SEMESTER V

USCHC520-SKILL BASED ELECTIVE: SMALL SCALE CHEMISTRY

Year: III **SEM: V**	**Course Code** USCHC520	**Title of the Course** Small Scale Chemistry	**Course Type** Theory	**Course Category** Skill Based Elective	**H/ W** 2	**Credits** 2	**Marks** 100

Learning Objectives:

1. To impart knowledge on small-scale industries.
2. To acquire skills in the manufacture of various small-scale products.

Course Outcomes:

The Learners will be able to

1. Understand the laws, role and steps involved in starting small scale industries.
2. Acquire skills to prepare soaps and detergents.
3. Describe the characteristics and uses of cosmetics and perfumes.
4. Gain skills in the manufacture of selected small-scale products.

CO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H

CO	**PO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H

Unit I: Small - Scale Industry

1.1.Objectives and characteristics of small-scale industries (K1& K2)
1.2. Types of SSI, role of SSI in Indian economy. (K1& K2)
1.3. Steps in starting SSI (K1& K2)
1.4. Laws for SSI, Problems of SSI (K1& K2)
1.5. Finance management, Quality control – definition and advantages. (K1& K2)
1.6.Marketing and branding, Advertising – definition, objectives, advertising media.(K1 &K2)

Unit II: Soaps and Detergents

2.1. Soaps- definition, fatty and non- fatty raw materials.**(**K1& K2)
2.2. Types of soaps, manufacture of laundry soap and bathing soap. **(**K1& K2)
2.3. Mechanism of cleansing action of soap.**(**K1& K2)
2.4. Composition, preparation and advantages of herbal soaps. **(**K1& K2)
2.5. Detergents - classification of surfactive agents (LABSA), manufacture of detergents. **(**K1& K2)
2.6. Shampoo – composition and manufacture of egg and herbal shampoo, anti-dandruff and conditioners.**(**K1& K2)

Unit III: Cosmetics and Perfumes

3.1. Cosmetics – definition and history.**(**K1& K2)
3.2. Kinds of cosmetics. **(**K1& K2)
3.3. Preparation of face powder, face cream and lipstick.**(**K1& K2)
3.4. Perfumes - definition, essential ingredients in perfumes.**(**K1& K2)
3.5. Classification of essential oils.**(**K1& K2)
3.6. Preparation of perfumes.**(**K1& K2)

Unit IV: Miscellaneous Small-Scale Products

4.1. Camphor – production, biosynthesis and applications. **(**K1& K2)
4.2. Bleaching powder – preparation, properties and uses. **(**K1& K2)
4.3. Biogas- composition, production and uses.**(**K1& K2)
4.4. Handmade paper from bagasse- composition of bagasse and uses.**(**K1& K2)
4.5. Asofoetida – composition, cultivation, manufactures and uses.**(**K1& K2)
4.6. Composition and manufacture of safety matches and agarbattis.**(**K1& K2)

Unit V: Miscellaneous Small-Scale Products

5.1. Recycling of synthetic organic polymers – applications of PET and PVC. **(**K1& K2)
5.2. Recycling of synthetic organic polymers – applications of HDPE and polystyrene.**(**K1& K2)
5.3. Reverse osmosis of water – production and applications.**(**K1& K2)
5.4. Coconut oil – manufacture by dry and wet process and uses. **(**K1& K2)
5.5. Vulcanization of rubber, making an eraser. **(**K1& K2)
5.6. Pencils–forms of graphite, adhesion and lengthwise graphitization method & uses. **(**K1& K2)

Reference Books:

1. Dr. V. Balu, Entrepreneurship and Small Business Promotion, First Edition, Sri Venkateswara Publications, 2004.
2. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co. Pvt. Ltd., 1981.
3. A.N.Zamre, V.G.Ratolikar, A Textbook of Modern Applied Chemistry, M.G.Lomte Edition, S.Chand& Co., 1985.
4. Clarence Henry Eckles, Willes Barnes Combs and Harold Macy, Milk and Milk products, Tata McGraw- Hill Publishing Company, 2002.
5. B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.
6. H.Panda, Herbal soaps detergents Hand Book, National Institute of Industrial Research,2011.

Open Educational Resources (OER)

1. https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Lipids/Properties_and_Classification_of_Lipids/Soaps_and_Detergents(Soaps and Detergents)
2. https://www.pdfdrive.com/perfumes-cosmetics-and-soaps-modern-cosmetics-d157713809.html (Perfumes, Cosmetics and Soaps e- book).

SEMESTER – V/VI

UGCHA520/620 - FOOD AND NUTRITION CHEMISTRY

Year : III SEM : V&VI	**Course Code** UGCHA520/620	**Title of the Course** Food & Nutrition Chemistry	**Course Type** Theory	**Course Category** Elective	**H/ W** 3	**Credits** 2	**Marks** 100

Learning Objectives:

1. To impart knowledge about the importance of food and its impact on human health.
2. To highlight the nutritive value of fruits and vegetables and the importance of balanced diet.

Course Outcomes:

The Learners will be able to

1. Explain the sources, classification, functions, deficiency diseases and metabolism of carbohydrates.
2. Explain the sources, classification, functions, deficiency diseases and metabolism of proteins and fats.
3. Outline the sources, functions and deficiency diseases of fat soluble and water soluble vitamins.
4. Describe the sources, functions, and deficiency diseases and RDA of essential and trace minerals.
5. Appreciate the nutritive values and evaluate the chemical changes and loss of nutrients during cooking and storage of fruits and vegetables.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

Unit I: (9 Hours)

1.1. Nutrition and Health – concept. (K1, K2)
1.2. Classification of food. (K1, K2)
1.3. Nutrients - macro and micro nutrients. (K1, K2)
1.4. Carbohydrates - sources, classification, functions, deficiency diseases, energy requirements. (K1, K2)
1.5. Blood sugar level. (K1, K2)
1.6. Carbohydrates metabolism - Glycolysis, Glyconeogenesis, Glycogenolysis. (K1, K2&K3)

Unit II: (9 Hours)

2.1. Proteins - sources, classification, functions. (K1, K2)
2.2. Deficiency diseases, energy requirements. (K1, K2)

2.3. Protein metabolism. (K1, K2&K3)
2.4. Fats - Sources, classification, functions. (K1, K2)
2.5. Deficiency diseases, energy requirements. (K1, K2)
2.6. Fat metabolism. (K1, K2&K3)

Unit III: (9 Hours)

3.1. Vitamins – classification, difference between fat soluble and water soluble vitamins. (K1, K2)
3.2. Fat soluble vitamins (A and D) (K1, K2)
3.3. Fat soluble vitamins (E and K) (K1, K2)
3.4. Water soluble vitamins (Thiamine, Riboflavin, Niacin Pyridoxine, Pantothenic acid,) sources, functions, deficiency diseases and daily requirements. (K1, K2)
3.5. Water soluble vitamins (Foliate, Choline, Biotin,Cyanocobalamin) sources, functions, deficiency diseases and daily requirements. (K1, K2)
3.6. Ascorbic acid - sources, functions, deficiency diseases and daily requirements. (K1, K2)

Unit IV: (9 Hours)

4.1. Minerals – classification. (K1, K2)
4.2. Major elements (Ca, P, Na, K) sources, functions, deficiency diseases and recommended requirements. (K1, K2)
4.3. Major elements (Fe, Mg, I and F), sources, functions, deficiency diseases and recommended requirements. (K1, K2)
4.4. Trace elements (Zn, Cu, Co, Se, Mo) - sources, functions, deficiency diseases and recommended requirements. (K1, K2)
4.5. Balanced diet - Recommended diet for adult - Indian men and women. (K1, K2)
4.6. Diet in pregnancy and lactation. (K1, K2)

Unit V: (9 Hours)

5.1. Vegetables – Nutritive value of green leafy vegetables, roots and tubers. (K1, K2)
5.2. Vegetable cookery (preliminary preparation, changes during cooking, loss of nutrients during cooking). (K1, K2)
5.3. Fruits – Nutritive value of fruits, pigments, water, cellulose and pectic substances, flavour
constituents, polyphenols, bitterness in fruits. (K1, K2)
5.4. Ripening of fruits – chemical ripening. (K1, K2)
5.5. Storage of fruits. (K1, K2)
5.6. Antioxidants - antioxidant properties of vegetables and fruits. (K1, K2)

Text Books:

1. B.Srilakshmi, Food Sciences, 5th Edition, New Age International Publishers, 2010.
2. Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.

Reference Books:

1. K. Park - Park's Text Book of Preventive and Social Medicine, 20th Edition, Banarsidas Bhanot Publishers, Jabalpur, 2009.
2. G.R.Agarwal, Kiran Agarwal and O.P.Agarwal, Agarwal's Textbook of Biochemistry, 11th Edition, Goel Publishing House, 2000.
3. Ambiga Shanmugam, Fundamentals of Biochemistry for Medical Students, 8th Edition, Reprint 2016.

Open Educational Resources (OER):

1. http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444 (Different methods of cooking)
2. http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444 (Classification of carbohydrates)
3. http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444 (Functions of food)