Sant Gadge Baba Amravati University, Amravati

Scheme of Implementation for

Four Year Undergraduate Degree Programme

In Engineering and Technology

B.Tech. (Chemical Engineering),
Undergraduate Engineering Degree Programme

In the faculty of

Science and Technology

ACADEMIC EVALUATION SCHEME/CREDIT SYSTEM

Year: 2024-25

(Scheme of Examination w.e.f. 2024-25 and onwards)

	Scheme for First Year Four Year Undergraduate Engineering Degree Programme Semester - I – B.Tech. (Chemical Engineering)												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Applied Mathematics -I (BSC)	1AL100BS	3	0	0	3	3	40	60			100	3 Hrs.
2	Engineering Physics (BSC)	1AL101BS	3	0	0	3	3	40	60			100	3 Hrs.
3	Computer Programming (ESC)	1AL102ES	3	0	0	3	3	40	60			100	3 Hrs.
4	Engineering Mechanics (ESC)	1AL103ES	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
5	Engineering Physics Lab. (BSC)	1AL104BS	0	2	0	2	1			25	25	50	
6	Computer Programming Lab. (ESC)	1AL105ES	0	2	0	2	1			25	25	50	
7	Engineering Mechanics Lab.(ESC)	1AL106ES	0	2	0	2	1			25	25	50	
8	Workshop (ESC)	1AL107ES	0	2	0	2	1			25	25	50	
	Vocational and Skill Enhancement Courses (VSEC-I)												
9	Technical Department Specific Basics of Chemical Processes (VSEC-I)	1CH108VS	0	4	0	4	2			50	-	50	
	Ability Enhancement Courses (AEC)												
10	Professional Communication English	1AL109AE	1	2	0	3	2			25	25	50	
	Co-curricular Course (CC)												
11	Co-curricular Course (CC)- Sports / Yoga / NSS / Fine Arts/Clubs	1AL110CC	0	4	0	4	2			50	-	50	
	TOTAL		13	18	0	31	**22**					**750**	

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External

Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

	Scheme for First Year Four Year Undergraduate Engineering Degree Programme Semester - II – B.Tech.(Chemical Engineering) Level- 4.5												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Applied Mathematics -II (BSC)	2AL111BS	3	0	0	3	3	40	60			100	3 Hrs.
2	Engineering Chemistry (BSC)	2AL112BS	3	0	0	3	3	40	60			100	3 Hrs.
3	Basic Electrical Engineering (ESC)	2AL113ES	3	0	0	3	3	40	60			100	3 Hrs.
4	Engineering Graphics (ESC)	2AL114ES	2	0	0	2	2	40	60			100	3 Hrs.
	Laboratory Courses												
5	Engineering Chemistry Lab. (BSC)	2AL115BS	0	2	0	2	1			25	25	50	
6	Basic Electrical Engineering Lab.(ESC)	2AL116ES	0	2	0	2	1			25	25	50	
7	Engineering Graphics Lab. (ESC)	2AL117ES	0	2	0	2	1			25	25	50	
	Vocational and Skill Enhancement Courses (VSEC-II)												
8	Technical Department Specific Computer Applications for Chemical Engineering (VSEC-II)	2CH118VS	1	2	0	3	2			50	-	50	
	Programme Core Course (PCC)												
9	Programme Core Course Introduction to Chemical Engineering	2CH119PC	2	0	0	2	2	20	30			50	2.00 Hrs.
	Indian Knowledge System (IKS)												
10	Indian Traditional Knowledge	2AL120IK	2	0	0	2	2	20	30			50	2.00 Hrs.
	Co-curricular Course (CC)												
11	Co-curricular Course (CC)- Sports / Yoga / NSS / Fine Arts/ Clubs	2AL121CC	0	4	0	4	2			50	-	50	
	TOTAL		16	12	0	28	**22**					**750**	

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External

Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Scheme for Multiple Entry and Exit

Exit option -1 (L5): Award of UG Certificate in Major with 44 credits and an additional 8 credits			
	Exit Courses		**Credits**
1	Material and Energy Balances (3CH246EC)	**Online/offline certification Course by SWAYAM, MOOC, NPTEL or any Government registered organization**	**4**
2	Numerical Methods in Chemical Engineering (3CH247EC)		**4**
	OR		
3	Two Month Internship at any Chemical Analysis Lab. or Chemical Industry and Report Submission with its Presentation. (3CH406EL) (288 – 320 Hours)		**8**

(Board of Studies in each subject is expected to specify different courses (combined of total 08 credits for the award of UG Certificate related with the major of respective discipline.)

Students can opt any one of these courses and submit the valid certificates to exit the programme.

	Scheme for Second Year Four Year Undergraduate Engineering Degree Programme Semester –III B.Tech. (Chemical Engineering)												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Programme Core Course -I Chemical Engg. Thermodynamics	3CH200PC/ 3CT200PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Programme Core Course –II Process Instrumentation	3CH201PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Programme Core Course –III Chemical Engineering Analysis	3CH202PC/ 3CT202PC	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
4	Community Engg. Project / Field Project	3CH400EL	0	4	0	4	2			25	25	50	
5	Programme Core Course –II Lab. Process Instrumentation Lab.	3CH203PC	0	2	0	2	1			25	25	50	
6	Programme Core Course –III Chemical Engineering Analysis Lab.	3CH204PC/ 3CT204PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
7	Multidisciplinary Minor –I Environmental Pollution: Policies and Regulations	3CH205M	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
	Open Elective other than a particular Program												
8	Open Elective –I De Carbonization Technologies Solar Energy For Sustainable Development	3CH206OE1 3CH206OE2	3	0	0	3	3	40	60	-	-	100	3 Hrs.
	HSSMC (Entrepreneurship/ Economics/ Management Course)												
9	(Entrepreneurship Development) Engineering Economics	3CH207EM/ 3CT207EM	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
	Value Education Course (VEC)												
10	Environmental Science Environmental Studies	3CH208VE/ 3CT208VE	2	0	0	2	2	20	30			50	2.00 Hrs.
	TOTAL		18	08	0	26	**22**					**700**	

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External
Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Open Elective-I: 1) De Carbonization Technologies (3CH206OE1) 2) Solar Energy For Sustainable Development (3CH206OE2)

***Please refer to the list of Multidisciplinary Minor courses attached separately.**

	Scheme for Second Year Four Year Undergraduate Engineering Degree Programme Semester -IV B.Tech. (Chemical Engineering) Level- 5.0												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Programme Core Course –I Fluid Flow Operation	4CH209PC/ 4CT209PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Programme Core Course-II (Chemical Engg. Operation – I) Mechanical Operation	4CH210PC/ 4CT210PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Programme Core Course-III Process Calculation	4CH211PC	2	0	0	2	2	40	60			100	3 Hrs.
	Laboratory Courses												
4	Programme Core Course –I Lab. Fluid Flow Operation Lab.	4CH212PC	0	2	0	2	1			25	25	50	
5	Programme Core Course –II Lab. (Chemical Engg. Operation – I Lab.) Mechanical Operation Lab.	4CH213PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
6	Multidisciplinary Minor –II Chemical Engineering in Air Pollution and Control	4CH214M	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
	Vocational and Skill Enhancement Courses (VSEC-III)												
7	VSEC-III Machine Design & Drawing	4CH215VS/ 4CT216VS	1	2	0	3	2			50	-	50	
	Open Elective other than a particular Program												
8	Open Elective- II Water Treatment Technologies Applied Wind Energy Technology	4CH216OE1 4CH216OE2	2	0	0	2	2	20	30			50	2.00 Hrs.
	HSSMC (Entrepreneurship/ Economics/ Management Course)												
9	(Entrepreneurship Development) Industrial Management	4CH217EM/ 4CT218EM	2	0	0	2	2	20	30			50	2.00 Hrs.
	(Ability Enhancement Course (AEC)												
10	Modern Indian Language Technical English	4CH218AE	2	0	0	2	2			25	25	50	.

	Value Education Course (VEC)												
11	Environmental Science / UHV /VE Human Values & Professional Ethics	4CH219VE	2	0	0	2	2	20	30			50	2.00 Hrs.
	TOTAL		19	06	0	25	**22**					**700**	

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Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Open Elective-II: 1) Water Treatment Technologies (4CH216OE1) 2) Applied Wind Energy Technology (4CH216OE2)

***Please refer to the list of Multidisciplinary Minor courses attached separately.**

Scheme for Multiple Entry and Exit

Exit option -2 (L6): Award of UG Diploma in Major with 88 credits and an additional 8 credits			
Exit Courses			
1	Chemical Process Utilities (5CH248EC)	**Online/offline certification Course by SWAYAM, MOOC, NPTEL or any Government registered organization**	**4**
2	Physico-chemical Processes For Wastewater Treatment (5CH249EC)		**4**
	OR		
3	Two month Internship in Chemical Analysis Lab., at any Chemical Industry and Report Submission with its Presentation. (5CH407EL) (288 – 320 Hours)		**8**

(Board of Studies in each subject is expected to specify different courses (combined of total 08 credits for the award of UG Diploma related with the major of respective discipline.)

Students can opt any one of these courses and submit the valid certificates to exit the programme.

	Scheme for Third Year Four Year Undergraduate Engineering Degree Programme Semester –V B.Tech. (Chemical Engineering)												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Programme Core Course –I Heat Transfer	5CH220PC/ 5CT220PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Programme Core Course-II Industrial Waste Treatment	5CH221PC/ 5CT221PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Programme Core Course-III Computer Programming & Application	5CH222PC/ 5CT223PE	3	0	0	3	3	40	60			100	3 Hrs.
4	Programme Elective Course –I Inorganic Chemical Technology Biochemical Engineering Material Science & Engineering	 5CH223PE 5CH224PE 5CH225PE	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
5	Programme Core Course –I Lab. Heat Transfer Lab.	5CH226PC/ 5CT224PC	0	2	0	2	1			25	25	50	
6	Programme Core Course –II Lab. Industrial Waste Treatment Lab.	5CH227PC/ 5CT225PC	0	2	0	2	1			25	25	50	
7	Programme Core Course –III Lab. Computer Programming & Application Lab.	5CH228PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
8	Multidisciplinary Minor –III Chemical Engineering in Liquid Waste Management	5CH229M	2	0	0	2	2	20	30			50	2.00 Hrs.
9	Multidisciplinary Minor –IV Chemical Engineering in Solid Waste Management	5CH230M	2	0	0	2	2	20	30			50	2.00 Hrs.
10	Multidisciplinary Minor –III Lab. –I Chemical Engineering in Liquid Waste Management Lab.	5CH231M	0	2	0	2	1			25	25	50	
	Open Elective other than a particular Program												
11	Open Elective- III Risk & Safety Management Renewable Biomass Energy Technology	 5CH232OE1 5CH232OE2	2	0	0	2	2	20	30			50	2.00 Hrs.
	TOTAL		18	08	0	26	**22**					**750**	

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Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Open Elective-III: 1) Risk & Safety Management (5CH232OE1) 2) Renewable Biomass Energy Technology (5CH232OE2)

***Please refer to the list of Multidisciplinary Minor courses attached separately.**

Programme Elective Course I (V Semester)	**1) Inorganic Chemical Technology (5CH223PE)**	**2) Biochemical Engineering (5CH224PE)**	**3) Material Science & Engineering (5CH225PE)**

	Scheme for Third Year Four Year Undergraduate Engineering Degree Programme Semester –VI B.Tech. in (Chemical Engineering) Level – 5.5												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Programme Core Course –I Mass Transfer -I	6CH233PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Programme Core Course-II Petrochemical Technology	6CH234PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Programme Core Course-III Chemical Reaction Engineering-I	6CH235PC/ 6CT235PE	3	0	0	3	3	40	60			100	3 Hrs.
4	Program Elective Course –II Organic Chemical Technology Fuel Cells and Hydrogen Energy Food Science and Engineering	 6CH236PE 6CH237PE 6CH238PE	3	0	0	3	3	40	60			100	3 Hrs.
5	Program Elective Course –III Process Equipment Design & Drawing Thermodynamics of Phase & Chemical Equilibrium Renewable Energy Sources	 6CH239PE/ 6CT234PE 6CH240PE 6CH241PE	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
6	Programme Core Course –I Lab. Mass Transfer –I Lab.	6CH242PC	0	2	0	2	1			25	25	50	
7	Programme Core Course –II Lab. Petrochemical Technology Lab.	6CH243PC	0	2	0	2	1			25	25	50	
8	Programme Core Course –III Lab. Chemical Reaction Engineering-I Lab.	6CH244PC/ 6CT238PE	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
9	Multidisciplinary Minor –V Environmental Impact & Risk Assessment	6CH245M	2	0	0	2	2	20	30			50	2.00 Hrs.
	Vocational and Skill Enhancement Courses												
10	VSEC -IV (Technical Dept. Specific) Minor Project on Recent Developments	6CH401VS	1	2	0	3	2			50	-	50	
	TOTAL		18	08	0	26	**22**					**750**	

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Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

***Please refer to the list of Multidisciplinary Minor courses attached separately.**

Programme Elective Course II (VI Semester)	**1) Organic Chemical Technology (6CH236PE)**	**2) Fuel Cells and Hydrogen Energy (6CH237PE)**	**3) Food Science and Engineering (6CH238PE)**
Programme Elective Course III (VI Semester)	**1) Process Equipment Design & Drawing (6CH239PE)**	**2) Thermodynamics of Phase & Chemical Equilibrium (6CH240PE)**	**3) Renewable Energy Sources (6CH241PE)**

*A Minor Project batch should not be more than 4 students in a batch so as to imbibe the research and development acumen in students by paying individual attention to each student by the mentor.

* Students are expected to work in a group, carry out a small and applicable project work and present it in a very professional manner before all staff and students of the department. A panel of experts will evaluate and guide students for their better prospects.

Scheme for Multiple Entry and Exit

Exit option -3 (L7): Award of UG Degree in Major with 132 credits and an additional 8 credits			
Exit Courses			
1	Optimization of Chemical Processes (7CH315EC)	**Online/offline certification Course by SWAYAM, MOOC, NPTEL or any Government registered organization**	**4**
2	Computer Aided Process Synthesis (7CH316EC)		**4**
	OR		
3	Two Month Internship at any Chemical Industry & Report Submission with its Presentation. (7CH408EL) (288 – 320 Hours)		**8**

Board of Studies in each subject is expected to specify different courses (combined of total 08 credits for the award of UG Degree related with the major of respective discipline.

	Scheme for Fourth Year Four Year Undergraduate Engineering Degree Programme Semester -VII B.Tech. (Chemical Engineering)												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Programme Core Course –I Mass Transfer -II	7CH300PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Programme Core Course-II Process Dynamics & Control	7CH301PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Program Elective Course –IV System Modeling Plant Design & Process Engineering Novel Separation Processes	 7CH302PE 7CH303PE/ 7CT302PE 7CH304PE	3	0	0	3	3	40	60			100	3 Hrs.
4	Program Elective Course –V Transport Phenomenon Multiphase Flow Principles of Non-Newtonian Fluid Mechanics	 7CH305PE/ 7CT303PE 7CH306PE 7CH307PE	3	0	0	3	3	40	60			100	3 Hrs.
5	Program Elective Course –VI Chemical Reaction Engineering-II Chemical Reactor Analysis & Design Introduction to Statistical Thermodynamics	 7CH308PE/ 7CT304PE 7CH309PE 7CH310PE	3	0	0	3	3	40	60			100	3Hrs.
	Laboratory Courses												
6	Programme Core Course Lab. –I Mass Transfer –II Lab.	7CH311PC	0	2	0	2	1			25	25	50	
7	Programme Core Course Lab. –II Process Dynamics & Control Lab.	7CH312PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
8	Multidisciplinary Minor –VI Advance Methods of Industrial Waste Treatment	7CH313M	2	0	0	2	2	20	30			50	2.00 Hrs.
9	Multidisciplinary Minor-VI Lab. –II Advance Methods of Industrial Waste Treatment Lab.	7CH314M	0	2	0	2	1			25	25	50	.

	Project												
10	Project (Phase-I)	7CH402EL	0	4	0	4	2			50	50	100	
	TOTAL		17	10	0	27	**22**					**800**	

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Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

***Please refer to the list of Multidisciplinary Minor courses attached separately.**

Programme Elective Course IV (VII Semester)	**1) System Modeling (7CH302PE)**	**2) Plant Design & Process Engineering (7CH303PE)**	**3 Novel Separation Processes (7CH304PE)**
Programme Elective Course V (VII Semester)	**1) Transport Phenomenon (7CH305PE)**	**2) Multiphase Flow (7CH306PE)**	**3) Principles of non-Newtonian Fluid Mechanics (7CH307PE)**
Programme Elective Course VI (VII Semester)	**1) Chemical Reaction Engineering - II (7CH308PE)**	**2) Chemical Reactor Analysis & Design (7CH309PE)**	**3) Introduction to Statistical Thermodynamics (7CH310PE)**

*For Multidisciplinary Minor course the committee of BoS may decide Theory and /Or Practical to be assigned to a specific multidisciplinary minor course within the limit of 2 Credits per course (for instance, Theory: 2 Credits or Theory: 1 Credit and Practical: 1 Credit or Practical: 2 Credits)

Internship/On job Training:

- In the Eighth semester, every student will have to undergo an internship and/or On Job Training. The Internship would be of 12 credits.
- The total duration of the internship would be for a period equivalent to 12 Calendar weeks.
- The internship may be completed in one or more organizations as described below.
- The internship could be of the following forms: Industrial internship in a company (within India or Abroad) involved in R&D / design / manufacturing (QA/QC/Plant Engineering / Stores and Purchase) / marketing / finance / consultancy / Technical services / Engineering / Projects, etc.
- At the end of the internship, each student will submit a written report based on the work carried out during the Internship.
- The report will be countersigned by the Supervisor from Industry / Institute as the case may be.
- Performance of the student will be assessed based on the written report and a presentation to the Department.
- Feedback will be taken from Industry mentors and this will used while assigning the grades.
- If the students are conducting project work in group then a Project batch should not be more than 4 students in a batch so as to imbibe the research and development acumen in students by paying individual attention to each student by the mentor.

	Scheme for Fourth Year Four Year Undergraduate Engineering Degree Programme Semester -VIII B.Tech. (Chemical Engineering) Level – 6.0												
Sr No.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total**	**ESE Time Hrs)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Research Methodology	8CH403EL	4*			4	4	40	60			100	3 Hrs.
2	Industry Internship	8CH404EL	0	24	0	24	12			100	200	300	--
3	Project (Phase-II)	8CH405EL	0	4	0	4	2			50	50	100	--.
	TOTAL		4	28	0	32	**18**					**500**	

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External
Note: Suitable number of hours per week is allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

***The course on Research Methodology may be completed by the student in Online mode (Swayam, MOOC's, any other platform approved by AICTE OR on the LMS platform offered by the Institute).**

Scheme for Minimum Passing Marks- Four Year Undergraduate Engineering Degree Programme

Semester –I & II [B.Tech. (Chemical Engineering / Chemical Technology)]

SN	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation				Theory (Total)		Practical Evaluation				Practical (Total)		ESE Time (Hours)
								External		Internal				External		Internal				
			L	P	T	Hrs.		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
	Core Courses																			
1	Basic Science Courses (BSC)		3	0	0	3	3	60	18	40	12	100	40							3 Hrs.
2	Engineering Science Courses (ESC)		3	0	0	3	3	60	18	40	12	100	40							3 Hrs.
	Laboratory Courses																			
3	Basic Science Courses (BSC)		0	2	0	2	1							25	10	25	10	50	25	
4	Engineering Science Courses (ESC)		0	2	0	2	1							25	10	25	10	50	25	
	Vocational and Skill Enhancement Courses (VSEC)																			
5	Technical Department Specific		1	2	0	3	2									50	20	50	25	
6	Technical Department Specific		0	4	0	4	2									50	20	50	25	
	Programme Core Course (PCC)																			
7	Programme Core Course		2	0	0	2	2	30	9	20	6	50	20							2 Hrs.
	Ability Enhancement Courses (ACE)																			
8	Professional Communication / Modern Indian Language		1	2	0	3	2							25	10	25	10	50	25	
	Indian Knowledge System (IKS)																			
9	Indian Traditional Knowledge		2	0	0	2	2	30	9	20	6	50	20							2 Hrs.
	Co-curricular course (CC)																			
10	Co-curricular Course		0	4	0	4	2									50	20	50	25	

Scheme for Minimum Passing Marks- Four Year Undergraduate Engineering Degree Programme Semester –III to VIII – [B.Tech. (Chemical Engg. / Chemical Technology)]																				
SN	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation				Theory (Total)		Practical Evaluation				Practical (Total)		ESE Time (Hours)
								External		Internal				External		Internal				
			L	P	T	Hrs.		Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	
	Core Courses																			
1	Programme Core Course		3	0	0	3	3	60	18	40	12	100	40							3 Hrs.
2	Programme Core Course		2	0	0	2	2	60	18	40	12	100	40							3 Hrs.
3	Multidisciplinary Minor		2	0	0	2	2	30	09	20	06	50	20							2 Hrs.
4	Open Elective		3	0	0	3	3	60	18	40	12	100	40							3 Hrs.
5	Open Elective		2	0	0	2	2	30	09	20	06	50	20							2 Hrs.
6	Research Methodology		4	0	0	4	4	60	18	40	12	100	40							3 Hrs.
	Laboratory Courses																			
7	Programme Core Course		0	2	0	2	1							25	10	25	10	50	25	
8	Community Engg. Project / Field Project		0	4	0	4	2							25	10	25	10	50	25	
9	Multidisciplinary Minor		0	2	0	2	1							25	10	25	10	50	25	
	Vocational and Skill Enhancement Courses (VSEC)																			
10	Course		1	2	0	3	2									50	20	50	25	
	HSSMC (Entrepreneurship/ Economics/ Management Course)																			
11	Course		2	0	0	2	2	30	09	20	06	50	20							2 Hrs.
	Value Education Course (VEC)																			
12	Course		2	0	0	2	2	30	09	20	06	50	20							2 Hrs.
	Programme Elective Course																			
13	Course		3	0	0	3	3	60	18	40	12	100	40							3 Hrs.
	Project																			
14	Minor Project		1	2	0	3	2									50	20	50	25	
15	Industry Internship		0	24	0	24	12							200	80	100	40	300	150	
16	Project (Phase I & II)		0	4	0	4	2							50	20	50	20	100	50	

Multidisciplinary Minor
Offered by
(Chemical Engineering Department)
Multidisciplinary Minor– in Chemical Engineering

Sem.	Credits	Multidisciplinary Minor	Chemical Engineering
III	2	Multidisciplinary Minor –I (3CH205M)	Environmental Pollution: Policies and Regulations
IV	2	Multidisciplinary Minor –II (4CH214M)	Chemical Engineering in Air Pollution and Control
V	2	Multidisciplinary Minor –III (5CH229M)	Chemical Engineering in Liquid Waste Management
V	2	Multidisciplinary Minor –IV (5CH230M)	Chemical Engineering in Solid Waste Management
V	1	Multidisciplinary Minor –III Lab. (5CH231M)	Chemical Engineering in Liquid Waste Management Lab.
VI	2	Multidisciplinary Minor –V (6CH245M)	Environmental Impact & Risk Assessment
VII	2	Multidisciplinary Minor –VI (7CH313M)	Advance Methods of Industrial Waste Treatment
VII	1	Multidisciplinary Minor –VI Lab. (7CH314M)	Advance Methods of Industrial Waste Treatment Lab.
Total	**14**		

The students from other branches than Chemical Engineering can offer this MDM in IIIrd Semester and will have to follow the path vertically in the subsequent semesters. Completion of 14credits **is required to fulfill the requirements for the Multidisciplinary Minor degree.**

Open Elective Course

Open Elective I (III Semester)	Open Elective II (IV Semester)	Open Elective III (V Semester)
De Carbonization Technologies (3CH206OE1) Renewable Solar Energy Engineering (3CH206OE2)	Water Treatment Technologies (4CH216OE1) Renewable Wind Energy Engineering (4CH216OE2)	Risk & Safety Management (5CH232OE1) Renewable Biomass Energy Engineering (5CH232OE2)

Double Minors (Multidisciplinary and Specialization Minors)

Specialization (Chemical Engineering) Minor Courses

[B.Tech. Chemical Engineering with Major Chemical Eng. with Double Minors (Multidisciplinary and Specialization Minors)]

Double Minor- Basket

Sem	Credits	DH- I Chemical Process Safety	Sem	Credits	DH- III Petrochemical Technology
III	4	Industrial Hygiene and Occupational Health (3CH260DH1)	III	4	Petroleum Exploration and Recovery Techniques (3CH260DH3)
IV	4	Fire Safety and Explosion Control (4CH261DH1)	IV	4	Natural Gas Engineering (4CH261DH3)
V	4	EHS Management and Control (5CH262DH1)	V	4	Petroleum Primary Processing Technology (5CH262DH3)
VI	4	Chemical and Process Safety Management (6CH263DH1)	VI	4	Petrochemical analysis and testing (6CH263DH3)
VII	2	Minor Project in Chemical Process Safety (7CH409DH1)	VII	2	Minor Project in Petrochemical Technology (7CH409DH3)
Total	**18**		**Total**	**18**	

Sem	Credits	DH- II Biofuels Technology	Sem	Credits	DH- IV Polymer Technology
III	4	Biofuels- Types and Applications (3CH260DH2)	III	4	Polymer Science & Technology (3CH260DH4)
IV	4	Biogas- Production Process Engineering (4CH261D2)	IV	4	Thermoplastics Polymer Technology (4CH261DH4)
V	4	Biodiesel- Production Process Engineering (5CH262DH2)	V	4	Thermoset Polymer Technology (5CH262DH4)
VI	4	Hydrogen- Production Process Engineering (6CH263DH2)	VI	4	Compounding & processing of polymers (6CH263DH4)
VII	2	Minor Project in Biofuels Technology (7CH409DH2)	VII	2	Minor Project in Polymer Technology (7CH409DH4)
Total	**18**		**Total**	**18**	

Honors with Research and Multidisciplinary Minor
in Chemical Engineering
Research Courses
(B. Tech Chemical Engineering - Honors with Research and Multidisciplinary Minor)

Sem	Credits	Course Code	Name of Course
VII	**8**	7CH410HR	Research Project – I Initiation Phase 1. Topic finalization & guide allocation 2. Literature survey & problem identification 3. Objective setting & methodology planning 4. Project proposal preparation & presentation 5. Initial experimentation/design trials 6. Mid-term progress report submission 7. Interim review presentation 8. End-semester report submission & evaluation
VIII	**10**	7CH411HR	Research Project – I Execution & Completion Phase 1. Continuation of experimental work/data collection 2. Analysis, validation, and interpretation of results 3. Prototype/sample development (if applicable) 4. Preparation of full project report 5. Drafting & submission of research paper to Scopus/peer-reviewed journal 6. Pre-final internal review 7. Final viva-voce & presentation 8. Submission of final report and supporting documents

Final-year **Chemical Engineering** students may opt to undertake a **Research Project** carrying **18 credits** during the **7th and 8th semesters.** The research project shall be conducted **over two consecutive semesters** (Semester VII and Semester VIII), under the guidance of a faculty supervisor. The project work must include:

1. A **comprehensive dissertation/Experimentation.**
2. **Periodic progress evaluations**, and
3. A **final viva-voce examination** conducted by an internal and/or external review panel.

The topic selected should align with the current academic and research priorities in the field of **Chemical Engineering**, and must comply with the **academic and ethical standards** set by the institute or affiliating university. Successful completion of the research project, including all evaluations and submission of the final dissertation, is **mandatory** for the award of project credits and degree.

Programme Elective Course Basket

Programme Elective I (V Semester)	**Programme Elective II (VI Semester)**	**Programme Elective III (VI Semester)**	**Programme Elective IV (VII Semester)**	**Programme Elective V (VII Semester)**	**Programme Elective VI (VII Semester)**
Inorganic Chemical Technology 5CH223PE	Organic Chemical Technology 6CH236PE	Process Equipment Design & Drawing 6CH239PE	System Modeling 7CH302PE	Transport Phenomenon 7CH305PE	Chemical Reaction Engineering-II 7CH308PE
Biochemical Engineering 5CH224PE	Fuel Cells and Hydrogen Energy 6CH237PE	Thermodynamics of Phase & Chemical Equilibrium 6CH240PE	Plant Design & Process Engineering 7CH303PE	Multiphase Flow 7CH306PE	Chemical Reactor Analysis & Design 7CH309PE
Material Science & Engineering 5CH225PE	Food Science and Engineering 6CH238PE	Renewable Energy Sources 6CH241PE	Novel Separation Processes 7CH304PE	Principles of non-Newtonian Fluid Mechanics 7CH307PE	Introduction to Statistical Thermodynamics 7CH310PE