



**Yogi Divine Society inspired,**

**Sarvodaya Kelavani Samaj managed,**

**Shree Manibhai Virani and Smt. Navalben Virani Science College,  
Rajkot**

**(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**

**M. Sc. Chemistry**

**(With Specialization in Organic /Analytical Chemistry)**

## **PROGRAM OBJECTIVES:**

The curriculum is devised to accomplish the following program objectives which students shall accomplish by the end of their post-graduation study.

- To impart education at an advanced level in a more holistic way and to enthuse the students for the subject.
- To provide flexibility in teaching & learning endowed with space for slow & fast learners.
- To update the students about the current status and new developments in the field of Chemistry.
- To train the students to make them confident and capable of accepting new challenges and Job roles in the field of chemistry.
- To expose the students to research in Chemistry and to promote the students for an independent research career.
- To make the students aware of the impact of Chemistry on health & environment and to enable them to imbibe the concept of sustainable development.
- To foster entrepreneurial spirit in the students and to create linkages with various industries/ research centres and others to expose the students to the expectations of the industries & the society.

## SCHEME OF INSTRUCTION AND EXAMINATIONS

For Students Admitted from A.Y. 2016-2017 & Onwards

Semester-I							
Subject Code	Course	Hrs. of Instruction	Exam Duration (Hrs)	Max. Marks			Credit
				CIA	SEE	Total	
<b>Part - I</b>							
16PCECC01	<b>Core 1:</b> Inorganic Chemistry	4	3	30	70	100	4
16PCECC02	<b>Core 2:</b> Organic Chemistry	4	3	30	70	100	4
16PCECC03	<b>Core 3:</b> Physical Chemistry	4	3	30	70	100	4
16PCECC04	<b>Core 4:</b> Analytical Chemistry	4	3	30	70	100	4
16PCECC05	<b>Core Practical -1:</b> Inorganic, Organic, Physical, Analytical Chemistry Practical	12	12	80	120	200	6
<b>Part - II</b>							
16PCECE01	IT Tools for Chemist	1	1	50	-	50	1
		<b>29</b>				<b>650</b>	<b>23</b>
<b>Part - III</b>							
16PVE01	Value Education	1	-	Remarks			1
		<b>30</b>				<b>650</b>	<b>24</b>

Semester-II							
Part - I							
16PCECC06	<b>Core 5:</b> Separation Techniques	5	3	30	70	100	5
16PCECC07	<b>Core 6:</b> Stereochemistry	4	3	30	70	100	4
16PCECC08	<b>Core 7:</b> Interpretative molecular spectroscopy <b>(Self Study course)</b>	1	-	30	70	100	4
16PCECC09	<b>Core 8:</b> Modern Analytical Techniques	4	3	30	70	100	4
16PCECC10	<b>Core Practical -2:</b> Separation Techniques, Stereochemistry, Modern Analytical Techniques Practical	15	12	80	120	200	6
Part - II							
16PCECE02	Scientific Writing (Research)	1	-	50	-	50	1
		<b>30</b>				<b>650</b>	<b>24</b>

\* After successful completion of Semester -I & Semester -II, option for student to select one of the Sub disciplines viz., Organic Chemistry **OR** Analytical Chemistry in Semester - III & Semester -IV.

Semester-III (SPECIALIZATION IN ORGANIC CHEMISTRY)							
Part - I							
16PCEOC01	<b>Core 9:</b> Organic Reactions, Rearrangements & Reagents	4	3	30	70	100	4
16PCEOC02	<b>Core 10:</b> Fundamentals of Medicinal Chemistry	4	3	30	70	100	4
16PCEOC03	<b>Core 11:</b> Chemistry of Natural Products	4	3	30	70	100	4
16PCEOC04	<b>Core 12:</b> Computer Based Test	-	-	50	-	50	1
16PCEOD01/ 16PCEOD02	<b>DSE – Core -1:</b> Polymer & Composite Materials <b>OR</b> Industrial Formulation Development	4	3	30	70	100	4
16PCEOC05	<b>Core Practical -3:</b> Organic Preparations	10	9	60	90	150	5
16PCEOD03/ 16PCEOD04	<b>DSE – Core -1 Practical:</b> Polymer & Composite Materials <b>OR</b> Industrial Formulations	2	3	20	30	50	1
-	Dissertation	1	-	Evaluated at the end of Sem-IV			-
Part - II							
16PCECE03	Pilot Plant Operation	1	-	50	-	50	1
		<b>30</b>				<b>700</b>	<b>24</b>

Semester-IV (SPECIALIZATION IN ORGANIC CHEMISTRY)							
<b>Part - I</b>							
16PCEOC06	<b>Core 13:</b> Chemistry of Synthetic Drugs	5	3	30	70	100	5
16PCEOC07	<b>Core 14:</b> Heterocyclic Chemistry	4	3	30	70	100	4
16PCEOC08	<b>Core 15:</b> Dissertation <b>OR</b> Practical	16	-	60	90	150	10
16PCEOD05/ 16PCEOD06	<b>DSE – Core -2:</b> Organic Synthesis: A Disconnection Approach <b>OR</b> Industrial Unit Processes	4	3	30	70	100	4
<b>Part - II</b>							
16PCECE04	Instrumental Training	1	-	50	-	50	1
		<b>30</b>				<b>500</b>	<b>24</b>
	<b>TOTAL</b>					<b>2500</b>	<b>96</b>

<b>Semester-III (SPECIALIZATION IN ANALYTICAL CHEMISTRY)</b>							
<b>Part – I</b>							
16PCEAC01	<b>Core 9:</b> Industrial Formulation Development	4	3	30	70	100	4
16PCEAC02	<b>Core 10:</b> Electro Analytical Techniques	4	3	30	70	100	4
16PCEAC03	<b>Core 11:</b> Industrial Analysis	4	3	30	70	100	4
16PCEAC04	<b>Core 12:</b> Computer Based Test	-	-	50	-	50	1
16PCEAD01/ 16PCEAD02	<b>DSE – Core -1:</b> Chemistry of Food Analysis <b>OR</b> Environmental & Green Chemistry	4	3	30	70	100	4
16PCEAC05	<b>Core Practical -3:</b> Analysis of Industrial Products	10	9	60	90	150	5
16PCEAD03/ 16PCEAD04	<b>DSE – Core -1 Practical:</b> Chemistry of Food Analysis <b>OR</b> Environmental & Green Chemistry	2	3	20	30	50	1
-	Dissertation	1	-	Evaluated at the end of Sem-IV			-
<b>Part - II</b>							
16PCECE03	Pilot Plant Operation	1	-	50	-	50	1
<b>Total</b>		<b>30</b>				<b>700</b>	<b>24</b>

<b>Semester-IV (SPECIALIZATION IN ANALYTICAL CHEMISTRY)</b>							
<b>Part – I</b>							
16PCEAC06	<b>Core 13:</b> Regulatory Affairs & IPR	5	3	30	70	100	5
16PCEAC07	<b>Core 14:</b> Analytical Method Development, Validation & Stability Studies	4	3	30	70	100	4
16PCEAC08	<b>Core 15:</b> Dissertation <b>OR</b> Practical	16	-	60	90	150	10
16PCEAD05/ 16PCEAD06	<b>DSE – Core -2:</b> Selected Techniques in Analytical Chemistry <b>OR</b> Phytopharmaceutical Analysis	4	3	30	70	100	4
<b>Part - II</b>							
16PCECE04	Instrumental Training	1	-	50	-	50	1
		<b>30</b>				<b>500</b>	<b>24</b>
	<b>TOTAL</b>					<b>2500</b>	<b>96</b>



## TOTAL MARKS & CREDIT DISTRIBUTION

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

## DISTRIBUTION OF COURSES

### ● Part – I: CORE & DSE CORE

#### CORE COURSES [Theory]

Sr. No.	Semester	Course Code	Course
1.	I	16PCECC01	Inorganic Chemistry
2.		16PCECC02	Organic Chemistry
3.		16PCECC03	Physical Chemistry
4.		16PCECC04	Analytical Chemistry
5.	II	16PCECC06	Separation Techniques
6.		16PCECC07	Stereochemistry
7.		16PCECC08	Interpretative molecular spectroscopy(Self Study)
8.		16PCECC09	Modern Analytical Techniques
9.	III (Specialization in Organic Chemistry)	16PCEOC01	Organic Reactions, Rearrangements & Reagents
10.		16PCEOC02	Fundamentals of Medicinal Chemistry

11.		16PCEOC03	Chemistry of Natural Products
12.	III (Specialization in Analytical Chemistry)	16PCEAC01	Industrial Formulation Development
13.		16PCEAC02	Electro analytical Techniques
14.		16PCEAC03	Industrial Analysis
15.	IV (Specialization in Organic Chemistry)	16PCEOC06	Chemistry of Synthetic Drugs
16.		16PCEOC07	Heterocyclic Chemistry
17.	IV (Specialization in Analytical Chemistry)	16PCEAC06	Regulatory Affair & IPR
18.		16PCEAC07	Analytical Method Development, Validation & Stability Studies

#### **CORE COURSES [Practical]**

<b>Sr. No.</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course</b>
1.	I	16PCECC05	Inorganic, Organic, Physical, Analytical Chemistry Practical
2.	II	16PCECC10	Separation Techniques, Stereochemistry, Modern Analytical Techniques Practical
3.	III (Specialization in Organic Chemistry)	16PCEOC05	Organic Preparations
4.	III (Specialization in Analytical Chemistry)	16PCEAC05	Analysis of Industrial Products

## OTHER CORE COURSES

Sr. No.	Semester	Course code	Course
1	III (Specialization in Organic Chemistry)	16PCEOC04	Computer Based Test
2	III (Specialization in Analytical Chemistry)	16PCEAC04	Computer Based Test
3	III-VI (Specialization in Organic Chemistry)	16PCEOC08	Dissertation OR Practical
4	III-VI (Specialization in Analytical Chemistry)	16PCEAC08	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.	III (Specialization in Organic Chemistry)	16PCEOD01 / 16PCEOD02	Polymer & Composite Materials / Industrial Formulation Development	16PCEOD03 / 16PCEOD04	Polymer & Composite Materials / Industrial Formulation Development Practical
2.	III (Specialization in Analytical Chemistry)	16PCEAD01 / 16PCEAD02	Chemistry of Food Analysis/ Environmental & Green Chemistry	16PCEAD03 / 16PCEAD04	Chemistry of Food Analysis/ Environmental & Green Chemistry Practical
3.	IV	16PCEOD05 / 16PCEOD06	Organic Synthesis: A Disconnection Approach / Industrial Unit Processes	-	-

	(Specialization in Organic Chemistry)				
4.	IV (Specialization in Analytical Chemistry)	16PCEAD05 / 16PCEAD06	Selected Techniques in Analytical Chemistry / Phytopharmaceutical Analysis	-	-

● **Part – II: COMPETENCY ENHANCEMENT COURSES**

Sr. No.	Semester	Course Code	Course
1.	I	16PCECE01	IT Tools for Chemist
2.	II	16PCECE02	Scientific Writing (Research)
3.	III (Specialization in Organic/Analytical Chemistry)	16PCECE03	Pilot Plant Operation
4.	IV (Specialization in Organic/Analytical Chemistry)	16PCECE04	Instrumental Training

● **Part – III: VALUE EDUCATION**

Sr. No.	Semester	Course Code	Course
1.	I	16PVE01	Value Education