DEPARTMENT OF TECHNOLOGY
SHIVAJI UNIVERSITY, KOLHAPUR

STRUCTURE
For
FIRST YEAR
To
FINAL YEAR B. TECH.
CHEMICAL ENGINEERING

TO BE EFFECTIVE FROM
ACADEMIC YEAR 2020-21

DEPARMENT OF TECHNOLOGY
SHIVAJI UNIVERSITY, KOLHAPUR
FIRST YEAR B.TECH
Scheme of Teaching and Examination

Semester – I (Group-A)

Course Code	Sr. No.	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
							Theory			Practical/Tutorial		
			L	T	P	Credits	Scheme	Max. Marks	Min. Passing $	Scheme	Max. Marks	Min. Passing $
BS-11A1	1.	Engineering Mathematics–I	4	1	-	05	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-11A2	2.	Engineering Physics	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11A1	3.	Basics of Mechanical Engineering	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11A2	4.	Engineering Mechanics	4	-	-	04	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11A3	5.	Basic Electronics Engineering	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-11A3	6.	Lab. –I Engineering Physics	-	-	2	01	---	---	---	IPE	50	20
ES-11A4	7.	Lab.–II Basics of Mechanical Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-11A5	8.	Lab.–III Engineering Mechanics	-	-	2	01	---	---	---	IPE	50	20
ES-11A6	9.	Lab.–IV Basic Electronics Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-11A7	10.	Lab.–V Computer Programming	1	-	2	02	---	---	---	IPE	50	20
ES-11A8	11.	Lab.–VI Workshop Practice	-	-	2	01	---	---	---	IPE	50	20
		Total	**18**	**1**	**12**	**25**		**500**			**300**	

Total Credits: 25
Total Contact Hours/Week: 31 hrs

Note:
$: In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Tutorials and practical shall be conducted in batches with batch strength not exceeding 15 students.
CIE – Continuous Internal Evaluation
SEE – Semester End Examination
IPE – Internal Practical Evaluation
* Semester End Examination duration will be 4 hrs

DEPARMENT OF TECHNOLOGY
SHIVAJI UNIVERSITY, KOLHAPUR
FIRST YEAR B.TECH
Scheme of Teaching and Examination

Semester – II (Group-A)

Course Code	Sr. No.	Course Title	Teaching Scheme with Credits (Hours / Week))				Examination Scheme (Marks)					
							Theory			Practical/Tutorial		
			L	T	P	Credits	Scheme	Max. Marks	Min. Passing $	Scheme	Max. Marks	Min. Passing $
BS-12A1	1.	Engineering Mathematics–II	4	1	-	05	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-12A2	2.	Engineering Chemistry	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12A1	3.*	Engineering Graphics	4	-		04	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12A2	4.	Basic Civil Engineering	3	-		03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12A3	5.	Basic Electrical Engineering	3	-		03	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-12A3	6.	Lab.–I Engineering Chemistry	-	-	2	01	---	---	---	IPE	50	20
ES-12A4	7.	Lab.–II Engineering Graphics	-	-	2	01	---	---	---	IPE	50	20
ES-12A5	8.	Lab.–III Basic Civil Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-12A6	9.	Lab. –IV Basic Electrical Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-12A7	10.	Lab. –V Programming with Scilab and Matlab	-	1	-	01	---	---	---	IPE	50	20
HS-12A1	11.	Lab.–VI Professional Communication	2	-	-	02	---	---	---	IPE	50	20
		Total	**19**	**2**	**8**	**25**		**500**			**300**	

Total Credits: 25
Total Contact Hours/Week: 29 hrs

Note:
$: In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Tutorials and practical shall be conducted in batches with batch strength not exceeding 15 students.
CIE – Continuous Internal Evaluation
SEE – Semester End Examination
IPE – Internal Practical Evaluation
* Semester End Examination duration will be 4 hrs

DEPARMENT OF TECHNOLOGY
SHIVAJI UNIVERSITY, KOLHAPUR
FIRST YEAR B.TECH
Scheme of Teaching and Examination

Semester – I (Group-B)

Course Code	Sr. No.	Course Title	Teaching Scheme with Credits (Hours / Week))				Examination Scheme (Marks)					
							Theory			Practical/Tutorial		
			L	T	P	Credits	Scheme	Max. Marks	Min. Passing $	Scheme	Max. Marks	Min. Passing $
BS-11B1	1.	Engineering Mathematics–I	4	1	-	05	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-11B2	2.	Engineering Chemistry	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11B1	3.*	Engineering Graphics	4	-		04	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11B2	4.	Basic Civil Engineering	3	-		03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-11B3	5.	Basic Electrical Engineering	3	-		03	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-11B3	6.	Lab.–I Engineering Chemistry	-	-	2	01	---	---	---	IPE	50	20
ES-11B4	7.	Lab.–II Engineering Graphics	-	-	2	01	---	---	---	IPE	50	20
ES-11B5	8.	Lab.–III Basic Civil Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-11B6	9.	Lab. –IV Basic Electrical Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-11B7	10.	Lab. –V Programming with Scilab and Matlab	-	1	-	01	---	---	---	IPE	50	20
HS-11B1	11.	Lab.–VI Professional Communication	2	-	-	02	---	---	---	IPE	50	20
		Total	**19**	**2**	**8**	**25**		**500**			**300**	

Total Credits: 25
Total Contact Hours/Week: 29 hrs

Note:
$: In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Tutorials and practical shall be conducted in batches with batch strength not exceeding 15 students.
CIE – Continuous Internal Evaluation
SEE – Semester End Examination
IPE – Internal Practical Evaluation
* Semester End Examination duration will be 4 hrs

DEPARMENT OF TECHNOLOGY
SHIVAJI UNIVERSITY, KOLHAPUR
FIRST YEAR B.TECH
Scheme of Teaching and Examination

Semester – II (Group-B)

Course Code	Sr. No.	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
							Theory			Practical/Tutorial		
			L	T	P	Credits	Scheme	Max. Marks	Min. Passing $	Scheme	Max. Marks	Min. Passing $
BS-12B1	1.	Engineering Mathematics–II	4	1	-	05	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-12B2	2.	Engineering Physics	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12B1	3.	Basics of Mechanical Engineering	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12B2	4.	Engineering Mechanics	4	-	-	04	CIE	30	40	---	---	---
							SEE	70		---	---	---
ES-12B3	5.	Basic Electronics Engineering	3	-	-	03	CIE	30	40	---	---	---
							SEE	70		---	---	---
BS-12B3	6.	Lab. –I Engineering Physics	-	-	2	01	---	---	---	IPE	50	20
ES-12B4	7.	Lab.–II Basics of Mechanical Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-12B5	8.	Lab.–III Engineering Mechanics	-	-	2	01	---	---	---	IPE	50	20
ES-12B6	9.	Lab.–IV Basic Electronics Engineering	-	-	2	01	---	---	---	IPE	50	20
ES-12B7	10.	Lab.–V Computer Programming	1	-	2	02	---	---	---	IPE	50	20
ES-12B8	11.	Lab.–VI Workshop Practice	-	-	2	01	---	---	---	IPE	50	20
		Total	**18**	**1**	**12**	**25**		**500**			**300**	

Total Credits: 25
Total Contact Hours/Week: 31 hrs

Note:
$: In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Tutorials and practical shall be conducted in batches with batch strength not exceeding 15 students.
CIE – Continuous Internal Evaluation
SEE – Semester End Examination
IPE – Internal Practical Evaluation
* Semester End Examination duration will be 4 h

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
SECOND YEAR B.TECH
Scheme of Teaching and Evaluation: Semester- III (Chemical Engineering)
To be implemented from Academic Year 2021- 22

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Evaluation Scheme (Marks)					
						Theory			Practical		
		L	T	P	Total Credits	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
CH211	Chemistry-I	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH212	Chemical Engineering Thermodynamics-I	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH213	Engineering Mathematics-III	03	01	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH214	Fluid Flow Operations	04	01	-	05	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH215	Material Science and Technology	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH216	Computer Programming for Chemical Engineers	02	-	-	02	-	-	-	-	-	-
CH211L	Chemistry-I Laboratory	-	-	02	01	-	-	-	IOE	50	20
									EPE	50	20
CH214L	Fluid Flow Operations Laboratory	-	-	02	01	-	-	-	IOE	50	20
									EPE	50	20
CH216L	Computer Programming for Chemical Engineers Laboratory	-	-	02	01	-	-	-	IPE	50	20
CH217L	Analytical Chemistry Laboratory	-	-	02	01	-	-	-	IOE	50	20
	Total	**19**	**02**	**08**	**25**	-	**500**	-	-	**300**	-
HS211	Environmental Studies	**02**	-	-	-	Project*	30	40	-	-	-
						Theory*	70				
Audit Course I											
HS212	Soft Skills Development	**02**	-	-	-	Institute Level	-	-	-	-	-

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Total contact hours per week: **29+2+2=33 and Total Credits=25**
***** indicates Environmental Studies project evaluation and the theory Evaluation will be at the end the year i.e. along with Semester IV End Examination.

Note: Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students.

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
IPE: Internal Practical Evaluation
EPE: External Practical Evaluation
IOE: Internal Oral Evaluation
EOE: External Oral Evaluation

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
SECOND YEAR B.TECH
Scheme of Teaching: Semester- III (Chemical Engineering)
To be implemented from Academic Year 2021- 22

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	T	P	Total Credits
CH211	Chemistry-I	04	-	-	04
CH212	Chemical Engineering Thermodynamics-I	03	-	-	03
CH213	Engineering Mathematics-III	03		-	03
CH214	Fluid Flow Operations	04	01	-	05
CH215	Material Science and Technology	03	-	-	03
CH216	Computer Programming for Chemical Engineers	02	-	-	02
CH211L	Chemistry-I Laboratory	-	-	02	01
CH213	Engineering Mathematics-III	-	01	-	01
CH214L	Fluid Flow Operations Laboratory	-	-	02	01
CH216L	Computer Programming for Chemical Engineers Laboratory	-	-	02	01
CH217L	Analytical Chemistry Laboratory	-	-	02	01
	Total	**19**	**02**	**08**	**25**
HS211	Environmental Studies	**02**	**-**	**-**	**Nil**
HS212	Soft Skills Development (Institute level audit course)	**02**	**-**	**-**	**Nil**

Total contact hours per week: **29+2+2=33 and Total Credits=25**
***** indicates Environmental Studies project evaluation and the theory Evaluation will be at the end the year i.e. along with Semester IV End Examination.

Note: Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students.

CIE: Continuous Internal Evaluation SEE: Semester End Examination
IPE: Internal Practical Evaluation EPE: External Practical Evaluation IOE: Internal Oral Evaluation EOE: External Oral Evaluation

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
SECOND YEAR B.TECH
Scheme of Teaching and Evaluation: Semester- IV (Chemical Engineering)
To be implemented from Academic Year 2021- 22

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Evaluation Scheme (Marks)					
						Theory			Practical		
		L	T	P	Total Credits	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
CH221	Chemistry-II	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH222	Chemical Engineering Thermodynamics-II	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH223	Chemical Process Calculations	03	01	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH224	Heat Transfer Operations	04	01	-	05	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH225	Mechanical Operations	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH221L	Chemistry-II Laboratory	-	-	02	01	-	-	-	EPE	50	20
CH224L	Heat Transfer Operations Laboratory	-	-	02	01	-	-	-	IOE	50	20
									EPE	50	20
CH225L	Mechanical Operations Laboratory	-	-	02	01	-	-	-	EOE	50	20
CH226L	Applied Electrical & Electronics Laboratory	02	-	02	03	-	-	-	IOE	50	20
CH227L	Mini Project	-	01	-	01	-	-	-	IOE	50	20
	Total	**18**	**03**	**08**	**25**	-	**500**	-	-	**300**	-

HS221	Environmental Studies	**02**	-	-	-	Project	30	40	-	-	-
						Theory	70				

Audit Course II											
HS222	Introduction to Performing Arts	**02**	-	-	-	Institute Level	-	-	-	-	-

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

Total contact hours per week: **29+2+2=33 and Total Credits=25**

Note: Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
IPE: Internal Practical Evaluation
EPE: External Practical Evaluation
IOE: Internal Oral Evaluation
EOE: External Oral Evaluation

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
SECOND YEAR B.TECH

Scheme of Teaching and Evaluation: Semester- IV (Chemical Engineering)
To be implemented from Academic Year 2021- 22

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	**T**	**P**	**Total Credits**
CH221	Chemistry-II	03	-	-	03
CH222	Chemical Engineering Thermodynamics-II	03	-	-	03
CH223	Chemical Process Calculations	03	01	-	04
CH224	Heat Transfer Operations	04	01	-	05
CH225	Mechanical Operations	03	-	-	03
CH221L	Chemistry-II Laboratory	-	-	02	01
CH224L	Heat Transfer Operations Laboratory	-	-	02	01
CH225L	Mechanical Operations Laboratory	-	-	02	01
CH226L	Applied Electrical & Electronics Laboratory	02	-	02	03
CH227L	Mini Project	-	01	-	01
	Total	**18**	**03**	**08**	**25**
HS221	Environmental Studies	**02**	-	-	Nil
HS222	Introduction to Performing Arts (Institute level audit course)	**02**	-	-	Nil

Total contact hours per week: **29+2+2=33 and Total Credits=25**

Note: Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students

CIE: Continuous Internal Evaluation
IPE: Internal Practical Evaluation
IOE: Internal Oral Evaluation
SEE: Semester End Examination
EPE: External Practical Evaluation
EOE: External Oral Evaluation

Equivalence of Second Year B.Tech (Chemical Engineering) Semester III and IV

The above syllabus structure is a revised version of the Second Year B.Tech (Chemical Technology) Program being conducted by Shivaji University at its Technology Department. This syllabus is to be implemented from June 2021, (Academic year 2021-22).

The Equivalence for the Courses/courses of Chemical Technology at Second Year B Tech Semester III and IV pre-revised Program under the faculty of Engineering and Technology is as follows. One major change is in the name of the Program as B.Tech (Chemical Engineering) at the place of B.Tech (Chemical Technology).

Second Year B.Tech Semester III (Chemical Engineering)

Sr.No	Second Year B.Tech (Chemical Technology) Semester III Pre-revised syllabus	Second Year B.Tech (Chemical Engineering) Semester III Revised syllabus	Remark
1.	Chemistry-I	Chemistry-I	Contents will be revised
2.	Engineering Mathematics-III	Engineering Mathematics-III	Contents will be revised
3.	Material Science & Technology	Material Science & Technology	Contents will be revised
4.	Fluid Flow Operations	Fluid Flow Operations	Contents will be revised
5.	Computer Programming for Chemical Engineers	Computer Programming for Chemical Engineers	Contents will be revised
6.	Chemistry- I Laboratory	Chemistry- I Laboratory	Contents will be revised
7.	Analytical Chemistry Laboratory	Analytical Chemistry Laboratory	Contents will be revised
8.	Fluid Flow Operations Laboratory	Fluid Flow Operations Laboratory	Contents will be revised
9.	Computer Programming for Chemical Engineers Laboratory	Computer Programming for Chemical Engineers Laboratory	Contents will be revised
10.	Environmental Studies	Environmental Studies	Contents will be revised
11.	Soft Skills Development	Soft Skills Development	Contents will be revised
12.	Chemical Engineering Thermodynamics-I	Chemical Engineering Thermodynamics-I	Contents will be revised

Second Year B.Tech Semester IV (Chemical Engineering)

Sr.No	Second Year B.Tech (Chemical Technology) Semester IV Pre-revised syllabus	Second Year B.Tech (Chemical Engineering) Semester IV Revised syllabus	Remark
1.	Chemistry-II	Chemistry-II	Contents will be revised
2.	Chemical Engineering Thermodynamics-II	Chemical Engineering Thermodynamics-II	Contents will be revised
3.	Chemical Process Calculations	Chemical Process Calculations	Contents will be revised
4.	Heat Transfer Operations	Heat Transfer Operations	Contents will be revised
5.	Chemistry-II Laboratory	Chemistry-II Laboratory	Contents will be revised
6.	Heat Transfer Operations Laboratory	Heat Transfer Operations Laboratory	Contents will be revised
7.	Introduction to Performing Arts	Introduction to Performing Arts	Contents will be revised
8.	Mechanical Operations	Mechanical Operations	Contents will be revised
9.	Mechanical Operations Laboratory	Mechanical Operations Laboratory	
10.	Applied Electrical & Electronics Laboratory	Applied Electrical & Electronics Laboratory	Contents will be revised
11.	-	Mini Project	Newly introduced

Audit courses have been assigned no any credits. The students will be evaluated for these courses by the concerned course in charge. There will be grade conferred to the student. The grade will be based on conversion of marks obtained out of 50. Obtaining passing grade in these audit courses is an essential condition.

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
THIRD YEAR B.TECH
Scheme of Teaching and Examination: Semester- V (Chemical Engineering)
To be implemented from Academic Year 2022- 23

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credits	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
CH311	Thermal Engineering and Plant Utilities	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH312	Chemical Reaction Engineering-I	03	01	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH313	Inorganic Chemical Technologies	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH314	Safety in Chemical Industry	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH315	Mass Transfer Operations-I	04	01	-	05	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH312L	Chemical Reaction Engineering-I Laboratory	-	-	02	01	-	-	-	IPE	50	20
CH315L	Mass Transfer Operations-I Laboratory	-	-	02	01	-	-	-	IOE	50	20
									EPE	50	20
CH316L	Case studies and seminar	-	01	-	01	-	-	-	IOE	50	20
HS317L	Industrial Safety and Hazard Management	-	01		01	-	-	-	IOE	50	20
CH318I	Internship I	-	-	-	01	-	-	-	EOE	50	20
	Total	**18**	**04**	**04**	**25**	-	**500**	-	-	**300**	-

Audit Course III											
LS311	Introduction to Foreign Language	**02**	-	-	-	Institute Level	-	-	-	-	-

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

Total contact hours per week: **26+2=28 and Total Credits=25**

CIE: Continuous Internal Evaluation SEE: Semester End Examination IPE: Internal Practical Evaluation
EPE: External Practical Examination IOE: Internal Oral Evaluation EOE: External Oral Examination

Note: **1.** Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students.

2. Under the title of 'Case studies and seminar', every individual student has to select a technical and field relevant case study for seminar and he or she has to deliver the same in the class. This particular activity is equivalent to one Credit and it carries 50 marks as an Internal Oral

Evaluation (IOE) which is included in Semester V. The students, besides the seminar delivery, have to submit a brief report (in specified format) on the chosen seminar topic.

3. Internship I, an activity performed after Semester IV will be evaluated as the part of Semester V. It is mandatory for all the students to submit to the institute, the Internship Report duly certified by the concerned organization.

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
THIRD YEAR B.TECH
Scheme of Teaching with Credits: Semester- V (Chemical Engineering)
To be implemented from Academic Year 2022- 23

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	**T**	**P**	**Credits**
CH311	Thermal Engineering and Plant Utilities	04	-	-	04
CH312	Chemical Reaction Engineering-I	03	01	-	04
CH313	Inorganic Chemical Technologies	04	-	-	04
CH314	Safety in Chemical Industry	03	-	-	03
CH315	Mass Transfer Operations-I	04	01	-	05
CH312L	Chemical Reaction Engineering-I Laboratory	-	-	02	01
CH315L	Mass Transfer Operations-I Laboratory	-	-	02	01
CH316L	Case studies and seminar	-	01	-	01
HS317L	Industrial Safety and Hazard Management	-	01		01
CH318I	Internship I	-	-	-	01
	Total	**18**	**04**	**04**	**25**

Audit Course III

LS311	Introduction to Foreign Language	**02**	**-**	-	Nil

Total contact hours per week: **26+2=28 and Total Credits=25**

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
THIRD YEAR B.TECH

Scheme of Teaching and Examination: Semester- VI (Chemical Engineering)
To be implemented from Academic Year 2022- 23

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credits	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
CH321	Chemical Reaction Engineering-II	04	01	-	05	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH322	Industrial Pollution Control	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH323	Mass Transfer Operations-II	03	01	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH324	Organic Chemical Technologies	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH325	Process Instrumentation and Control	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH321L	Chemical Reaction Engineering-II Laboratory	-	-	02	01	-	-	-	EPE	50	20
CH323L	Mass Transfer Operations-II Laboratory	-	-	02	01	-	-	-	EPE	50	20
CH324L	Organic Chemical technologies Laboratory	-	-	02	01	-	-	-	IPE	50	20
CH325L	Process Instrumentation and Control Laboratory	-	-	02	01	-	-	-	IOE	50	20
CH326L	Micro Project	-	01	-	01	-	-	-	EOE	50	20
CH327	Industrial Visits	-	-	-	01	-	-	-	IOE	50	20
	Total	**17**	**03**	**08**	**25**	-	**500**	-	-	**300**	-

Audit Course IV											
RM321	Research Methodology	**02**	-	-	-	-	-	-	-	-	-

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

Total contact hours per week: **28+2=30 and Total Credits=25**

CIE: Continuous Internal Evaluation SEE: Semester End Examination IPE: Internal Practical Evaluation
EPE: External Practical Examination IOE: Internal Oral Evaluation EOE: External Oral Examination

Note: **1.** Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students

2. Mini project work carried out by a group of students (Preferably maximum 4 students in a group) throughout the semester will be evaluated as an EOE by an external examiner/s. Mini Project report submission and oral presentation by the group is mandatory. The work throughout the semester will be under the supervision of internal teachers with one tutorial per week.

3. There will be at least two industrial visits to reputed chemical industry (1-2 days) in the sixth week of the semester VI. The students will submit a report of the visits. This particular activity is equivalent to one Credit and it carries 50 marks as an Internal Oral Evaluation (IOE) which is included in Semester VI. For submission of the visit report, the students will follow one specific format.

3. Internship II which is part of Semester VII evaluation will be the activity after the SEE of semester VI. It is mandatory for all the students to undergo the same and report to the institute for the semester VII along with the completion certificate by the concerned organization. The students have to submit a hard as well as soft copy of the activity report to the institute

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
THIRD YEAR B.TECH

Scheme of Teaching with Credits: Semester- VI (Chemical Engineering)

To be implemented from Academic Year 2022- 23

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	**T**	**P**	**Credits**
CH321	Chemical Reaction Engineering-II	04	01	-	05
CH322	Industrial Pollution Control	03	-	-	03
CH323	Mass Transfer Operations-II	03	01	-	04
CH324	Organic Chemical Technologies	03	-	-	03
CH325	Process Instrumentation and Control	04	-	-	04
CH321L	Chemical Reaction Engineering-II Laboratory	-	-	02	01
CH323L	Mass Transfer Operations-II Laboratory	-	-	02	01
CH324L	Organic Chemical technologies Laboratory	-	-	02	01
CH325L	Process Instrumentation and Control Laboratory	-	-	02	01
CH326L	Micro Project	-	01	-	01
CH327	Industrial Visits	-	-	-	01
	Total	**17**	**03**	**08**	**25**

Audit Course IV

RM321	Research Methodology	**02**	-	-	-

Total contact hours per week: **28+2=30 and Total Credits=25**

Equivalence of Third Year B.Tech (Chemical Engineering) Semester V and VI

The above syllabus structure is a revised version of the Third Year B.Tech (Chemical Technology) Program being conducted by Shivaji University at its Technology Department. This syllabus is to be implemented from June 2022, (Academic year 2022-23).

The Equivalence for the subjects/courses of Chemical Technology at Third Year B Tech Semester V and VI pre-revised Program under the faculty of Engineering and Technology is as follows. One major change is in the name of the Program as B.Tech (Chemical Engineering) at the place of B.Tech (Chemical Technology).

Third Year B.Tech Semester V (Chemical Engineering)

Sr. No	Third Year B.Tech(Chemical Technology) Semester V Pre-revised syllabus	Third Year B.Tech (Chemical Engineering) Semester V Revised syllabus	Remark
13.	Thermal Engineering and Plant Utilities	Thermal Engineering and Plant Utilities	Contents will be revised
14.	Inorganic Chemical Technologies	Inorganic Chemical Technologies	Contents will be revised
15.	Safety in Chemical Industry	Safety in Chemical Industry	Contents will be revised
16.	Mass Transfer Operations-I	Mass Transfer Operations-I	Contents will be revised
17.	Mass Transfer Operations-I Laboratory	Mass Transfer Operations-I Laboratory	Contents will be revised
18.	Case Studies and Seminar	Case Studies and Seminar	Contents will be revised
19.	Chemical Reaction Engineering-I	Chemical Reaction Engineering-I	Contents will be revised
20.	Chemical Reaction Engineering-I Laboratory	Chemical Reaction Engineering-I Laboratory	
21.	Industrial Safety and Hazard Management (Laboratory)	Industrial Safety and Hazard Management (Tutorial)	Contents will be revised
22.	Internship I	Internship I	Contents will be revised

Third Year B.Tech Semester VI (Chemical Engineering)

Sr. No	Third Year B Tech(Chemical Technology) Semester VI Pre-revised syllabus	Third Year B.Tech (Chemical Engineering) Semester VI Revised syllabus	Remark
12.	Chemical Reaction Engineering-II	Chemical Reaction Engineering-II	Contents will be revised
13.	Organic Chemical Technologies	Organic Chemical Technologies	Contents will be revised
14.	Industrial Pollution Control	Industrial Pollution Control	Contents will be revised
15.	Mass Transfer Operations-II	Mass Transfer Operations-II	Contents will be revised
16.	Chemical Reaction Engineering-II Laboratory	Chemical Reaction Engineering-II Laboratory	Contents will be revised
17.	Organic Chemical technologies Laboratory	Organic Chemical technologies Laboratory	Contents will be revised
18.	Mass Transfer Operations-II Laboratory	Mass Transfer Operations-II Laboratory	Contents will be revised
19.	Mini Project	Micro Project	Title is changed and contents will be revised
20.	Industrial Visit	Industrial Visit	Contents will be revised
21.	Process Instrumentation and Control	Process Instrumentation and Control	Contents will be revised
22.	Process Instrumentation and Control Laboratory	Process Instrumentation and Control Laboratory	

Audit courses have been assigned no any credits. The students will be evaluated for these courses by the concerned course in charge. There will be grade conferred to the student. The grade will be based on conversion of marks obtained out of 50. Obtaining passing grade is essential condition.

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
FINAL YEAR B.TECH
Scheme of Teaching and Examination: Semester- VII (Chemical Engineering)
To be implemented from Academic Year 2023-24

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Total Credits	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
CH411	Biochemical Engineering	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH412	Elective-I	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH413	Process Equipment Design	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH414	Industrial Economics and Management	03	-	-	03	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH415	Process Modeling and Simulation	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH413L	Process Equipment Design Laboratory	-	-	02	01	-	-	-	IPE	50	20
									EPE	50	20
CH415L	Process Modeling and Simulation Laboratory	-	-	02	01				IPE	50	20
CH416T	Comprehensive Tests		01	-	01	-	-	-	IPE	50	20
CH417L	Major Project-Phase I	-	-	02	01	-	-	-	IOE	50	20
CH418	Internship II	-	-	-	02	-	-	-	EOE	50	20
	Total	**19**	**01**	**06**	**25**	-	**500**	-	-	**300**	-

Audit Course V											
HS411	Introduction to Indian Constitution	**02**	-	-	-	Institute Level	--	---	---	-----	-----

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.
Total contact hours per week: **26+2=28 and Total Credits=25**

CIE: Continuous Internal Evaluation
IPE: Internal Practical Evaluation
IOE: Internal Oral Evaluation
SEE: Semester End Examination
EPE: External Practical Examination
EOE: External Oral Examination

Note: **1.** Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 students.

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
FINAL YEAR B.TECH

Scheme of Teaching with Credits: Semester- VII (Chemical Engineering)
To be implemented from Academic Year 2023-24

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	T	P	Credits
CH411	Biochemical Engineering	04	-	-	04
CH412	Elective-I	04	-	-	04
CH413	Process Equipment Design	04	-	-	04
CH414	Industrial Economics and Management	03	-	-	03
CH415	Process Modeling and Simulation	04	-	-	04
CH413L	Process Equipment Design Laboratory	-	-	02	01
CH415L	Process Modeling and Simulation Laboratory			02	01
CH416T	Comprehensive Tests		01	-	01
CH417L	Major Project-Phase I	-	-	02	01
CH418	Internship II	-	-	-	02
	Total	**19**	**01**	**06**	**25**

Audit Course V

HS411	Introduction to Indian Constitution	**02**	-		Nil

Total contact hours per week: **26+2=28 and Total Credits=25**

CH412 ELECTIVE-I

Elective –I is a pool of various courses from the Program domain. The list is as below:

CH412.1 Petroleum Refinery Engineering, CH412.2 Advanced Separation Techniques CH412.3 Polymer Chemistry, CH412.4 Introduction to Food Process Engineering, CH412.5 Green Chemistry and Catalysis, CH412.6 Environmental Science and Microbiology, CH412.7 Drugs and Pharmaceutical Technology, CH412.8 Advanced Spectroscopy, CH412.9 Molecular Quantum Mechanics , CH412.10 Statistical Methods in Engineering

Teaching Scheme: L: 4 hours/week **Credits: 4**

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
FINAL YEAR B.TECH

Scheme of Teaching and Examination: Semester- VIII (Chemical Engineering)
To be implemented from Academic Year 2023-24

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Total	Scheme	Max. marks	Min. Passing	Scheme	Max. marks	Min. Passing
CH421	Elective-II (Open Elective)	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH422	Energy Resources and Utilization	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH423	Process Economics and Project Engineering	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH424	Special Chemical Technologies	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH425	Transport Phenomena	04	-	-	04	CIE	30	40	-	-	-
						SEE	70		-	-	-
CH426L	Piping & Instrumentation Design and Drawing	-	-	02	01	-	-	-	IOE	50	20
CH427L	Plant Design and Drawing	-	-	02	01	-	-	-	EPE	50	20
CH428T	Seminar	-	01	-	01				IOE	50	20
CH429L	Major Project-Phase II	-	-	04	02	-	-	-	IPE	50	20
						-	-	-	EPE	100	40
	Total	**20**	**01**	**08**	**25**	-	**500**	-	-	**300**	-

Audit Course VI											
HS421	Professional Ethics	**02**	-	-	-	Institute Level	-	-	-	-	-

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

Total contact hours per week: **29+2=31 and Total Credits=25**

CIE: Continuous Internal Evaluation SEE: Semester End Examination
IPE: Internal Practical Evaluation (Based on Project Work) EOE: External Oral Examination
IOE: Internal Oral Evaluation EPE: External Practical Examination (Based on Project Work)

Note: **1.** Tutorials and Practical to be conducted in batches with batch strength not exceeding 15 Students.

DEPARTMENT OF TECHNOLOGY,
SHIVAJI UNIVERSITY KOLHAPUR
FINAL YEAR B.TECH

Scheme of Teaching with Credits: Semester VIII (Chemical Engineering)
To be implemented from Academic Year 2023-24

Course Code	Course Title	Teaching Scheme with Credits (Hours / Week)			
		L	T	P	Credits
CH421	Elective-II (Open Elective)	04	-	-	04
CH422	Energy Resources and Utilization	04	-	-	04
CH423	Process Economics and Project Engineering	04	-	-	04
CH424	Special Chemical Technologies	04	-	-	04
CH425	Transport Phenomena	04	-	-	04
CH426L	Piping & Instrumentation Design and Drawing	-	-	02	01
CH427L	Plant Design and Drawing	-	-	02	01
CH428T	Seminar	-	01	-	01
CH429L	Major Project-Phase II	-	-	04	02
	Total	**20**	**01**	**08**	**25**

Audit Course VI					
HS421	Professional Ethics	**02**	-	-	-

Total contact hours per week: **29+2=31 and Total Credits=25**

CH421 ELECTIVE-II (OPEN ELECTIVE)

Elective –II is also termed as Open Elective with the motive that besides pool of the Program domain electives, the students are free to choose an elective from any other Program at the institute. The pool is as below:

CH421.1 Petrochemical Technology, CH421.2. Industrial Biotechnology, CH421.3. Polymer Technology, CH421.4 Food Process Technology, CH421.5 Interfacial Science and Engineering, CH421.6 Environmental Chemistry and Biochemistry, CH421.7 Advanced Material , CH421.8 Project Management, CH421.9 CFD Applications in Chemical Processes, CH421.10 Open Elective (to be chosen from any of the specialized UG Program available on the campus)

Teaching Scheme: L: 4 hours/week **Credits: 4**

The interested students have to choose the elective from the above mentioned list of electives. In case of the open elective chosen from the other program, the students have to contact the concerned course teacher and attend the classes in the respective course which will be taught by the concerned teacher.

Equivalence of Final Year B.Tech (Chemical Engineering) Semester VII and VIII

The above syllabus structure is a revised version of the Final Year B.Tech (Chemical Technology) Program being conducted by Shivaji University at its Technology Department. This syllabus is to be implemented from June 2023, (Academic year 2023-24). The Equivalence for the subjects/courses of Chemical Technology at Final Year B Tech Semester VII and VIII pre-revised course under the faculty of Engineering and Technology is as follows. One major change is in the name of the Program as B.Tech (Chemical Engineering) at the place of B.Tech (Chemical Technology).

Final Year B.Tech Semester VII (Chemical Engineering)

Sr. No	Final Year B.Tech(Chemical Technology) Semester VII Pre-revised syllabus	Final Year B.Tech (Chemical Engineering) Semester VII Revised syllabus	Remark
23.	Biochemical Engineering	Biochemical Engineering	Contents will be revised
24.	Elective-I	Elective-I	Contents will be revised
25.	Industrial Economics and Management	Industrial Economics and Management	Contents will be revised
26.	Major Project-Phase I	Major Project-Phase I	Contents will be revised
27.	Internship II	Internship II	Contents will be revised
28.	Process Equipment Design	Process Equipment Design	Contents will be revised
29.	Process Equipment Design Laboratory	Process Equipment Design Laboratory	
30.	Process Modeling and Simulation	Process Modeling and Simulation	Contents will be revised
31.	Process Modeling and Simulation Laboratory	Process Modeling and Simulation Laboratory	
32.	Comprehensive Tests	Comprehensive Tests	Contents will be revised
33.	Audit Course V Introduction to Indian Constitution	Audit Course V Introduction to Indian Constitution	Contents will be revised

Final Year B.Tech Semester VIII (Chemical Engineering)

Sr.No	Final Year B.Tech(Chemical Technology) Semester VIII Pre-revised syllabus	Final Year B.Tech (Chemical Engineering) Semester VIII Revised syllabus	Remark
1.	Energy Resources and Utilization	Energy Resources and Utilization	Contents will be revised
2.	Elective-II (Open Elective)	Elective-II (Open Elective)	Contents will be revised
3.	Special Chemical Technologies	Special Chemical Technologies	Contents will be revised
4.	Transport Phenomena	Transport Phenomena	Contents will be revised
5.	Major Project-Phase II	Major Project-Phase II	Contents will be revised
6.	Process Economics and Project Engineering	Process Economics and Project Engineering	Contents will be revised
7.	Piping & Instrumentation Design and Drawing	Piping & Instrumentation Design and Drawing	Contents will be revised
8.	Plant Design and Drawing	Plant Design and Drawing	Contents will be revised
9.	Seminar	Seminar	Contents will be revised
10.	Audit Course VI Professional Ethics	Audit Course VI Professional Ethics	Contents will be revised

Audit course have been assigned no any credits. The students will be evaluated for these courses by the concerned course in charge. There will be grade conferred to the student. The grade will be based on conversion of marks obtained out of 50. Obtaining passing grade is essential condition.

Program Educational Objectives (PEOs), Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Program Educational Objectives (PEOs):	
PEO1	**Excellence in Career** : To prepare graduates with basic knowledge in chemical engineering and to develop our graduates to supervise chemical industry practices.
PEO2	**Professional Effectiveness:** To prepare and develop the graduates with high order knowledge in design and construction of process plants.
PEO3	**Continuing Education and Exercising Leadership** : To prepare engineering graduates with the highest level of technical competence with creativity, innovation and leadership skills.
PEO4	**Contribution to Society** : To prepare dedicated graduates for the creation of solutions to address challenges faced by the state, the nation and society.
PEO5	**Contribution to healthy and sustainable development:** To prepare graduates with ethical and environmentally responsible engineering professionals.
Program Outcomes (POs)	
PO1	**Domain specific Engineering knowledge** : Attainment of the ability to acquire and apply knowledge of mathematics, physics, chemistry, basic engineering sciences and Chemical Engineering specialization so as to make analysis of complex chemical engineering problems.
PO2	**Problem Analysis ability** : Attainment of the ability to acquire knowledge which will enable them to analyze problems while working in chemical and allied industries as well as consultancies.
PO3	**Acquiring skills to Design/develop solutions to problems** : Acquiring skills in selection, design, erection and control of unit processes and unit operations and to attain ability to understand the past and present trends in manufacturing, production and marketing of chemically derived products.
PO4	**Capacity to investigate complex problems** : Attainment of the ability to identify new research areas in chemical engineering and to 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, also to make efforts to come up with striking innovations in the field.
PO5	**Modern tool usage** : Attainment of the ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools including 'modeling and prediction' to complex engineering activities so as to solve advanced engineering problems.
PO6	**The engineer's connectivity with 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.
PO7	**Environment and sustainability awareness**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Practicing Ethics and Values** : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Ability to work as an Individual and in team :** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Acquiring Communication Skills**: 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.
PO11	**Well verse with task of Project management and finance aspects**: 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.
PO12	**Life-long learning attitude**: 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)	
PSO1	**Professional skills**: Acquiring skills to utilize the knowledge of chemical engineering in innovative, dynamic and challenging environment for design and development of new products, Attainment of ability to acquire skills required to help chemical industry through courses like Process Design , Piping Design and the relevant software training
PSO2	**Practical implementation and testing skills**: Attainment of ability to acquire skills required to help chemical industry. These may be imbibed through courses/workshops on industrial safety & hazard management, hands on training for topics like 'analytical techniques', 'instrumentation' required in chemical and allied industry.
PSO3	**Successful career and entrepreneurship**: Transformation of the students into technocrats who will design and develop systems and subsystems for Chemical allied Technologies and few of these technocrats may become entrepreneurs also.