Chemistry Minor
Paper: 1
(Theory)
Course Title: Chemistry in Daily life

Credits:4	Elective
Duration of the Course: 6 Months Total No. of Lectures = 60h	Max. Marks : 100

Unit	Topics	No. of Lectures
I	**Chemistry of Water:** Water resource**,** water quality parameter and drinking standard. Physical, chemical, biological quality of drinking water	06
II	**Water composition analysis:** Hardness testing, pH, salinity, turbidity/TDS, conductivity testing, minerals.	06
III	**Carbohydrates:** Classification of carbohydrates, general properties of glucose and fructose. Biological importance of carbohydrates.	06
IV	**Basics of food science:** Basic concepts, nutrition and nutrients, classification of food, food group and food pyramids and balanced diet.	06
V	**(a) Food Preservation:** Definitions, objective, and principle of food preservation, different methods of food preservation. **(b) Contamination of food:** Physical and chemical (heavy metal and pesticide) contamination of food. Elementary idea of food additives (intentional and unintentional, antioxidant, sweeteners and colors).	12
VI	**Food safety and standards:** Food safety, food hazards of biological origins, food standards (ISI, Agmark, FPO, MPO, PFA and FSSAI).	06
VII	**Medicine and health care:** Definition and Classification of drugs. Analgesic (non-narcotic and norcotic drugs). Adverse effect of the representative therapeutic agents (only elementary idea) such as sulfonamide chloroquine, chlorumphenicol, asprin, paracetamol and antacids.	12
VIII	**Cosmetics:** Introduction of cosmetic products, forms of cosmetics and their suitable examples. Preventive measures in their uses and applications.	06

Suggested Readings:

1. Water Chemistry by Vernon L. Snoeyink and Davis Jenkins; John Wiley & Sons.
2. Water Chemistry by P. L. Brezonik and Willium A. Arnold; Oxford University Press.
3. Water Chemistry by Stanley E. Manahan; CRC Press, Tayler & Francis Group.
4. Drinking Water Treatment for Developing Countries' by A. B. Pandit and J. Kishen Kumar.
5. Carbohydrate based Drug Discovery' by Chi – Huey, Wong; Wiley – VCH.
6. Carbohydrate Chemistry for Food Scientists, 3rd Edition; J. N. BeMiller, WP:Woodhead Publishing, Elsevier.

Suggested online links:

http://heecontent.upsdc.gov.in/Home.aspx
https://nptel.ac.in/courses/104/106/104106096/

Chemistry Minor
Paper – 2
(Theory)
Course Title: Chemistry and Society

Credits:4	Elective
Duration of the Course: 6 Months Total No. of Lectures = 60h	Max. Marks : 100

Unit	Topics	No. of Lectures
I	**Importance of Chemistry in Society:** Chemicals – good or bad. Chemicals verses life expectancy. Consumer chemistry, chemical literacy for life.	06
II	**Chemistry of Soil Science:** Definition of soil, concept of lithosphere, soil as natural body, soil components (air, water, Inorganic and Organic solids).	06
III	**Chemistry in Agriculture and Plant Protection:** Fertilizers (nitrogen, phosphorus and potassium based) and biomagnifications. Pesticide (introduction and examples): insecticide, fungicides, herbicide, rodenticide and molluscicide. Regulations, Control and specific use of pesticide.	12
IV	**Soap and detergents:** Soap, types of soap, synthetic detergents and their classification. Mechanism of cleaning action.	06
V	**Energy and Chemistry:** Fuels (fossil, petroleum, coals and natural gas). Energy (nuclear, solar, water, wind), energy from biomass and garbage, green energy, clean energy.	10
VI	**Chemistry in Global Economy:** The direct and indirect global impact of chemical industry and their contribution towards sustainable developments.	06
VII	**Chemistry and Modern Warfare:** Explosives, nuclear weapons, chemical weapons of mass destruction. Type of chemical warfare agents (nerve, blood, blister, choking), protection devices.	08
VIII	**Chemistry in Crime and Law Enforcement:** Introduction of forensic chemistry, Chemistry in mob control, drugs in sports, analytical tool in crime detection.	06

Suggested Readings:

1. The Surface Chemistry of Soils by Garrison Sposito, Oxford University Press.
2. Principles and Practice of Soil Science: The Soil as a Natural Resource,4th Ed. by Robert E. White; Blackwell Publishing.
3. Environmental Chemistry of Soils by Murray B. McBride, Oxford University Press.
4. Fundamentals of Soil Science by Henry D. Foth, 8th Ed., John Wiley & Sons.
5. Encyclopedia of Soil Science by Ward Chesworth, Springer.
6. Biobased surfactants and detergents: Synthesis, properties and applications; Douglas G. Hayes, Dai Kitamoto, D. K. Y. Solaiman, R. D. Ashby;AOCS Press.
7. Lotions, Soaps and Scents; Anne G. Lewis; Lerner Publishing Group.
8. Handbook on Soaps, Detergents and Acid Slurry, 3rd rev. Ed., NIIR Board, Asia Pacific Business Press Inc.
9. Food, Energy and Water: The Chemistry connection; Satinder Ahuja, Elsevier.
10. Sustainability and Environmental Impact of Renewable energy Sources, R, M, Harrison, R. E. Hester, Royal Society of Chemistry.
11. Industrial Chemistry for Advanced Students; Mark Anthony Benyenuto; De Gruyter.
12. Agents of War: A History of Chemicals and Biological Weapons; Edward M, Spiers; Reaktion Books.
13. Forensic Chemistry: Fundaamentals and Applications; jay Siegel, Wiley – Blackwell.
14. Forensic Laboratory Manual: Chemistry Matter and Chenge (Student Edition), McGraw-Hill.
15. Forensic Chemistry: David E. Newton, Facts on File.
16. Genetically Modified Athletes: Biomedical Ethics, Gene Doping and sports; Andy Miah; Routledge.

Suggested online links:

http://heecontent.upsdc.gov.in/Home.aspx
https://nptel.ac.in/courses/104/106/104106096/
https://nptel.ac.in/courses/104/106/104106096/
https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm
https://nptel.ac.in/courses/104/103/104103071/#