

SEMESTER V

Course Code: CHE5D02

Open Course 2: CHEMISTRY IN DAILY LIFE

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcomes

At the end of the course, students will be able to:

CO1: Identify commonly used drugs in Kerala-benefits and its side effects.

CO2: Identify diseases caused by deficiency of vitamins.

CO 3: Create awareness about food additives, food adulteration and emphasize the significance of local food produce.

CO 4: Create awareness about uses of pesticides and fertilizers and their impacts on the environment.

CO5: Analyse petroleum fuels and its quality standards.

CO 6: Apply 3R principle in daily life.

CO7: Evaluate the advantages and disadvantages of cleansing agents and cosmetics on the basis of their ingredients

Module I: Polymers (8 hrs)

Classification of polymers: Origin, structure, synthesis, molecular forces. Commercially important polymers: Application of polyethylene, polystyrene, polyhaloolefines, Nylon 6, Nylon 66, Melamine, Terylene, Bakelite, natural and synthetic rubber, vulcanization, Advantages of vulcanized rubber, natural silk and artificial silk, - Plastic identification codes – Applications of biodegradable polymers (PGA, PLA and PHBV) – 3R principle - Importance of plastic recycling.

References

1. B. K. Sharma, *Industrial Chemistry*, 11th Edn., Goel publishing House, Meerut, 2000.
2. K. S. Tewari, N. K. Vishnoi, S. N. Mehrotra, *A Textbook of Organic Chemistry*, 2nd Edn., Vikas Publishing House (Pvt.) Ltd., New Delhi, 2004.
3. V. R. Gowarikar, *Polymer Chemistry*, New Age International Pvt. Ltd., New Delhi, 2010.
4. B. K. Sharma, *Polymer Chemistry*, Goel Publishing House, Meerut, 1989.
5. M. G. Arora, M. Singh, M. S. Yadav, *Polymer Chemistry*, 2nd Revised Edn., Anmol Publications Private Ltd., New Delhi, 1989.
6. Catia Bastioli, *Handbook of Biodegradable Polymers*, Smithers Rapra Publishing, 2005.

Module II: Chemistry in Biological Systems (8 hrs)

Vitamins: Name, source, function and deficiency diseases. Enzymes - Classifications, characteristics, role, examples. Hormones - Sex hormones - Androgens, oestrogens, progesterone, example, function. Cortical hormones - a few examples with function. Nucleic acid-RNA, DNA: Introduction - role in life process (No structure or chemical reactions needed).

References

1. M. V. Kulkarni, *Biochemistry*, Pragati Books Pvt. Ltd., 2008.
2. S. C. Rastogi, *Biochemistry*, 2nd Edn., Tata McGraw Hill Publishing Co., New Delhi, 2007.
3. U. Satyanarayana, U. Chakrapani, *Biochemistry*, Elsevier Health Sciences, 2014.
4. K. S. Tewari, N. K. Vishnoi, S. N. Mehrotra, *A Textbook of Organic Chemistry*, 2nd Edn., Vikas Publishing House (Pvt.) Ltd., New Delhi, 2004.
5. D. Sriram, *Medicinal Chemistry*, Pearson Education India, 2010.
6. N. V. Bhagavan, *Medical Biochemistry*, Academic Press, 2002.

Module III: Food Chemistry (8 hrs)

Common adulterants in different foods: Milk and milk products, vegetable oils, cereals, tea, coffee powder, chilly powder and beverages.

Food Additives: Antioxidants and food preservatives – Commonly used permitted and non-permitted food colours – Artificial sweeteners – Taste enhancers – Artificial ripening of fruits and its side effects.

Modern Food Habits: Definition and health effects of fast foods, instant foods, dehydrated foods and junk foods. Harmful effects of modern food habits.

Significance of healthy food habits. Importance of local produce: Coconut water, tapioca, yam, black pepper.

Food laws and standards- Food Safety and Standards Act.

References

1. Lillian Hoagland Meyer, *Food Chemistry*, 1st Edn., CBS Publishers & Distributors, New Delhi, 2004.
2. B. A. Fox, A. G. Cameron, E. Arnold, *Food Science, Nutrition and Health*, 6th Edn., Edward Arnold, London, 1995.
3. A. Siddiqui, N. Anusha, *Deleterious Effects of Food Habits in Present Era*, J. Aller. Ther. 3:114, 2012.
4. H. S. Ramaswamy, M. Marcotte, *Food Processing: Principles and Applications*, CRC Press, 2005.
5. A. F. Smith, *Encyclopedia of Junk Food and Fast Food*, Greenwood Publishing Group, 2006.
6. T. A. M. Sagati, *The Chemistry of Food Additives and Preservatives*, John Wiley & Sons, 2012.
7. S. N. Mahindru, *Food Additives*, APH Publishing, 2009.
8. Biju Mathew, *Anchor India*, Info Kerala Communications Pvt. Ltd., 2015.

Module IV: Agriculture (4 hrs)

Fertilizers: Essential nutrients for plants – NPK value – Natural and synthetic fertilizers – Nitrogenous, phosphatic and potash fertilizers (examples) – Impact of excessive use of fertilizers on environment – Biofertilizers.

Pesticides: Classification – Insecticides, herbicides, rodenticides and fungicides (definition and examples only) – Non-degradable pesticides – Pesticide pollution and its impact on environment – Endosulfan disaster in Kerala (brief study). Pheromones.

References

1. H. S. Rathore, L. M. L. Nollet, *Pesticides: Evaluation of Environmental Pollution*, CRC Press, USA, 2012.
2. Murray Park, *The Fertilizer Industry*, Elsevier, 2001.
3. B. K. Sharma, *Industrial Chemistry*, Krishna Prakashan Media, 1991.

Module V: Cleansing Agents and Cosmetics (6 hrs)

Cleansing Agents: Soaps – Hard and soft soaps – Alkali content – TFM – Detergents (classification) – Cleaning action – Advantages and disadvantages of soaps and detergents – Shaving creams. Shampoos: Ingredients and functions – Different kinds of shampoos (Anti-dandruff, anti-lice, herbal and baby shampoos). Tooth paste: Composition and health effects.

Cosmetics: Hair dye: Chemicals used and its harmful effects. Face and skin powders: Types, ingredients and functions. Cleansing creams: Cold creams, vanishing creams and bleach creams. Perfumes, antiperspirants, sun screen preparations, nail polishes, lipsticks, rouges, eyebrow pencils and eye liners (ingredients and functions) – Harmful effects of cosmetics.

References

1. B. K. Sharma, *Industrial Chemistry*, Krishna Prakashan Media, 1991.

2. M. S. R. Winter, *A Consumer's Dictionary of Cosmetic Ingredients*, 7th Edn., Three Rivers Press, New York, 2009.

Module VI: Pharmaceuticals and Dyes (8 hrs)

Drug: Chemical name, generic name and trade names with examples. Terminology: Prodrug, pharmacy, pharmacology, pharmacophore, pharmacognosy, pharmacodynamics and pharmacokinetics (elementary idea only). Antipyretics, analgesics, antacids, antihistamines, antibiotics, antiseptics, disinfectants, anaesthetics, tranquilizers, narcotics, antidepressants and psychedelic drugs (definition and examples). Benefits and side effects of commonly used drugs in Kerala – Paracetamol, Atenolol, Morphine, insulin (structure not required).

Dyes: classification based on constitution, application, examples, uses.

Dyes: Requirements of a dye – Classification based on mode of application to the fabric – Applications of dyes (general study).

References

1. B. K. Sharma, *Industrial Chemistry*, Krishna Prakashan Media, 1991.
2. Gurdeep R. Chatwal, *Synthetic Drugs*, Himalaya Publishing House, Bombay, 1995.
3. Jayashree Ghosh, *A Textbook of Pharmaceutical Chemistry*, 3rd Edn., S. Chand and Company Ltd., New Delhi, 1999.

Module VII: Fuels (6 hrs)

Definition and classification of fuels – Characteristics of a good fuel – Combustion – Calorific value – Wood.

Coal: Classification based on carbon content – Fractional distillation products of coal and uses of various fractions.

Petroleum: Origin – Fractional distillation – Different fractions, their composition and uses. Petrol: Knocking – Octane number – Aviation fuel. Diesel: Cetane number. Flash point. Natural gas, biogas and LPG: Composition and uses.

Pollution due to burning of fossil fuels.

Solar energy and solar cells (applications only).

References

1. B. K. B. Rao, *Modern Petroleum Refining Processes*, 4th Edn., Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 2002.
2. B. K. Sharma, *Industrial Chemistry*, Krishna Prakashan Media, 1991.

Scheme of Examinations:

The external question paper carries 60 marks and internal examination is of 15 marks. Duration of each external examination is 2 Hrs. The pattern of External Examination is as given below:

Section A

Short answer type carries 2 marks each – 12 questions

Ceiling – 20

Section B

Paragraph/ Problem type carries 5 marks each – 7 questions

Ceiling – 30

Section C

Essay type carries 10 marks (1 out of 2)

1x10=10

The students can answer all the questions in sections A & B but there shall be ceiling.

Mark Distribution