



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

COURSE DATA SHEET

SEMESTER	I	BATCH	2026
COURSE NAME	FOOD AND NUTRITIONAL CHEMISTRY	COURSE CODE	26UCHGE1001
COURSE UNITS	V	COURSE TYPE	Generic Elective(GE) - I
CONTACT HOURS (L-T-P)	4-0-2	CREDITS	5
OFFERED BY	CHEMISTRY	SHIFT (I / II) Shift I - 8:15 am - 12:50 pm Shift II - 1:00 pm - 5:30 pm	SHIFT -I

COURSE OBJECTIVES

1	To understand the basics of food, nutrition, vitamins, and their importance in maintaining good health.
2	To study the composition, processing, and quality of milk and dairy products, along with the chemistry of important biomolecules.
3	To develop basic knowledge and practical skills in identifying common food adulterants and ensuring food quality and safety

COURSE OUTCOMES: On completion of the course the students will be able to...

	CO Statement	Cognitive Level
CO1	To explain the types of food, bakery products, beverages, and the nutritional importance of fruits	K1 to K6
CO2	To describe the sources, functions, and deficiency diseases of vitamins and the role of essential minerals in the human body.	K1 to K6



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

CO3	Explain the composition, processing, quality standards, and environmental aspects of milk and dairy products	K1 to K6
CO4	To identify the classification, structure, and uses of carbohydrates and their importance as biomolecules	K1 to K6
CO5	To detect common adulterants in food items using basic laboratory techniques	K1 to K6

SYLLABUS

UNIT	TOPICS	HOURS
1	Unit I : Food chemistry Types of food – staple food – digestion of food – stale food and its effects of stale food. Bakery products - examples of baked food – confectionary products – role of confectionary products in day to day life – beverages – types of beverages – advantages and disadvantages of beverages. Fruits – role of fruits for a healthy life – apple, mango, grapes, pomegranate, orange, banana and jackfruit.	15
2	Unit II : Vitamins Vitamins – definition and types – sources, deficiency diseases and uses of vitamin A, vitamin B1, B2 and B12, vitamin C, vitamin D, vitamin E and vitamin K. Role of Vitamins in human beings. Bioinorganic chemistry – Role of Na, K, Ca, P, Fe, Zn, Co and Mg in human system (Structure is not necessary).	15
3	Unit III : Dairy chemistry Definition of Milk as per FSSAI and average Composition of Milk. Structural Elements of Milk, difference between normal milk and colostrums. Standards of milk products – Butter, Ghee, Khoa, Paneer, Dahi and Lassi - Physicochemical changes in milk constituents during manufacture and storage of traditional dairy products. Chemical quality of water in dairy industry. Manufacture of milk powder, cheese and paneer - Environmental issues in effluent discharge from Dairy Industry.	15



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

4	Unit IV : Biomolecules Carbohydrates – definition, classification, structure and uses of glucose and fructose. Disaccharide – sucrose – inversion of cane sugar (definition only) – uses of sucrose. Polysaccharide – starch and cellulose – structure and uses – cellulose types – ethyl cellulose, nitro cellulose, and carboxymethyl cellulose.	15
5	Unit V: Practical activities Adulteration in foods – milk, oil, ghee, turmeric powder, chilli powder, tea, coffee powder, green peas, pepper, jaggery, milk cream and honey. Activity- Food Composition Analysis of Commonly Consumed Products	15
Note (if any)		

TEXT/REFERENCE BOOKS/E - RESOURCES:

Text Books	Text book Reference(s) 1. J.D.Lee, <i>Concise Inorganic Chemistry</i>, 5thedn., Blackwell Science, London, 2010. 2. B. R. Puri, L. R. Sharma, K. C. Kalia, <i>Principles of Inorganic Chemistry</i>, Shoban Lal Nagin Chand and Co., New Delhi, 2005. 3. Satyaprakash, G.D. Tuli, S.K. Basu, R.D. Madan, <i>Advanced Inorganic Chemistry</i>. Vol. II 5thedn., S. Chand & company, New Delhi, 2000. 4. S.C. Rastogi, <i>Biochemistry</i>, Tata McGraw Hill publishers. 2007. 5. H. Singh and V.K. Kapoor, <i>Medicinal and Pharmaceutical Chemistry</i>, Vallabh Prakashan, Delhi, 1996, 14thedn.
Books For Reference	1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, John M. Beale Jr and John M. Block, Wolters Kluwer, 2011, 12thedn. 2. Swaminathan, M. (2014). <i>Essentials of food and nutrition</i> (Vols. 1 & 2). BAPPCO. 3. Fundamentals of Foods, Nutrition and Diet Therapy Mudambi, S. R., & Rajagopal, M. V. (2017). 4. <i>Fundamentals of foods, nutrition and diet therapy</i> (7th ed.). New Age International Publishers. 5. Belitz, H.-D., Grosch, W., & Schieberle, P. (2009). <i>Food chemistry</i> (4th ed.).
E-Learning Resources	1. https://microbenotes.com/category/biochemistry/ 2. https://www.masterorganicchemistry.com/organic-1/ 3. https://www.organic-chemistry.org/ 4. https://www.chemistryworld.com/organic-chemistry/211.subject



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

PEDAGOGY (TEACHING METHODOLOGY):

- Chalk & Talk
- LCD/SMART Boards
- Student Assignments
- Student Seminars/Webinars
- Student Model Making
- Quizzes
- MCQ
- Web Resources

CO-PO AND CO-PSO MAPPING:										
	PO1	PO2	PO3	PO4	PO5	PO6		PSO1	PSO2	PSO3
CO1	3	2	2	2	2	-		3	2	2
CO2	2	3	3	3	3	-		3	3	3
CO3	2	2	2	2	2	-		3	3	3
CO4	3	3	3	2	2	-		3	3	3
CO5	2	3	3	2	3	-		2	3	3
Average (Use only filled in cells for calculation)	2.4	2.6	2.6	2.2	2.4	-		2.8	2.8	2.8

Correlation Level: 1-Low 2-Moderate 3-Strong

JUSTIFICATION OF CO-PO/PSO MAPPING			
CO	PO/PSO	Level of correlation	Justification
CO1	PO1	3	Acquires fundamental knowledge of food chemistry and nutrition
	PO2	2	Develops analytical understanding of food categories.
	PO3	2	Applies nutritional concepts for healthy practices.



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

	PO4	2	Encourages scientific learning.
	PO5	2	Foundation for nutrition research.
	PO6	-	No direct contribution.
	PSO1	3	Understands food chemistry.
	PSO2	2	Identifies food components.
	PSO3	2	Applies concepts practically.
CO2	PO1	2	Provides basic knowledge of vitamin chemistry.
	PO2	3	Strengthens understanding of vitamin structure and classification.
	PO3	3	Applies concepts in nutrition, medicine, and food fortification.
	PO4	3	Supports advanced study in nutritional biochemistry.
	PO5	3	Useful in health, wellness, and food technology sectors.
	PO6	-	No direct ethical aspect.
	PSO1	3	Builds strong vitamin chemistry knowledge.
	PSO2	3	Develops analytical skills in vitamin testing.
	PSO3	3	Supports research and industrial applications of vitamins.
CO3	PO1	2	Builds basic domain knowledge in dairy chemistry and analytical techniques
	PO2	2	Strengthens understanding of chemical preparation methods
	PO3	2	Improves ability to apply fundamental concepts in laboratory settings.
	PO4	2	Provides essential analytical skills required for higher-level dairy research.
	PO5	2	Enables application of analytical methods in industry and quality control
	PO6	-	No direct contribution to ethical and moral values.
	PSO1	3	Gives strong knowledge of chemical preparation methods used in dairy analysis.
	PSO2	3	Develops practical skills in milk and dairy testing
	PSO3	3	Enhances analytical expertise applicable in research and industry
CO4	PO1	3	Strengthens theoretical knowledge of carbohydrate chemistry.
	PO2	3	Builds understanding of monosaccharide and polysaccharide structures.
	PO3	2	Applies concepts in food and fermentation industries.
	PO4	2	Supports advanced study in carbohydrate biochemistry.
	PO5	2	Relevant in nutrition and pharmaceutical formulations.
	PO6	-	No direct ethical aspect.
	PSO1	3	Provides solid foundation in carbohydrate chemistry.
	PSO2	3	Develops skills in identification and analysis of carbohydrates.



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust

Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

	PSO3	3	Supports research in food chemistry and industrial applications.
CO5	PO1	2	Food adulteration knowledge
	PO2	3	Practical detection skills.
	PO3	3	Solves food safety problems
	PO4	2	Scientific investigation
	PO5	3	Research in food safety
	PO6	-	No direct contribution
	PSO1	2	Food quality testing.
	PSO2	3	Analytical methods.
	PSO3	3	Laboratory applications.





Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

COURSE DATA SHEET

SEMESTER	II	BATCH	2026
COURSE NAME	INTEGRATED CHEMISTRY	COURSE CODE	26UCHGE1002
COURSE UNITS	V	COURSE TYPE	Generic Elective(GE) - II
CONTACT HOURS (L-T-P)	4-0-2	CREDITS	5
OFFERED BY	CHEMISTRY	SHIFT (I / II) Shift I - 8:15 am - 12:50 pm Shift II - 1:00 pm - 5:30 pm	SHIFT –I

COURSE OBJECTIVES	
1	To understand the basics of water treatment, water hardness, and corrosion and their control.
2	To study the types, properties, and uses of polymers, plastics, rubbers, and resins in daily life
3	To gain knowledge of medicinal plants and develop basic skills in the qualitative analysis of organic compounds

COURSE OUTCOMES: On completion of the course the students will be able to...		
	CO Statement	Cognitive Level
CO1	To explain the basics of water treatment and methods of softening water.	K1 to K6
CO2	To study the types of corrosion and the methods used to prevent corrosion.	K1 to K6
CO3	To Identify the types, properties, and uses of polymers, plastics, rubbers, and resins.	K1 to K6
CO4	To study the medicinal uses of common Indian medicinal plants and herbal products.	K1 to K6



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

CO5	To Perform qualitative analysis of selected organic compounds using basic laboratory techniques.	K1 to K6
------------	--	----------

SYLLABUS

UNIT	TOPICS	HOURS
1	Unit I: Water technology Water – types and composition – potable water – requirements – hardness of water – types of hardness – removal of hardness by ion exchange (softening technique), - municipal water –water treatment – Reverse osmosis - definition and explanation. Boiler water – Methods to remove scales in boiler water treatment. Difference between soft and hard water.	15
2	Unit II: Corrosion Introduction – definition, types of corrosion (definition only) – direct, electrochemical, galvanic, liquid metal, erosion and microbiologically influenced corrosion. Corrosion and its prevention, control by internal and external means - conditioning and alloying the metals, corrosion inhibitors, modification of corrosion environment, protective and organic coatings, cathodic and anodic protection.	15
3	Unit III: Industrial Polymers Plastics – Thermoplastics, Thermosetting Plastics – Differences. Bioplastics – role of biopolymers in day to day life. Uses of polyethylene, polypropylene, polyacrylonitrile, polyvinyl chloride, polytetrafluoroethylene. Synthetic polymer – definition - uses of nylon-6, nylon-6,6 and polyester. Rubber - natural and synthetic rubbers – definition – vulcanization of rubber - Role of rubber in day to day life.	15
4	Unit IV: Medicinal plants and herbal products Indian medicinal plants and uses – Tulasi, neem, Phyllanthus niruri, mango, mint, coriander, Hibiscus, Justicia adhatoda, and Solanum trilobatum. Role of herbal medicine in day to day life – rose, turmeric, ginger, aloe vera, garlic, Ashwagandha and clove.	15



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

5	Unit V : Practical activities Analysis of carbohydrate, Amide (Urea), monocarboxylic and dicarboxylic acid. Activity- Analysis of the Composition of Common Medicinal Products	15
Note (if any)		

TEXT/REFERENCE BOOKS/E - RESOURCES:

Text Books	Text book references 1. Jain, P. C., & Jain, M. (2016). <i>Engineering chemistry</i>. Dhanpat Rai Publishing Company. 2. Dara, S. S., & Umare, S. S. (2015). <i>A textbook of engineering chemistry</i>. S. Chand & Company Ltd. 3. Sharma, B. K. (2014). <i>Industrial chemistry</i>. Goel Publishing House. 4. Vogel, A. I. (2008). <i>Vogel's textbook of practical organic chemistry</i> (5th ed.). Pearson Education.
Books For Reference	1. Gowariker, V. R., Viswanathan, N. V., & Sreedhar, J. (2015). <i>Polymer science</i>. New Age International Publishers. 2. Kar, A. (2017). <i>Medicinal chemistry</i> (6th ed.). New Age International Publishers. 3. Fontana, M. G. (2005). <i>Corrosion engineering</i> (3rd ed.). McGraw-Hill Education. 4. Kirtikar, K. R., & Basu, B. D. (2003). <i>Indian medicinal plants</i> (2nd ed.). International Book Distributors.
E-Learning Resources	1. https://www.ncbi.nlm.nih.gov/books/NBK482447/ 2. https://training.seer.cancer.gov/treatment/chemotherapy/types.html 3. https://www.pharmpress.com/product/9780857110831/fasttrack-chemistry

PEDAGOGY(TEACHING METHODOLOGY):

- Chalk & Talk
- LCD/SMART Boards



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

- Student Assignments
- Student Seminars/Webinars
- Student Model Making
- Quizzes
- MCQ
- Web Resources

CO-PO AND CO-PSO MAPPING:										
	PO1	PO2	PO3	PO4	PO5	PO6		PSO1	PSO2	PSO3
CO1	3	2	2	2	2	–		2	2	3
CO2	3	3	2	2	2	–		3	2	3
CO3	3	3	3	2	2	–		3	3	3
CO4	2	2	2	3	2	–		3	3	2
CO5	2	3	3	2	3	–		3	3	2
Average (Use only filled in cells for calculation)	2.6	2.6	2.4	2.2	2.2	–		2.8	2.6	2.6

Correlation Level: 1-Low 2-Moderate 3-Strong

JUSTIFICATION OF CO-PO/PSO MAPPING			
CO	PO/PSO	Level of correlation	Justification
CO1	PO1	3	Acquires fundamental knowledge of water chemistry and treatment methods.
	PO2	2	Develops analytical understanding of water quality and hardness.
	PO3	2	Applies water treatment concepts to domestic and industrial applications.
	PO4	2	Encourages scientific understanding of water purification techniques.
	PO5	2	Builds a foundation for environmental and water quality studies.
	PO6	–	No direct contribution.
	PSO1	3	Understands the principles of water chemistry.



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

CO2	PSO2	2	Explains water treatment and softening techniques.
	PSO3	2	Applies concepts in environmental and industrial contexts.
	PO1	3	Gains knowledge of corrosion processes and mechanisms.
	PO2	3	Analyses factors influencing corrosion and protection methods.
	PO3	2	Applies corrosion control techniques in engineering and industry.
	PO4	2	Develops understanding of materials degradation and prevention.
	PO5	2	Supports industrial applications and maintenance practices.
	PO6	–	No direct contribution.
	PSO1	3	Understands corrosion chemistry.
	PSO2	3	Evaluates corrosion prevention methods scientifically.
CO3	PSO3	2	Applies corrosion control concepts in practical situations.
	PO1	3	Acquires knowledge of polymer chemistry and materials.
	PO2	3	Analyses classification and properties of industrial polymers.
	PO3	3	Applies polymer science to industrial and commercial applications.
	PO4	2	Supports advanced learning in polymer chemistry.
	PO5	2	Develops awareness of modern polymer technologies.
	PO6	–	No direct contribution.
	PSO1	3	Understands synthesis and applications of polymers.
	PSO2	3	Explains industrial uses of plastics and rubbers.
	PSO3	3	Applies polymer concepts in research and manufacturing.
CO4	PO1	2	Gains knowledge of medicinal plants and herbal products.
	PO2	2	Understands medicinal properties and applications of herbs.
	PO3	2	Applies herbal knowledge to healthcare and wellness.
	PO4	3	Encourages research in medicinal chemistry and natural products.
	PO5	2	Supports pharmaceutical and nutraceutical applications.
	PO6	–	No direct contribution.
	PSO1	3	Understands phytochemicals and medicinal plants.
	PSO2	3	Identifies herbal products and their therapeutic uses.
	PSO3	3	Applies herbal chemistry in research and healthcare.
CO5	PO1	2	Acquires knowledge of qualitative organic analysis.
	PO2	3	Develops analytical skills in identifying organic compounds.
	PO3	3	Applies laboratory techniques for compound identification.
	PO4	2	Enhances scientific investigation and problem-solving ability.
	PO5	3	Develops practical competence for research and industrial laboratories.
	PO6	–	No direct contribution.



Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous)

Owned and Managed by Cork Industries Charities Trust
Affiliated to University of Madras - Re-Accredited with 'A+' Grade by NAAC - 4th Cycle

PSO1	2	Understands qualitative analysis principles.
PSO2	3	Performs systematic organic compound analysis.
PSO3	3	Applies laboratory skills in research and quality control.

