



**Yogi Divine Society inspired,
Sarvodaya Kelavani Samaj managed,
Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot**

(Autonomous)
Affiliated to Saurashtra University, Rajkot
Re-Accredited at 'A' Level by NAAC
STAR college Scheme & Status by MST-DBT
UGC- College with Potential for Excellence (CPE)
UGC-DDU KAUSHAL Kendra
GAAA – Highest Grade A-1 by KCG, Government of Gujarat
GPCB-Government of Gujarat approved Environment Audit Center
UGC-Autonomous College

DEPARTMENT OF CHEMISTRY

Integrated B.Sc.-M.Sc. CHEMISTRY

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot
(Autonomous)
Affiliated to Saurashtra University, Rajkot

Department of Chemistry

Integrated B.Sc.-M.Sc. CHEMISTRY

OBJECTIVES OF THE PROGRAM

Courses offered in this program are geared towards providing students with an overall understanding of general chemistry so that they can enter the workforce with the necessary knowledge and skills. It will enable students to gain familiarity with the current industry practices and technologies.

The objectives are to:

- Train graduates with the requisite knowledge to pursue M.Sc. &/ Ph.D. degrees in Chemistry.
- Turn out graduates who can teach the subject in secondary and tertiary level of education in the county.
- Train graduates who can be employed in Industry and the other sectors of the economy.

Graduates from the Integrated-degree program will have to demonstrate:

- An understanding of major concepts, theoretical principles and experimental findings in chemistry.
- An ability to work effectively in diverse teams in both classroom and laboratory.
- An ability to employ critical thinking and efficient problem-solving skills in the four basic areas of chemistry (analytical, inorganic, organic, and physical).
- An ability to conduct experiments, analyze data, and interpret results, while observing responsible and ethical scientific conduct.
- Effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner.
- The ability to use classical & modern instrumentation for chemical analysis and separation.
- The ability to use computers for chemical simulation and computation.
- The ability to employ modern library search tools/ databases (e.g. Scifinder, Science direct etc.) to locate, retrieve, and evaluate scientific information.
- A familiarity with and application of safety and chemical hygiene regulations and good laboratory practices.
- An ability to gain entry into professional organizations, or other related job.

SCHEME OF INSTRUCTION AND EXAMINATIONS
For Students Admitted from A.Y. 2016-2017 & Onwards

Semester - I							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART – I							
16ILCEN01	Functional English-I	3	3	40	60	100	3
PART- II							
16ICHCC01	Core-1: Fundamentals of Chemistry-I	5	3	30	70	100	5
16ICHCC02	Core-2: Fundamentals of Chemistry-II	5	3	30	70	100	5
16ICHDA01	Core-3: Physics-I	3	3	30	70	100	3
16ICHCC03	Core Practical-1: Inorganic/Analytical Chemistry Practical	6	3	20	30	50	3
16ICHCC04	Core Practical-2: Organic/Physical Chemistry Practical	4	3	20	30	50	2
16ICHDA02	DSE-Allied Practical-1: Physics-I Practical	2	3	20	30	50	1
		28				550	22
PART –III							
	AECC-1: Environmental Science	1	-	-	-	-	-
	SEC-1: Value Education- I	1	-	Remarks			1
		30					

Semester - II							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART – I							
16ILCEN02	Functional English-II	3	3	40	60	100	3
PART- II							
16ICHCC05	Core-3: Fundamentals of Chemistry-III	5	3	30	70	100	5
16ICHCC06	Core-4: Fundamentals of Chemistry-IV	5	3	30	70	100	5
16ICHDA03	DSE-Allied-2: Physics-II	3	3	30	70	100	3
16ICHCC07	Core Practical- 3: Inorganic/Analytical Chemistry Practical	6	3	20	30	50	3
16ICHCC08	Core Practical-4: Organic/Physical Chemistry Practical	4	3	20	30	50	2
16ICHDA04	DSE-Allied Practical-2: Physics-II Practical	2	3	20	30	50	1
		28				550	22
PART –III							
	AECC-1: Environmental Science	1	-	Remarks			2
	SEC-2: Value Education –II	1	-	Remarks			1
		30					

Semester - III							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART – I							
16ILCEN03	Advanced English Language -I	3	3	40	60	100	3
PART- II							
16ICHCC09	Core -5: Inorganic Chemistry	4	3	30	70	100	4
16ICHCC10	Core -6: Analytical Chemistry	4	3	30	70	100	4
16ICHCC11	Core -7: Petroleum and Petrochemicals	2	2	30	70	100	2
16ICHDA05	DSE-Allied-3: Mathematics-I	3	3	30	70	100	3
16ICHCC12	Core Practical -5: Inorganic Chemistry Practical	5	3	20	30	50	2
16ICHCC13	Core Practical-6: Analytical Chemistry Practical	5	3	20	30	50	2
16ICHCC14	Core Practical-7: Petroleum Analysis Practical	2	3	20	30	50	1
16ICHDA06	DSE- Allied Practical-3: Mathematics-I Practical	2	3	20	30	50	1
		30				700	22

Semester- IV							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART – I							
16ILCEN04	Advanced English Language -II	3	3	40	60	100	3
PART- II							
16ICHCC15	Core -8: Organic Chemistry	4	3	30	70	100	4
16ICHCC16	Core -9: Physical Chemistry	4	3	30	70	100	4
16ICHCC17	Core -10: Agrochemicals	2	2	30	70	100	2
16ICHDA07	DSE- Allied-4: Mathematics-II	3	3	30	70	100	3
16ICHCC18	Core Practical-8: Organic Chemistry Practical	6	3	20	30	50	2
16ICHCC19	Core Practical-9: Physical Chemistry Practical	6	3	20	30	50	2
16ICHDA08	DSE- Allied Practical-4: Mathematics-II Practical	2	3	20	30	50	1
		30				650	21

*Compulsory internship / Training / Project for 4 weeks in summer vacation between 4th & 5th Semester. Report to be submitted in the beginning of 5th semester. Viva voce conducted in the beginning of 5th semester.

Semester- V							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART- II							
16ICHCC20	Core-11: Spectroscopy & Separation Technique-I	4	3	30	70	100	4
16ICHCC21	Core-12: Polymer Chemistry	4	3	30	70	100	4
16ICHCC22	Core-13: Industrial Formulations (Self Study core course)	2	-	50	-	50	4
16ICHCC23	Core 14: Computer Based Test (of core courses from SEM -I st to 5 th SEM)	-	2	100	-	100	1
16ICHCC24	Core 15: Internship / Training / Project	-	-	40*	60*	100	6
16ICHDC01/ 16ICHDC02/ 16ICHDC03	DSE-Core-1: Application of Computer in Chemistry / Green Methods in Chemistry/ Soil Analysis	3	3	30	70	100	3
16ICHCC25	Core Practical-10: Spectroscopy & Separation Technique-1 Practical	6	3	20	30	50	2
16ICHCC26	Core Practical-11: Polymer Chemistry Practical	3	3	20	30	50	1
16ICHDC04/ 16ICHDC05/ 16ICHDC06	DSE-Core Practical-1: Applications of Computer in Chemistry Practical / Green Methods in Chemistry Practical / Soil Analysis Practical	3	2	20	30	50	1
	Generic Elective-1 (from common UG Pool)	2	-	100	-	100	2
-	Group Project/ Review Article/ Instrumental Training	3	-	Evaluation in SEM.-VI			-
		30				800	22+6

*internal evaluation by trainer/advisor-40 Marks

*External evaluation of project report-60 Marks

Semester- VI							
Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hrs.)	Maximum Marks			Credits
				CIE	SEE	Total	
PART- II							
16ICHCC27	Core-16: Spectroscopy & Separation Technique-II	4	3	30	70	100	4
16ICHCC28	Core-17: Heterocyclic Chemistry and Synthetic Drugs	4	3	30	70	100	4
16ICHCC29	Core-18: Chemistry of Natural Products	4	3	30	70	100	4
16ICHCC30	Core-19: Group Project / Review article / Instrumental Training	4	-	40	60	100	2
16ICHDC07/ 16ICHDC08/ 16ICHDC09	DSE-Core-2: Unit Operation & Processes/ Biochemical Analysis / Chemistry of Surface Coating	3	3	30	70	100	3
16ICHCC31	Core Practical-17: Heterocyclic Chemistry and Synthetic Drugs Practical	4	6	20	30	50	2
16ICHCC32	Core Practical-18: Chemistry of Natural Products Practical	2	3	20	30	50	1
16ICHDC10/ 16ICHDC11/ 16ICHDC12	DSE-Core 2-Practical: Unit Operation & Processes Practical / Biochemical Analysis Practical / Chemistry of Surface Coating Practical	3	3	20	30	50	1
Common Code	Generic Elective-2 (From common UG Pool)	2	-	100	-	100	2
		30				750	23
Total Marks : 4000							

Semester-VII							
Subject Code	Course	Hrs. of Instruction	Exam Duration (Hrs)	Max. Marks			Credit
				CIA	SEE	Total	
Part - I							
16ICHCC33	Core 20: Inorganic Chemistry	4	3	30	70	100	4
16ICHCC34	Core 21: Organic Chemistry	4	3	30	70	100	4
16ICHCC35	Core 22: Physical Chemistry	4	3	30	70	100	4
16ICHCC36	Core 23: Analytical Chemistry	4	3	30	70	100	4
16ICHCC37	Core Practical -19: Inorganic, Organic, Physical, Analytical Practical	12	12	80	120	200	6
Part - II							
16ICHCE01	IT Tools for Chemist	1	1	50	-	50	1
		29				650	23
Part - III							
16IVE01	Value Education	1	-	Remarks			1
		30				650	24

Semester-VIII							
Part - I							
16ICHCC38	Core 24: Separation Techniques	4	3	30	70	100	4
16ICHCC39	Core 25: Stereochemistry	4	3	30	70	100	4
16ICHCC40	Core 26: Interpretative molecular spectroscopy (Self Study course)	1	-	30	70	100	4
16ICHCC41	Core 27: Modern Analytical Techniques	4	3	30	70	100	4
Common code	Generic Elective-3 (Choice from a Pool)	2	-	100	-	100	2
16ICHCC42	Core Practical -20: Separation Techniques, Stereochemistry, Modern Analytical Chemistry	12	9	30	70	100	5
Part - II							
16ICHCE02	Scientific Writing (Research)	1	-	50	-	50	1
		30				650	24

* Industrial Training for at least 4 weeks during summer vacation

* After successful completion of Semester -VII & Semester -VIII, option for student to select one of the Sub disciplines viz., Organic Chemistry **OR** Analytical Chemistry in Semester -IX & Semester -X.

Semester-IX (SPECIALIZATION IN ORGANIC CHEMISTRY)							
Part - I							
16ICHOC01	Core 28: Organic Reactions, Rearrangements & Reagents	4	3	30	70	100	4
16ICHOC02	Core 29: Fundamentals of Medicinal Chemistry	4	3	30	70	100	4
16ICHOC03	Core 30: Chemistry of Natural Products	4	3	30	70	100	4
16ICHOC04	Core 31: Computer Based Test	-	-	50	-	50	1
16ICHDC13/ 16ICHDC14	DSE –Core -3: Polymer & Composite Materials OR Industrial Formulations	4	3	30	70	100	4
16ICHOC05	Core Practical -21: Organic Preparations	9	9	60	90	150	3
16ICHDC15/ 16ICHDC16	DSE Core -3 Practical: Polymer & Composite Materials OR Industrial Formulations	2	3	20	30	50	1
-	Dissertation	2	-	Evaluated at the end of Sem-X			-
Part-II							
16ICHCE03	Pilot Plant Operation	1	-	50	-	50	1
		30				700	22

Semester-X (SPECIALIZATION IN ORGANIC CHEMISTRY)

Part - I							
16ICHOC06	Core 32: Chemistry of Synthetic Drugs	5	3	30	70	100	5
16ICHOC07	Core 33: Heterocyclic Chemistry	4	3	30	70	100	4
16ICHOC08	Core 34: Dissertation OR Practical	16	-	60	90	150	10
16ICHDC17/ 16ICHDC18	DSE – Core -4: Organic Synthesis - A Disconnection Approach OR Industrial Unit Operations	4	3	30	70	100	4
Part - II							
16ICHCE04	Instrumental Training	1	-	50	-	50	1
	TOTAL	30				500	24
						2500	96

Semester-IX (SPECIALIZATION IN ANALYTICAL CHEMISTRY)

Part – I							
16ICHAC01	Core 28: Industrial Formulation Development	4	3	30	70	100	4
16ICHAC02	Core 29: Electro Analytical Techniques	4	3	30	70	100	4
16ICHAC03	Core 30: Industrial Analysis	4	3	30	70	100	4
16ICHAC04	Core 31: Computer Based Test	-	-	50	-	50	1
16ICHDC19/ 16ICHDC20	DSE-Core-3: Chemistry of Food Analysis OR Environmental & Green Chemistry	4	3	30	70	100	4
16ICHAC05	Core Practical -22: Analysis of industrial products	10	9	60	90	150	5
16ICHDC21/ 16ICHDC22	DSE- Core-3 Practical: Chemistry of Food Analysis OR Environmental & Green Chemistry	2	3	20	30	50	1
-	Dissertation	1	-	Evaluated at the end of Sem-X			-
Part-II							
16ICHCE03	Pilot Plant Operation	1	-	50	-	50	1
		30				700	24

Semester-X (SPECIALIZATION IN ANALYTICAL CHEMISTRY)

Part – I

16ICHAC06	Core 32: Regulatory Affairs & IPR	5	3	30	70	100	5
16ICHAC07	Core 33: Analytical Method Development, Validation & Stability Studies	4	3	30	70	100	4
16ICHAC08	Core 34: Dissertation OR Practical	16	-	60	90	150	10
16ICHDC23/ 16ICHDC24	DSE - Core -4: Selected Techniques in Analytical Chemistry OR Phytopharmaceutical Analysis	4	3	30	70	100	4

Part - II

16ICHCE04	Instrumental Training	1	-	50	-	50	1
						500	24
	TOTAL	30				2500	96

TOTAL MARKS & CREDIT DISTRIBUTION (FIRST THREE YEAR)

S.N.	PART	Total Marks	Total Credits
1.	PART-I: Language Courses	400	12
2.	PART-II : Core, DSE-Allied, DSE-Core, GE, Internship / Training	3600	120+6
3.	PART-III: AECC- I & II and SEC- I, II & III	Remarks	08
TOTAL		4000	140+6

Non-credit compulsory Course: Add on **Certificate Course**: (Hands on experiential course): **Formulation of Perfume, Cosmetics & Toiletries** of 15 hrs. Duration in Sem.-III & IV each, is compulsory to earn degree.

DISTRIBUTION OF COURSES (FIRST THREE YEARS)

• **PART-I : LANGUAGE COURSE**

The following are compulsory courses offered in first to fourth semesters.

S.N.	Semester	Course Code	Course
1.	I	16ICEN01	Functional English-I
2.	II	16ILCEN02	Functional English-II
3.	III	16ILCEN03	Advanced English Language -I
4.	IV	16ILCEN04	Advanced English Language -II

• **PART-II : CORE, DSE-ALLIED, DSE-CORE, GE**

CORE COURSES [Theory]

S.N.	Semester	Course Code	Course
1.	I	16ICHCC01	Fundamental Chemistry-I
2.		16ICHCC02	Fundamental Chemistry-II
3.	II	16ICHCC05	Fundamental Chemistry-III
4.		16ICHCC06	Fundamental Chemistry-IV
5.	III	16ICHCC09	Inorganic Chemistry
6.		16ICHCC10	Analytical Chemistry
7.		16ICHCC11	Petroleum & Petrochemicals
8.	IV	16ICHCC15	Organic Chemistry
9.		16ICHCC16	Physical Chemistry
10.		16ICHCC17	Agrochemicals
11.	V	16ICHCC20	Spectroscopy & Separation Technique-I
12.		16ICHCC21	Polymer Chemistry
13.		16ICHCC22	Industrial Formulations (Self-Study)
14.		16ICHCC25	Computer based Test (MCQs on Fundamentals and Principles of Core Courses up to V th Semester)
15.	VI	16ICHCC26	Spectroscopy & Separation Technique-II
16.		16ICHCC27	Heterocyclic Chemistry & Synthetic Drugs
17.		16ICHCC28	Chemistry of Natural Products

• **CORE COURSES [Practical]**

S.N.	Semester	Course Code	Course
1.	I	16ICHCC03	Inorganic /Analytical Chemistry Practical
2.		16ICHCC04	Organic/Physical Chemistry Practical
3.	II	16ICHCC07	Inorganic /Analytical Chemistry Practical
4.		16ICHCC08	Organic/Physical Chemistry Practical
5.	III	16ICHCC12	Inorganic Chemistry Practical
6.		16ICHCC13	Analytical Chemistry Practical
7.		16ICHCC14	Petroleum Analysis Practical
8.	IV	16ICHCC18	Organic Chemistry Practical
9.		16ICHCC19	Physical Chemistry Practical
10.	V	16ICHCC23	Spectroscopy & Separation Tech.-I Practical
11.		16ICHCC24	Polymer Chemistry Practical
12.	VI	16ICHCC29	Heterocyclic & Synthetic Drugs Practical
13.		16ICHCC30	Chemistry of Natural Products Practical

• **OTHER CORE COURSES**

S.N.	Semester	Course Code	Course
1.	V-VI	16ICHCC31	Group Project / Review article / Industrial Training/ Instrumental Training

S.N.	Semester	Course Code	Course
1.	III & IV	N.A. (Non credit compulsory Course)	Add on Certificate Course : (Hands on experiential course) Formulation of Perfume, cosmetics & Toiletries of 15 hrs. duration in Sem.-III & IV each, is compulsory to earn degree (Evaluation by Remarks in Sem.-IV only)

• **DSE ALLIED COURSES [Theory]**

S.N.	Semester	Course Code	Course
1.	I	16ICHDA01	Physics- I
2.	II	16ICHDA03	Physics II
3.	III	16ICHDA05	Mathematics- I
4.	IV	16ICHDA07	Mathematics- II

• **DSE ALLIED COURSES [Practical]**

S.N.	Semester	Course Code	Course
1.	I	16ICHDA02	Physics- I Practical
2.	II	16ICHDA04	Physics II Practical
3.	III	16ICHDA06	Mathematics- I Practical
4.	IV	16ICHDA08	Mathematics- II Practical

- **DSE CORE COURSES [Theory & Practical]**

Students are required to opt for any one of the courses offered in 5th & 6th semesters respectively.

S.N.	Sem.	Theory		Practical	
		Course Code	Course	Course Code	Course
1.	V	16ICHDC01	Applications of Computer in Chemistry	16ICHDC04	Applications of Computer in Chemistry Practical
2.		16ICHDC02	Green Methods in Chemistry	16ICHDC05	Green Methods in Chemistry Practical
3.		16ICHDC03	Soil Analysis	16ICHDC06	Soil Analysis Practical
1.	VI	16ICHDC07	Unit Operation & Processes	16ICHDC10	Unit Operation & Processes Practical
2.		16ICHDC08	Biochemical Analysis	16ICHDC11	Biochemical Analysis Practical
3.		16ICHDC09	Chemistry of Surface Coating	16ICHDC12	Chemistry of Surface Coating Practical

- **ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) and SKILL ENHANCEMENT COURSE (SEC)**

Ability Enhancement Compulsory Course (AECC)			
S.N.	Course Code	Semester	Course Particulars
1	As per common list	I & II	AECC-I Environment Science
2		IV & V	AECC-II Communication Skill/Soft Skills
Skill Enhancement Course (SEC)			
1	As per common list	I	SEC-I Value Education-I
		II	Value Education-II
2		Any Semester between II - V	SEC-II *Co-Curricular Course
3		Any Semester between II - V	SEC-III **Value Added Courses

*Co-Curricular Courses - Option to students to choose 1 from a list of courses offered by the college, such as Add on Courses, Gandhian Studies Certificate Course, Women Studies Course, etc.

**Value Added Courses - Option to student to choose at least 1 from a list of courses offered from each UG department.

- **Courses offered by Chemistry Department to UG students of other departments**

I : DSE – Allied Courses [Theory]

S.N.	Semester	Course Code	Course	Name of Program
1.	I	16IBTDA01 & 16IICDA01	Chemistry-I	B.Sc. Biotechnology & B.Sc. Industrial Chemistry
2.	II	16IBTDA03 & 16IICDA03	Chemistry-II	B.Sc. Biotechnology & B.Sc. Industrial Chemistry
3.	III	-	Chemistry-I	B.Sc. Biochemistry
4.	IV	-	Chemistry-II	B.Sc. Biochemistry

II : DSE – Allied Courses [Practical]

S.N.	Semester	Course Code	Course	Name of Program
1.	I	16IBTDA02 & 16IICDA02	Chemistry-I Practical	B.Sc. Biotechnology & B.Sc. Industrial Chemistry
2.	II	16IBTDA04 & 16IICDA04	Chemistry-II Practical	B.Sc. Biotechnology & B.Sc. Industrial Chemistry
3.	III	-	Chemistry-I Practical	B.Sc. Biochemistry
4.	IV	-	Chemistry-II Practical	B.Sc. Biochemistry

III : Generic Elective Courses

S.N	Offered for	Semester	Course Code	Course
1	Other B.Sc. Programs & Other B.Sc.-M.Sc. Integrated Programs	V	16UCHGE01	Chemistry in everyday life
		VI	16UCHGE01	Chemical Hazards & Safety
2	Other B.Sc.-M.Sc. Integrated Programs	VIII	16PCHGE01	Green Chemistry for Sustainable Development

Value added Courses

Offered for	Course Code	Course
Other B.Sc. Programs & Other B.Sc.- M.Sc. Integrated Programs	16UCHVA01	Surface Coating techniques
	16UCHVA02	Formulations of Detergent and toiletires
	16UCHGE01	Soil & Water analysis

TOTAL MARKS & CREDIT DISTRIBUTION PG (Fourth and fifth year)

Sr. No.	PART	Total Marks	Total Credits
1.	PART-I: Core & DSE Courses	2300	91
2.	PART-II : Competency Enhancement Courses	200	04
3.	PART-III : Value Education	-	01
TOTAL		2500	96

DISTRIBUTION OF COURSES PG (Fourth and fifth year)

• **Part – I: CORE & DSE CORE**

CORE COURSES [Theory]

Sr. No.	Semester	Course Code	Course
1.	VII	16ICHCC33	Inorganic Chemistry
2.		16ICHCC34	Organic Chemistry
3.		16ICHCC35	Physical Chemistry
4.		16ICHCC36	Analytical Chemistry
5.	VIII	16ICHCC38	Separation Techniques
6.		16ICHCC39	Stereochemistry
7.		16ICHCC40	Interpretative molecular spectroscopy (Self Study)
8.		16ICHCC41	Modern Analytical Techniques
9.	IX (Specialization in Organic Chemistry)	16ICHOC01	Organic Reactions, Rearrangements & Reagents
10.		16ICHOC02	Fundamentals of Medicinal Chemistry
11.		16ICHOC03	Chemistry of Natural Products
12.	IX (Specialization in Analytical)	16ICHAC01	Industrial Formulation Development
13.		16ICHAC02	Electro analytical Techniques
14.		16ICHAC03	Industrial Analysis

	Chemistry)		
15.	X	16ICHOC06	Chemistry of synthetic Drugs
16.	(Specialization in Organic Chemistry)	16ICHOC07	Heterocyclic Chemistry
17.	X	16ICHAC06	Regulatory Affair & IPR
18.	(Specialization in Analytical Chemistry)	16ICHAC07	Analytical Method Development, Validation & Stability Studies

CORE COURSES [Practical]

Sr. No.	Semester	Course Code	Course
1.	VII	16ICHCC37	Inorganic, Organic, Physical Chemistry Practical
2.	VIII	16ICHCC42	Separation Techniques, Stereochemistry
3.	IX (Specialization in Organic Chemistry)	16ICHOC05	Organic Preparations
4.	IX (Specialization in Analytical Chemistry)	16ICHAC05	Analysis of industrial products

OTHER CORE COURSES

Sr. No.	Semester	Course code	Course
1.	IX (Specialization in Organic Chemistry)	16ICHOC04	Computer Based Test
2.	IX (Specialization in Analytical Chemistry)	16ICHAC04	Computer Based Test
3.	IX-X (Specialization in Organic Chemistry)	16ICHOC08	Dissertation OR Practical
4.	IX-X (Specialization in Analytical Chemistry)	16ICHAC08	Dissertation OR Practical

DSE CORE COURSES [Theory & Practical]

Students are required to opt for any one of the courses offered in each semester respectively.

Sr. No.	Sem.	Theory		Practical	
		Course Code	Course	Course Code	Course
1.	IX (Specialization in Organic Chemistry)	16ICHDC13/ 16ICHDC14	Polymer & Composite Materials/ Industrial Safety & Management	16ICHDC15/ 16ICHDC16	Polymer & Composite Materials/ Industrial Safety & Management Practical
2.	IX (Specialization in Analytical Chemistry)	16ICHDC19/ 16ICHDC20	Chemistry of Food Analysis/ Environmental & Green Chemistry	16ICHDC21/ 16ICHDC22	Chemistry of Food Analysis/ Environmental & Green Chemistry Practical
3.	X (Specialization in Organic Chemistry)	16ICHDC17/ 16ICHDC18	Organic synthesis - A Disconnection Approach / Industrial Unit Operations		
4.	X (Specialization in Analytical Chemistry)	16ICHDC23/ 16ICHDC24	Selected techniques in Analytical chemistry / Phytopharmaceutical Analysis		

• Part – II: COMPETANCY ENHANCEMENT COURSES

Sr. No.	Semester	Course Code	Course
1.	VII	16ICHCE01	IT Tools for Chemist
2.	VIII	16ICHCE02	Scientific Writing (Research)
3.	IX (Specialization in Organic/Analytical Chemistry)	16ICHCE03	Pilot Plant Operation
4.	X (Specialization in Organic/Analytical Chemistry)	16ICHCE04	Instrumental Training

• Part – III: VALUE EDUCATION

Sr. No.	Semester	Course Code	Course
1.	VII	16IVE01	Value Education