



**Sarvodaya Kelavani Samaj managed,
Shri Manibhai Virani and Smt. Navalben Virani Science College
(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 –Grade A-1 by KCG, Government of Gujarat

GPCB-Government of Gujarat approved Environment Audit Center

Nodal Center for capacity building by GSBTM

Department of Chemistry

B.Sc. Chemistry

Transdisciplinary Elective

Part II			
Transdisciplinary Elective-I			
For the students admitted from A.Y. 2021-22 onwards			
Offering Department: Chemistry	Offered to: Students across the University for whom at least 80% of this course content is not covered in one or more courses, which are part of their regular curriculum.		
Semesters: IV-V (3 year program) / VI-VII (4 year program)			
Course Code	Course Title	Credit	Hr/Wk
	Chemical Hazards and Safety	2	2

Prerequisite:

Awareness about various types of health hazards and knowledge of terminologies used in psychological health hazards, Health & Safety Management Systems, Fire Safety and Electrical Safety

Course Objective:

This course aims to provide fundamental and classical concepts of chemical hazards and safety, as chemical process technology becomes more complex, chemical engineers will need a more detailed and fundamental understanding of safety. The course focuses on understanding the important technical fundamentals of chemical process safety. The emphasis on the fundamentals will help the student to understand the concepts and apply them accordingly. This application requires a significant quantity of fundamental knowledge and technology. Through this course students can get the through information about various type of chemical hazards, their types and safety measures.

Course Content:

Modules	Hours
<p>Module-I: Foundation in Health and Safety</p> <ul style="list-style-type: none"> • The scope and nature of occupational health and safety • Moral, legal and financial reasons for promoting good standard of health and safety • The legal framework for the regulation of health and safety including sources and types of law • The scope, duties and offences of employers, managers, employees and others under the health and safety at work etc. Act 1974 • The scope, duties and offences of employers, managers, employees and others under the management of health and safety at work regulation. 	7

<ul style="list-style-type: none"> • The legal and organizational health and safety roles and responsibilities of clients and their contractors • Key elements of health and safety management system • Purpose and importance of setting a policy for health and safety • Key features and appropriate content of an effective health and safety policy 	
<p>Module-II: Health and Safety Management Systems</p> <p>Organizing</p> <ul style="list-style-type: none"> • Organizational health and safety roles and responsibilities of employers, directors, managers and supervisors • Concept of health and safety culture and its significance in the management of health and safety in an organization <p>Risk assessment and controls</p> <ul style="list-style-type: none"> • Principles and practice of risk assessment • General principles of prevention in relation to risk reduction measures • Sources of health and safety information • Role and function of permit-to-work system • Emergency procedures and arrangements for contacting the emergency services • Requirement for, effective provision of first-aid in the works place. 	6
<p>Module-III: Controlling Chemical Hazards</p> <ul style="list-style-type: none"> • GHS pictograms and hazard classes • Personal Protective Equipment • Standard format of M.S.D.S <ul style="list-style-type: none"> ➤ OSHA Format ➤ ANSI Format ➤ NFPA Format ➤ HMIS Format ➤ R & S Format 	5
<p>Module-IV: Fire Safety & Electrical Safety</p> <p>Fire Safety</p> <ul style="list-style-type: none"> • Fire initiation, classification, spread and legal requirements • Fire risk assessment • Fire prevention and prevention of fire spread • Fire alarm system and fire fighting arrangements • Evacuation of workplace • Fire risk assessment checklist • Typical fire notice <p>Electrical safety</p> <ul style="list-style-type: none"> • Principles, hazards and risks associated with the use of electricity at work • Control measures when working with electrical systems. 	6
<p>Module-V: Biological and Psychological Health Hazards and Risk Control</p> <p>Chemical and biological health hazards and risk control</p>	6

<ul style="list-style-type: none"> • Form of hazardous substance • Classification of hazardous substance • Health risks from hazardous substance • Assessment of health risks • Occupational exposure limits • Control measures • Specific agents • Safe handling and storage of waste <p>Physical and psychological health hazards and risk control</p> <ul style="list-style-type: none"> • Noise • Vibration • Radiation • Stress 	
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Pedagogic Tools:

1. Chalk & Talk
2. PPTs & Videos
3. Assignments
4. Group discussion

Reference Books:

1. Introduction to health and safety at work by Phil Hughes MBE and Ed Ferrett.
2. Industrial Hygiene and Chemical Safety by M.H. Fulekar.
3. Safety And Hazards Management In Chemical Industries by M.N. Vyas
4. Handbook Of Chemical Industries by P. Vishwanathan, Medtec by P. Vishwanathan
5. Handbook of Chemicals and Safety by Dikshith T.S.S.
6. Chemical Process Safety: Fundamentals with Applications by Crowl

Suggested MOOCs:

1. <https://nptel.ac.in/>
2. <https://nptel.ac.in/>
3. <https://in.coursera.org/>

Methods of Assessment & Tools:

Components of CIA: 100 marks

Sr.	Component	Content	Duration (if any)	Marks
1	Attendance	---	---	10
2	Assignment-1	---	---	10
3	Assignment-2	---	---	10
4	Test-1	Module I & II	1.5 Hours	20 (set for 30)
5	Test-2	Module I to V	2.5 Hours	50 (set for 50)
			Total	100

Department of Chemistry

Part II Transdisciplinary Elective-II For the students admitted from A.Y. 2021-22 onwards			
Offering Department:	Offered to:		
Chemistry	Students across the University for whom at least 80% of this course content is not covered in one or more courses, which are part of their regular curriculum.		
Semesters: IV-V (3 year program) / VI-VII (4 year program)			
Course Code	Course Title	Credit	Hr/Wk
	Chemistry in Everyday Life	2	2

Prerequisite:

Awareness about various types of diseases, drug-receptor interaction, SAR and basic knowledge of terminologies used in medicinal chemistry, Cleansing, Coloring and Cosmetic Chemistry

Course Objective:

This course aims to provide fundamental, classification & application of anticancer, anti-infections, cardiovascular and metabolic disorder drugs. Illustrate classification & synthesis of CNS acting agents, anti-inflammatory drugs and anesthetic agents to choose physical and chemical test for analysis of oils and fats; and categorize bio molecules with their source & structure. This course focuses on understanding the important the chemistry involved in the compound of the daily life. The course aims to address SDG-3: Good Health and Well-Being

Course Content:

Modules	Hours
Module-I: Drugs and their Classification: <ul style="list-style-type: none"> • Cancer and infectious diseases • Cardiovascular and metabolic diseases • Central Nervous system diseases • Analgesic and anti inflammatory drugs <ul style="list-style-type: none"> ➤ Non-steroidal anti-inflammatory drugs (NSAIDs) ➤ Antipyretic analgesics • Anesthetics drugs <ul style="list-style-type: none"> ➤ General Anesthetic ➤ Local Anesthetic 	7
Module-II: Chemicals in food products: <ul style="list-style-type: none"> • Introduction & type of food additives:- Preservatives, Antioxidants, Artificial sweeteners, Flavors and flavors enhancers, Stabilizers, Thickening and jelling agents • Pesticides: analysis of organophosphorous and organochlorine pesticide. 	6

<ul style="list-style-type: none"> • Determination of pesticide residues in grain, fruits, vegetables, milk and milk products. • Pigments and synthetic dyes: natural pigment – Carotenoids, Anthocyanin, flavones, Chlorophyll – their occurrence, characteristic properties • Permitted synthetic dyes & non-permitted synthetic dyes used by industries, Harmful effects of non-permitted dye 	
<p>Module-III: Cleansing Agents:</p> <p>Soap</p> <ul style="list-style-type: none"> • Introduction of soap • Cleaning Action of soap • Raw materials for manufacturing of soap • Soap Manufacturing <ul style="list-style-type: none"> ➤ Continuous process for the manufacture of soap ➤ Batch process for the manufacture of soap • Type of Soap • Advantages and disadvantage of soap <p>Detergent</p> <ul style="list-style-type: none"> • Introduction of detergent • Raw materials for manufacturing of detergent • Type of detergents • Detergent manufacturing • Advantages and disadvantage of detergents 	5
<p>Module-IV: Coloring Agents:</p> <ul style="list-style-type: none"> • Introduction of Coloring Agent • Era of natural dyes • Era of synthetic dyes • Classification of dyes according to application <ul style="list-style-type: none"> ➤ Acid dyes. ➤ Basic or cationic dyes. ➤ Direct dyes ➤ Azoic dyes ➤ Vat dyes. • Classification of dyeing <ul style="list-style-type: none"> ➤ Direct dyeing ➤ Vat dyeing ➤ Mordant dyeing ➤ Disperse dyeing 	6
<p>Module-V: Chemistry of Cosmetic Materials:</p> <ul style="list-style-type: none"> • Classification of cosmetic • Cosmetic for Skin <ul style="list-style-type: none"> ➤ Function of Skin ➤ Composition of Skin 	6

<ul style="list-style-type: none"> ➤ Cleansing cream ➤ White, emulsified cold cream ➤ Liquefying cleansing creams ➤ Face Powders • Cosmetic for Dental <ul style="list-style-type: none"> ➤ Dental care preparation ➤ Tooth pastes • Cosmetic for Hair <ul style="list-style-type: none"> ➤ Function of hair ➤ Shampoos 	
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Reference Books:

1. RSC Food Analysis Monographs, edited by: Peter Belton and Roger Wood, RSC Publication, Print ISSN:1757-7098
2. Chemical Analysis of Food: Techniques and Application, 1st Edition by Y Pico; 2012, Elsevier; ISBN:9780123848635
3. Ashutosh Kar (2018, 7th Edition), Medicinal Chemistry. New Age International (P) Ltd. (ISBN: 978-9386649720)
4. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003
5. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication

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