

**Course structure & Syllabi (with Objectives & Outcomes) for
Semesters III to VIII of 4-Year B. Tech Program in Chemical
Engineering (CE - Code: 407), University of Calcutta
(with effect from: Academic Year 2024-2025)
Notification No. CSR/92/2024.**

1. Schedule of Papers and distribution of Credits for the 4-Year B. Tech Semester III to VIII (final) Examination in Chemical Engineering are as follows:

4-Year B. Tech, 3rd Semester

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
				L	T	P	Total		
1	Basic Science	BSMA 301	Mathematics III	2	1	0	3	3	100
2	Basic Science	BSTH 302	Thermodynamics	2	0	0	2	2	100
3	Professional Core	PCPT 303	Particle and Fluid Processing Technology	2	1	0	3	3	100
4	Professional Core	PCFM 304	Fluid Mechanics	2	1	0	3	3	100
5	Professional Core	PCMB 305	Material & Energy Balance Computation	2	1	0	3	3	100
6	Professional Core	PCER 306	Energy Resources and their utilization	2	1	0	3	3	100
7	Professional Core	PCFT 307	Fuel Technology Laboratory	0	0	3	3	1.5	50
8	Professional Core	PCMO 308	Mechanical Operation Laboratory	0	0	3	3	1.5	50
			Total	11	6	6	23	20	700

4-Year B. Tech, 4th Semester

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
				L	T	P	Total		
1	Engineering Science	ESPT 401	Process Thermodynamics	2	1	0	3	3	100
2	Engineering Science	ESSM 402	Engineering and Solid Mechanics	2	1	0	3	3	100
3	Professional Core	PCMS 403	Material Science	2	1	0	3	3	100
4	Professional Core	PCHT 404	Heat Transfer – I	2	1	0	3	3	100
5	Professional Core	PCMT 405	Mass Transfer – I	2	1	0	3	3	100
6	Professional Core	PCNM 406	Numerical Methods in Chemical Engineering	2	1	0	3	3	100
7	Professional Core	PCHL 407	Heat Transfer Laboratory	0	0	3	3	1.5	50
8	Professional Core	PCFF 408	Fluid Flow Laboratory	0	0	3	3	1.5	50
			Total	12	6	6	24	21	700

4-Year B. Tech, 5th Semester

Sl. #	Category	Paper Code	Course	Course hour/Week			Credit		Full Marks
				L	T	P	Total		
1	Professional Core	PCRE 501	Chemical Reaction Engineering – I	2	1	0	3	3	100
2	Professional Core	PCMT 502	Mass Transfer – II	2	1	0	3	3	100
3	Professional Core	PCCT 503	Chemical Process Technology	2	1	0	3	3	100
4	Professional Core	PCPE 504	Project Engineering	2	1	0	3	3	100
5	Professional Elective	PECE 505 / 515	Professional Elective – I	2	1	0	3	3	100
6	Open Elective	OECE 506 / 516	Open Elective – I	2	1	0	3	3	100
7	Professional Core	PCML 507	Mass Transfer Laboratory	0	0	3	3	1.5	50
8	Professional Core	PCPD 508	Process Equipment Design & Drawing	0	0	3	3	1.5	50
9	Mandatory Course (Non-Credit)	MCES 509	Environmental Science	2	0	0	2	0	100
			Total	14	6	6	26	21	700*

***Excluding Mandatory (Non-Credit) Course**

4-Year B. Tech, 6th Semester

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
				L	T	P	Total		
1	Professional Core	PCRE 601	Chemical Reaction Engineering – II	2	1	0	3	3	100
2	Professional Core	PCRE 602	Refinery Engineering	2	1	0	3	3	100
3	Professional Core	PCIC 603	Process Instrumentation & Control	2	1	0	3	3	100
4	Professional Core	PCTP 604	Transport Phenomena	2	1	0	3	3	100
5	Professional Elective	PECE 605 / 615	Professional Elective – II	2	1	0	3	3	100
6	Open Elective	OECE 606 / 616	Open Elective – II	2	1	0	3	3	100
7	Professional Core	PCPS 607	Plant Design and Simulation Laboratory	0	0	3	3	1.5	50
8	Professional Core	PCRT 608	Reaction Engineering & Thermodynamics Lab	0	0	3	3	1.5	50
			Total	12	6	6	24	21	700

After completion of 6th Semester Examination (during the Summer), students will go for Internship/Plant Training.

4-Year B. Tech, 7th Semester

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
				L	T	P	Total		
1	Professional Core	PCHT 701	Heat Transfer – II	2	1	0	3	3	100
2	Professional Core	PCPC 702	Petrochemicals	2	1	0	3	3	100
3	Humanities	HUEM 703	Economics and Management	2	1	0	3	3	100
4	Professional Core	PCIC 704	Instrumentation and Process Control Lab	0	0	3	3	1.5	50
5	Professional Elective	PECE 705/715	Professional Elective – III	2	1	0	3	3	100
6	Open Elective	OECE 706/716	Open elective – III	2	1	0	3	3	100
7	Internship in Industry	PIPT 707	Internship/ Plant Training *	6-8 weeks				1.5	100
8	Project Work	PIPW 708	Project Work – I	0	0	6	6	3	100
			Total	10	5	9	24	21	750

***After completion of 6th Semester Examination (during the Summer), students will go for Internship/Plant Training.**

B. Tech, 8th Semester

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
				L	T	P	Total		
1	Professional Core	PCDS 801	Departmental Seminar	0	0	3	3	1.5	100
2	Professional Core	PCAI 802	Analytical Instrument Lab	0	0	3	3	1.5	50
3	Mandatory Course (Non-Credit)	MCIC 803	Indian Constitution	2	0	0	2	0	100
4	Project Work	PIPW 804	Project Work – II	0	0	8	8	6	200
5	Professional Elective	PECE 805/815	Professional Elective – IV	2	1	0	3	3	100
6	Open Elective	OECE806/816	Open Elective – IV	2	1	0	3	3	100
7	Project Internship	PIGV 807	General Viva-Voce	---				3	100
			Total	6	2	14	22	18	650*

***Excluding Mandatory (Non-Credit) Course**

Elective Papers**Semester V**

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
	<u>Any one from the list</u>			L	T	P	Total		
1	Professional Elective – I	PECE 505	Nanotechnology for Energy Harvesting	2	1	0	3	3	100
2	Professional Elective – I	PECE 515	Nanotechnology for Environmental Sustainability	2	1	0	3	3	100
	<u>Any one from the list</u>								
1	Open Elective – I	OECE 506	Biochemical Engineering	2	1	0	3	3	100
2	Open Elective – I	OECE 516	Biotechnology	2	1	0	3	3	100

Semester VI

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
	<u>Any one from the list</u>			L	T	P	Total		
1	Professional Elective – II	PECE 605	Water pollution and Wastewater Management	2	1	0	3	3	100
2	Professional Elective – II	PECE 615	Solid Waste Management	2	1	0	3	3	100
	<u>Any one from the list</u>								
1	Open Elective – II	OECE 606	Polymer Science and Engineering	2	1	0	3	3	100
2	Open Elective – II	OECE 616	Ceramic Materials and Engineering	2	1	0	3	3	100

Semester VII

Sl. #	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
	<u>Any one from the list</u>			L	T	P	Total		
1	Professional Elective – III	PECE 705	Advanced Process Control	2	1	0	3	3	100
2	Professional Elective – III	PECE 715	Computational Fluid Dynamics	2	1	0	3	3	100
	<u>Any one from the list</u>								
1	Open Elective – III	OECE 706	Process Plant Simulation	2	1	0	3	3	100
2	Open Elective – III	OECE 716	Process Modeling and Simulation	2	1	0	3	3	100

Semester VIII

Sl.#	Category	Paper Code	Course	Course hour/Week				Credit	Full Marks
	<u>Any one from the list</u>			L	T	P	Total		
1	Professional Elective – IV	PECE 805	Industrial Hazards & Plant safety	2	1	0	3	3	100
2	Professional Elective – IV	PECE 815	Air Pollution and Control	2	1	0	3	3	100
	<u>Any one from the list</u>								
1	Open Elective – IV	OECE 806	Advanced Separation Processes	2	1	0	3	3	100
2	Open Elective – IV	OECE 816	Interfacial Engineering	2	1	0	3	3	100

2. Details of Course objectives, Course outcomes, Syllabi and References of the 4-Year B. Tech Semester III to VIII (final) Examination in Chemical Engineering:

For conducting - **End Semester Examination** (applicable to all Theory papers, including Professional and Open Electives):

- The Examination will be of 3 hours duration.
- There will be at least 2 (two) paper-setters (internal) for each theoretical paper for End Semester Examination and the answer scripts will be examined by at least two Examiners (Internal).
- Each question paper shall consist of 4 (four) compulsory sections giving equal weightage to each individual module of the syllabus. Questions shall be set taking all the course outcomes specified for the paper.