0.98	0.49	0.47	0.48	0.46	0.45	1.70	1.07	1.83
Overall PO attainment		1.90	1.74	1.69	1.41	1.15	1.23	1.19	0.90	0.98	1.06	1.10	1.47	1.74	1.61	1.56

Table B.3.3.2a

For the Academic year 2018-2019

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CHM-101	Chemistry-I	1.9	1.6	1.1	0.4	0.4	0.4	0.4	0.4	0.4	1.4	0.4	1.9	1.7	1.0	1.6
PHY-101	Physics-I	0.7	0.7	0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.7	0.6	0.4	0.4
MTH -101	Mathematics-I	1.6	1.4	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.6	1.4	1.5	1.0
HSS 101	Comm. Skills & Oral Presentation	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	1.9	2.1	2	0.4	0.6	0.4	0.4
IT-101	Computer Fundamentals And Problem Solving Techniques	1.9	1.2	0.6	0.4	0.9	0.4	0.4	0.4	0.4	0.4	0.4	1.9	0.56	0.44	0.38
CIV- 102	Engineering Drawing	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.4	1.0	1.0	0.8	1.0	1.1	1.0	1.0
CHM-101 P	Chemistry-I Laboratory	2.3	1.5	0.3	0.4	2.3	1.9	2.1	0.4	0.4	1.4	2.0	2.3	2.5	2.3	1.5
PHY-102 P	Physics-I Laboratory	0.74	0.68	0.73	0.73	0.68	0.38	0.4	0.42	0.42	0.44	0.44	1.01	0.59	0.74	0.49
IT 102 P	Computer Fundamentals And Problem Solving Techniques Lab	1.68	1.34	1.54	1.24	1.32	0.38	0.4	0.42	0.42	0.44	0.44	1.64	2.08	1.32	1.02
WSP-I	Workshop Practices- I	2.6	1.1	1.1	0.4	1.8	1.9	1.9	1.9	2.6	1.9	0.4	2.6	2.0	1.2	1.1
CHM-201	Chemistry-II	2.0	1.7	1.8	1.1	1.3	1.1	2.0	1.2	1.2	2.0	0.4	2.0	2.1	1.4	1.6
PHY-201	Physics-II	0.8	0.8	0.7	0.5	0.5	0.4	0.4		0.6	0.4	0.4	0.8	0.6	0.4	0.4
MTH-201	Mathematics-II	1.6	1.3	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.6	1.4	1.7	1.0
HSS-201	Introduction To Social Sciences	0.4	0.4	1.4	0.4	0.4	1.2	1.0	1.0	1.1	0.7	0.6	0.4	0.6	0.4	0.4
CSE-201	Computer Programming	1.8	1.5	1.7	1.3	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.8	2.1	1.2	0.9
CIV-201	Strength of Materials	2.2	2.1	1.4	1.4	0.4	1.5	1	0.4	0.4	0.4	0.4	0.4	1.7	1	1.4

MED-201	Machine Drawing	1.9	1.6	1.1	0.4	0.4	0.4	0.4	0.4	0.4	1.4	0.4	1.9	1.7	1.0	1.6
CHM-201 P	Chemistry-II Laboratory	2.3	1.5	0.3	0.4	1.9	1.9	2.1	0.4	0.4	1.5	2.0	2.3	2.5	2.4	1.5
PHY-201 P	Physics-II Laboratory	0.65	0.59	0.73	1.08	1.55	0.38	0.4	0.42	0.42	0.44	0.44	1.01	0.59	0.66	0.59
CSE-202 P	Computer Programming Laboratory	1.9	1.9	2.0	1.4	1.9	0.4	0.4	0.4	0.7	0.4	0.4	1.9	1.2	1.9	1.0
WSP-II	Workshop Practices-Ii	2.5	1.1	1.0	0.4	1.7	1.8	1.8	1.8	2.5	1.8	0.4	2.5	2.0	1.1	1.1
ChBC-31	Introduction to Chemical Eng.	1.6	1.2	0.9	0.4	0.6	1.1	0.8	0.6	0.4	0.4	0.6	1.6	1.94	1.82	1.76
ChBC-32	Material and Energy Balance	2.3	2.3	1.7	1.8	1.9	1.6	1.6	1.6	1	0.4	1.6	2.3	2.14	1.65	1.59
ChBC-33	Process Fluid Mechanics	1.9	1.7	1.8	1.3	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.9	2.03	1.81	0.87
ChBC-34	Thermodyn. & Chem.Kinetics	1.4	1.2	1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.4	1.25	1.28	1.07
EEBC-31	Basic Elect. & Electronics Eng.	2.6	1.8	1.6	2.3	1.8	1.5	0.4	0.4	0.4	0.4	2.2	1.6	2.2	2.0	2.1
HSBC-31	Ethics and Self Awareness	0.4	0.4	2	0.4	0.4	1.5	1.3	1.5	1.1	1.5	1.6	0.4	0.56	1.56	0.38
MTBC-31	Chemical Eng. Mathematics-I	1.6	1.6	1.7	1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.6	1.72	1.9	0.38
ChBC-41	Chemical Eng. Thermodynamics	1.3	1.4	1.2	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.3	1.69	1.58	0.94
ChBC-42	Heat Transfer	2.3	2.3	2	1.8	0.4	1.4	1.4	0.4	0.4	0.4	0.4	2.3	1.83	2.34	1.01
ChBC-43	Mechanical Operations	1.7	1.5	1.3	1.2	0.4	1.3	1.5	0.4	0.4	0.4	0.4	1.7	1.76	1.64	1.58
ChBC-44P	Fluid Mech. & Mech. Oper. Lab	2	1.9	1.1	2.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2	2.11	1.22	1.93
ChBC-45	Mass Transfer -I	2	1.8	1.7	1.7	1.8	1.8	1.9	2.1	2	2.1	2.1	2	2.6	2.04	1.78
ChBS-41	Seminar	2.3	2.7	2.3	2.3	2.3	1.5	2.3	2.7	0.9	1.9	1.3	2.3	2	1.04	2.68
EEBC-41P	Basic Ele. & Electron. Eng. Lab	2	1.4	1.3	1.6	1.1	1.3	0.4	0.4	0.4	0.4	1.7	1.4	1.8	1.7	1.8
MTBC-41	Chemical Eng. Mathematics –II	1.9	1.7	1.2	1.3	0.4	0.4	0.4	0.4	0.4	1	0.4	1.9	2	1.16	1.66
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.1	1.8	1.8	1	1.9	1.3	1.5	0.4	0.9	1	1.7	2.1	2.21	1.81	1.92
ChBC-52	Chemical Reaction Eng.	1.9	1.6	1.6	1.6	1.5	1.4	1.4	1.5	1.3	2.2	1.5	1.9	2	1.1	1.8
ChBC-53	Material Science & Technology	1.5	1.8	1.9	2.4	1.6	1.1	1.6	0.6	0.4	0.4	0.6	1.5	1.74	1.72	2.06
ChBC-54	Chemical Technology – I	1.7	1.6	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.7	0.4	1.7	1.62	1.69	0.92
ChBC-55	Mass Transfer -I	2.0	1.8	1.7	1.7	1.8	1.8	1.9	2.1	2.0	2.1	2.1	2.1	2.6	2.0	1.8
ChBS-56P	Heat Transfer Laboratory.	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2.5	2.29	2.17	1.93
HSBC-51	Basic Management Principles	0.4	1.5	1.5	0.7	0.4	1	0.7	1.6	1.6	1.1	1.7	0.4	1.78	1.66	1.6
ChBC-61	Proc. Equip.Des. -II (Process Aspect)	1.9	1.7	1.7	1.1	1.6	1.3	1.4	0.4	0.9	0.5	1.4	1.9	2.03	1.57	1.74
ChBC-62	Mass Transfer – II	1.8	1.9	1.7	1.5	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.8	2.1	1.72	1.79

ChBC-63	Chemical Technology – II	1.5	1.5	1.6	1.4	1.5	1.3	1.8	0.8	0.4	0.5	0.8	1.5	1.48	0.44	1.11
ChBC-64	Energy Eng.	2.3	1.9	2	1.9	1.8	1.6	2.1	2.4	1.6	1.6	1.6	2.3	2.3	2.03	1.6
ChBC-65P	Energy Eng. Laboratory.	1.8	1.1	1.1	1	1.6	1.6	2.2	0.4	1.6	0.4	1.6	1.8	1.46	1.64	1.58
ChBC-66	Process Instrumentation	2	1.4	0.9	1.4	1.4	0.4	0.4	0.4	0.4	0.4	0.4	2	2.12	1.67	1.42
ChBC-67	Transport Phenomena	1.8	1.8	1.7	1.4	1.4	1.2	1.3	1	0.4	0.4	0.4	1.8	1.96	1.84	1.78
ChBC-68P	Thermody. and React. Eng. Lab	2.7	2.7	2.7	2.1	1.7	1.7	1.9	1.2	0.4	0.4	0.4	2.7	2.88	2.76	2.7
ChBC-69	Ind. Training & Presentations	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2.5	2.29	2.17	1.93
ChBP-71	Pre-project work	1.9	1.1	1.1	1.1	1.8	2.5	1.1	1.1	1.9	2.6	2.7	1.9	2.04	2.49	1.86
ChBC-72	Chemical Process Safety	2.1	2.1	1.7	1.9	1.4	1.6	2.1	1.4	1.6	1.9	1.8	2.1	2.21	1.73	1.26
ChBC-73	Process Dynamics & Control	1.6	0.4	1.2	0.4	1.4	0.4	1.3	0.4	1	0.4	0.8	1.6	1.1	0.4	0.6
ChBC-74P	Process Dyn. & Control Laboratory.	1.8	1.1	1.1	1.1	1.8	2.5	0.4	0.4	1.8	0.4	1.9	1.8	1.98	1.86	2.52
ChBC-75	Process Econ.& Plant Design	1.3	1.4	1.2	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.3	1.69	1.58	0.94
ChBC-76	Biochemical Eng.	2.5	2.5	2.5	2.5	1.9	2.7	2.7	2.3	1.2	2.0	0.4	2.0	2.9	2.8	2.7
ChBC-77P	Mass Transfer Laboratory.	2.3	2.3	2.3	2.3	1.6	0.4	0.4	0.4	2.3	2.3	1	2.3	2.45	1.67	1.86
HSBE-71	Human Resource Development	0.4	0.4	2.2	0.4	0.4	1.6	1.4	1.6	1.2	1.5	1.7	0.4	1.78	0.44	0.38
MTBE-71	Operation Research	1.9	2.3	1.2	2	0.4	0.4	0.4	0.4	0.4	1.8	0.4	1.9	1.98	1.72	1.64
HSBE-72	Managerial Econ. for Engineers	0.4	0.4	2.2	1.6	1.2	1.5	1.4	1.1	1.7	1.7	1.7	0.4	1.79	0.44	0.38
ChBE-74	Computational Fluid Dynamics	1.4	1.4	1.4	1.4	1.2	0.4	0.4	0.4	0.9	0.9	0.9	1.4	1.59	1.13	1.15
ChBP-81	Project	1.9	1.1	1.1	1.1	1.8	2.5	1.1	1.1	1.9	2.6	2.7	1.9	2.04	2.49	1.86
ChBC-82	Bioresource Technology	2.7	2.7	2.7	2.5	1.9	2.7	2.7	2.2	1	1.8	0.4	2.7	2.88	2.56	2.7
ChBC-83P	Biochemical Eng. Laboratory.	2.7	2.7	2.7	2.1	1.7	1.7	1.9	1.2	0.4	0.4	0.4	2.7	2.88	2.56	2.7
ChBC-84	Model. & Simulation in Chem. Eng.	2	2	2	1.9	1.4	1.4	0.4	0.4	0.4	0.4	0.4	2	2.2	2.08	2.02
ChBC-85	Industrial Pollution Abatement	1.4	1.5	1.1	1.5	1.0	1.5	1.5	0.4	0.4	0.4	0.4	0.4	1.3	2.0	1.6
ChBE 82	Petroleum Refining	2.2	1.7	1.7	0.8	1.6	1.4	1.6	1.2	1.2	0.9	1.2	2.2	2.48	1.51	2.3
ChBE 81	Process Heat Integration	2.3	2.3	2.3	2.1	1.9	1.4	1.7	0.4	0.4	0.4	0.4	2.3	2.49	1.72	1.02
HSBE-82	Entrepreneurship Development	0.4	0.4	2.2	0.4	0.4	1.6	1.4	1.6	1.2	1.6	1.7	0.4	1.78	0.44	0.38
ChBE-82	Fuel Cell Technology	2.1	1.7	1.7	1.7	1	1.5	1.3	0.6	0.4	0.4	0.4	2.1	2.1	1.2	1.7
Overall PO Attainment		1.75	1.54	1.50	1.24	1.17	1.13	1.08	0.84	0.88	1.01	0.95	1.69	1.83	1.51	1.41

Table B.3.3.2b

For the Academic year 2017-2018

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CHM-101	Chemistry-I	1.7	1.6	1.2	0.3	0.4	0.4	0.4	0.4	0.4	1.7	0.4	1.8	1.6	1.6	0.9
PHY-101	Physics-I	2.1	2.1	1.9	1.1	1.8	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4
MTH -101	Mathematics-I	1.8	1.4	1.8	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4	1.5	1.6	1.1
HSS 101	Communi. Skills & Oral Pres.	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	1.9	2.1	1.9	0.4	0.5	0.4	0.4
IT-101	Computer Fundamentals And Problem Solving Techniques	1.8	1.4	1.7	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.6	2.1	0.9	0.9
CIV- 102	Engineering Drawing	1.7	1.6	1.6	1.6	1.3	1.3	1.3	0.4	1.7	1.7	1.3	1.3	1.8	1.7	1.6
CHM-101 P	Chemistry-I Laboratory	2.3	1.5	1.4	0.3	2.3	1.9	2.1	0.4	0.4	1.4	1.9	1.3	2.4	2.3	1.5
PHY-102 P	Physics-I Laboratory	0.58	0.53	0.58	0.56	0.54	0.35	0.38	0.42	0.40	0.42	0.41	0.79	0.45	0.55	0.36
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	1.9	2.0	2.3	1.4	2.0	0.4	0.4	0.4	0.8	0.4	0.4	2.4	1.2	2.1	1.0
WSP-I	Workshop Practices- I	2.3	1	1	0.3	1.7	1.7	1.7	1.7	2.4	1.7	0.4	2.4	1.8	1.1	1
CHM-201	Chemistry-II	1.8	1.6	1.7	1.1	1.1	1	2.1	1.1	1.1	2	0.4	1.6	1.8	2	1.2
PHY-201	Physics-II	1.5	1.4	1.2	0.8	0.7	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.5	0.4	0.4
MTH-201	Mathematics-II	1.9	1.5	1.8	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	1.5	1.9	1.1
HSS-201	Introduction To Social Sciences	0.4	0.4	0.7	0.3	0.4	1.5	1.1	1.3	1.5	0.8	0.5	0.8	0.5	0.4	0.4
CSE-201	Computer Programming	1.6	1.2	1.5	1.1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.5	1.9	1.1	0.8
CIV-201	Strength of Materials	1.4	1.4	1	1	0.4	1.1	0.7	0.4	0.4	0.4	0.4	0.4	1.2	0.7	1
MED-201	Machine Drawing	1.2	0.4	1.2	0.7	1.7	0.4	0.4	0.8	0.7	0.4	0.4	0.7	1.5	1	0.6
CHM-201 P	Chemistry-II Laboratory	2.3	1.9	1.7	0.3	0.4	1.7	1.9	0.4	0.4	1.6	1.4	1.4	2.3	2.3	1.9
PHY-201 P	Physics-II Laboratory	0.51	0.46	0.58	0.84	1.23	0.35	0.38	0.42	0.40	0.42	0.41	0.79	0.45	0.49	0.44
CSE-202 P	Computer Programming Laboratory	1.4	1.4	1.4	1	1.4	0.4	0.4	0.4	0.6	0.4	0.4	1.6	1	1.4	0.8
WSP-II	Workshop Practices-II	2.4	1.1	1	0.3	1.7	1.7	1.8	1.8	2.5	1.8	0.4	2.5	1.9	1.1	1
ChBC-31	Introduction to Chemical Eng.	1.5	1.1	0.9	0.3	0.5	1	0.7	0.6	0.4	0.4	0.5	0.7	1.8	1.7	1.6
ChBC-32	Material and Energy Balance	2.4	2.4	1.9	1.8	2	1.6	1.6	1.6	1	0.4	1.6	2.3	2.3	1.7	1.6
ChBC-33	Process Fluid Mechanics	1.8	1.7	1.8	1.3	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.4	2	1.3	0.8
ChBC-34	Thermodynamics and Chemical Kinetics	1.8	1.4	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.7	1.5	1.5	1.3

EEBC-31	Basic Electrical Eng.	2.6	1.8	1.6	2.3	1.8	1.5	0.4	0.4	0.4	0.4	2.2	1.5	2.1	2	2.1
EEBC-32P	Basic Electrical Eng. Laboratory.	2.4	1.6	1.6	1.9	1.4	1.4	0.4	0.4	0.4	0.4	1.7	1.4	1.8	1.7	1.8
MTBC-31	Chemical Eng. Mathematics-I	1.6	1.7	1.7	1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.6	1.7	1.9	0.4
ChBC-41	Chemical Eng. Thermodynamics	1.5	1.5	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.8	1.5	1.6	0.8
ChBC-42	Heat Transfer	1.9	1.9	1.8	1.5	0.4	1.1	1.1	0.4	0.4	0.4	0.4	1.5	1.6	2	0.9
ChBC-43	Mechanical Operations	2	1.7	1.5	1.5	0.4	1.5	1.9	0.4	0.4	0.4	0.4	1.3	2.1	1.9	1.9
ChBC-44P	Fluid Mec. & Mech.Opera. Laboratory	2.2	2.2	2.2	2.1	1.5	0.3	0.4	0.4	2.2	2.2	1	1	2.2	1.7	1.5
HSBC41	Ethics and Self Awareness	0.4	0.4	2	0.3	0.4	1.5	1.3	1.5	1.1	1.4	1.5	1.5	0.5	1.5	0.4
ChBS-41	Seminar	2.3	2.7	2.3	2.3	2.3	1.5	2.3	2.8	0.9	2	1.3	1.9	2	1	2.7
EEBC-41	Basic Electronics Eng.	2.1	1.7	2	2	1.6	0.6	0.9	0.4	0.4	0.4	0.4	1.5	2	1.7	1.5
EEBC-41P	Basic Electronics Eng. Laboratory	2.1	1.5	1.15	1.1	1.2	1.1	1.0	0.49	0.49	0.45	1.10	1.18	1.38	1.4	1.16
MTBC-41	Chemical Eng. Mathematics –II	1.7	1.5	1.1	1.1	0.4	0.4	0.4	0.4	0.4	1	0.4	1.3	1.7	1.2	1.4
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	1.6	1.4	1.4	1	1.3	1.1	1.2	0.4	0.7	0.5	1.1	1.2	1.7	1.4	1.6
ChBC-52	Chemical Reaction Eng.	2.1	1.8	1.7	1.7	1.6	1.4	1.4	1.6	1.7	0.4	1.5	1.7	2.3	1.1	2.1
ChBC-53	Material Science & Technology	1.6	1.8	2	2	1.7	1.1	1.7	0.6	0.4	0.4	0.6	2.6	1.8	1.8	2.1
ChBC-54	Chemical Technology – I	1.3	1.4	1.5	1.7	1.6	1.2	1.3	0.6	0.6	0.6	0.9	2.5	1.6	1.2	1.4
ChBC-55	Mass Transfer -I	2	1.8	1.7	1.7	1.7	1.8	2	2.1	2	2.1	2.1	2.1	2.7	2	1.7
ChBS-56P	Heat Transfer Laboratory.	2.3	2	2.4	2.5	0.4	1.8	2.2	0.4	0.4	0.4	0.4	1.9	2	2.2	1.8
HSBC-51	Basic Management Principles	0.4	2.6	2.2	2.7	0.4	2.1	2.1	2.2	2.2	2.4	2.3	2.3	0.5	0.4	0.4
ChBC-61	Proc. Equip. Design -II (Process Aspect)	1.6	1.4	1.4	1	1.3	1.1	1.2	0.4	0.7	0.5	1.1	1.2	1.7	1.4	1.6
ChBC-62	Mass Transfer – II	1.5	1.6	1.5	1.2	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.8	1.4	1.5
ChBC-63	Chemical Technology – II	1.5	1.5	1.6	1.4	1.5	1.3	1.8	0.8	0.4	0.4	0.7	2.6	1.5	0.4	1.1
ChBC-64	Energy Eng.	2.4	2	2.2	2	1.8	1.7	2.2	2.4	1.5	1.9	1.7	1.7	2.4	2.1	1.6
ChBC-65P	Energy Eng. Laboratory.	1.6	1	1	0.9	1.4	1.4	2	0.4	1.4	0.4	1.5	1.5	1.3	1.5	1.4
ChBC-66	Process Instrumentation	2.4	1.7	0.9	1.7	1.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2.6	1.9	1.7
ChBC-67	Transport Phenomena	2.1	2.1	2	1.4	1.4	1.3	1.5	1.1	0.4	0.4	0.4	1.6	2.2	2.1	2
ChBC-68P	Thermodyn. & Reac. Eng. Laboratory.	2.7	2.7	2.7	2	1.6	1.7	1.9	1.2	0.4	0.4	0.4	2	2.9	2.7	2.7
ChBC-69	Ind. Training & Presentations	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2	2.3	2.1	1.9

ChBP-71	Pre-project work	1.7	1	1	1	1.6	2.3	1	1.1	1.7	2.3	2.3	1.7	1.8	2.2	1.6
ChBC-72	Chemical Process Safety	2.4	2.3	2	2.1	1.6	1.8	2.4	2.1	1.8	2	2	2.3	2.4	1.9	1.4
ChBC-73	Process Dynamics & Control	2.6	2.2	2.4	2.2	1.7	1.9	1.9	1.1	0.4	0.4	0.4	1.9	2.8	1.1	2.2
ChBC-74P	Process Dynamics & Control Laboratory	2.6	2.6	2.6	1.8	1.5	2.4	2.6	1.9	1.2	1.9	0.4	1.9	2.8	2.5	2.6
ChBC-75	Process Econ. & Plant Design	1.4	1.5	1.3	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.5	1.8	1.7	1
ChBC-76	Biochemical Eng.	2.5	2.46	2.44	2.45	1.87	2.65	2.7	2.32	1.16	1.96	0.41	1.96	2.8	2.7	2.6
ChBC-77P	Mass Transfer Laboratory.	2.2	2.2	2.2	2.1	1.5	0.3	0.4	0.4	2.2	2.2	1	1	2.2	1.7	1.5
MTBE-71	Operation Research	2.6	2.2	2.4	2.2	1.7	1.9	1.9	1.1	0.4	0.4	0.4	1.9	2.8	1.1	2.2
HSBE-72	Managerial Econ. for Engineers	0.4	0.4	2.2	1.6	1.2	1.5	1.4	1.1	1.6	1.7	1.6	1.7	1.8	0.4	0.4
ChBP-81	Project	1.7	1	1	1	1.6	2.3	1	1.1	1.7	2.3	2.3	1.7	1.8	2.2	1.6
ChBC-82	Bioresource Technology	2.7	2.6	2.6	2.4	1.9	2.6	2.6	2.1	1	1.7	0.4	1.8	2.6	2.5	2.6
ChBC-83P	Biochemical Eng. Laboratory.	2.2	2	1.7	1.5	1.9	1.4	1.3	1.1	1	1.2	1.4	1.6	1.7	1.7	1.8
ChBC-84	Modeling & Sim. in Chem. Eng.	2	2	2	1.6	1.2	1.2	0.4	0.4	0.4	0.4	0.4	1.5	2.2	2	2
ChBC-85	Industrial Pollution Abatement	2.0	2.4	1.8	2.3	1.5	2.3	2.4	0.4	0.4	0.4	0.4	0.4	2.5	2.4	2.3
ChBE-82	Petroleum Refining	2.3	1.8	1.8	0.3	1.4	1.6	1.5	1.7	0.4	0.4	0.8	1.7	2.5	1.6	2.3
HSBE-82	Entrepreneurship Development	0.4	0.4	2.2	0.3	0.4	1.6	1.4	1.6	1.2	1.6	1.6	1.7	1.8	0.4	0.4
Overall PO Attainment		1.81	1.62	1.64	1.31	1.22	1.18	1.18	0.88	0.87	0.96	0.89	1.49	1.80	1.52	1.39

Table B.3.3.2c

OVERALL PO/PSO ATTAINMENT LEVELS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
2019-2020	1.90	1.74	1.69	1.41	1.15	1.23	1.19	0.90	0.98	1.06	1.10	1.47	1.74	1.61	1.56
2018-2019	1.75	1.54	1.50	1.24	1.17	1.13	1.08	0.84	0.88	1.01	0.95	1.69	1.83	1.51	1.41
2017-2018	1.81	1.62	1.64	1.31	1.22	1.18	1.18	0.88	0.87	0.96	0.89	1.49	1.80	1.52	1.39

Table B.3.3.2.d