

CHEM 1002 – Introduction to Chemistry of Cosmetics

School:	School of Science
Subject Area:	Chemistry
Course Credit:	3
Instructor:	CHAN Dennis Ho Wai
Pre-requisite/co-requisite:	Nil

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

The Hong Kong University of Science and Technology
CHEM 1002 Introduction to Chemistry of Cosmetics
2025 Summer Semester
Course Outline

1. Course Instructor:

Prof. CHAN, Ho-Wai Dennis
Room 4528 (Lift 25/26), Academic Building. E-mail: chanhw@ust.hk
Tel. 3469 2099

2. Teaching assistant(s):

(i) *Miss MAK, Pui Yu Angela* *E-mail: makpy@ust.hk*
(ii) *Mr. MAN, Tak-Pui Tim* *E-mail: takpm@ust.hk*
Room UG001, CYT Building. *Tel. 3469 2583*

3. Meeting Time and Venue:

Date/Time: every Mon, Wed & Fri, 2:00 pm – 5:20 pm
Venue: Room 2503 (Lift 25 or 26), Academic Building

4. Course Description:

Credit points: 3.0 *Pre-requisite:* LANG 1401/1402/1403/1404 *Exclusion:* NIL

Common Core Area: Broadening – Science

Previous course code: CHEM 002 / CORE 1121

Brief information:

This course concentrates on the basic scientific principles in cosmetic science. Various topics with emphasis on molecular approach related to cosmetic products' formulation and proper uses of cosmetic products will be covered. Major topics include definition of cosmetics, make-up cosmetics, skin-care cosmetics, hair-care cosmetics, vehicles of cosmetic products, surfactants, colorants, alpha hydroxyl acids & beta hydroxyl acids, antioxidants and sunscreens, skin-whitening agents, hydrating substances / moisturizers, antiperspirants & deodorants and botanical ingredients.

5. Intended Learning Outcomes (ILOs):

This is an introductory chemistry course designed for students either with or without background knowledge in chemistry. Students are expected to achieve the following outcomes after taking the course:

- (i) To identify the contributions of chemists to the technological innovations of modern personal care products.
- (ii) To develop basic understanding of fundamental chemistry concepts and the scientific basis for cosmetic formulations.
- (iii) To employ concepts in chemistry to explain some cosmetic technology and cosmetic inventions.
- (iv) To appreciate the efforts of chemists in cosmetic product design and developments.

6. Assessment scheme:

Letter grades (i.e., a grade ranging from A+ to F).

Assessment	Weighting
1. Homework, HW1 (before mid-term test) & HW2 (before final exam)	15%
2. Quiz (Based on topics covered in topics 1 to 2)	15%
3. Mid-term Test (Based on topics covered in topics 1 to 5)	35%
4. Final Examination (Focus will be put on topics covered in topics 6 to 11)	35%

- *About Academic Integrity*: Dishonesty or cheating will not be tolerated. Any student violating the HKUST Academic Honor Code (<https://registry.hkust.edu.hk/resource-library/academic-honor-code-and-academic-integrity>) will be subject to disciplinary procedure.
- In HW1 and HW2, you are allowed to use *generative artificial intelligence (genAI)* to aid you in any manner. Quiz, Mid-term Test and Final Examination are closed-book assessments. No *genAI* is allowed in these assessments.

7. Student Learning Resources:

(a) Course Handouts:

Course handouts can be accessed from the Canvas site (<https://canvas.ust.hk>), by using your own ITSO username and password.

(b) General Reference Books:

- (i) Hilda Butler (editor), *Poucher's Perfumes, Cosmetics, and Soaps, 10th edition*, Dordrecht: Kluwer Academic Publishers © 2010. [call nr.: [TP983.P723 2010](#)] or Hilda Butler (editor), *Poucher's Perfumes, Cosmetics, and Soaps, 10th edition*, Dordrecht: Springer-Science+Business Media, B.V. © 2000. §§
- (ii) Zoe D. Draeles; Lauren A. Thaman (editors), *Cosmetic Formulation of Skin Care Products*, New York: Taylor & Francis © 2006. [call nr.: [TP983.3.C67 2006](#)] §§
- (iii) Nava Dayan (editor), *Skin Aging Handbook: An Integrated Approach to Biochemistry and Product Development*, New York: William Andrew Inc. © 2008. [call nr.: [QP88.5.S553 2008](#)] §§
- (iv) Linda D. Williams, *Chemistry Demystified*, New York: McGraw-Hill © 2003. [call nr.: [QD33.2.W54 2003](#)] §§ or the same title published in 2011 [call nr.: [QD37.W48 2011](#)]
- (v) Anthony J. O'Lenick Jr.; Thomas G. O'Lenick, *Organic Chemistry for Cosmetic Chemists*, Carol Stream, IL: Allured Publishing, © 2008 [call nr.: [TP983.O445 2008](#)]
(§§: denotes an electronic version (e-book) is available in HKUST library and can be accessed using campus Wi-Fi network. For the remaining, you can borrow them from library's Course Reserves Collection.)

8. Teaching and Learning Activities:

Type of Activities	ILOs
1. Lectures – participation and attention in lectures on fundamentals of chemistry and the scientific basis	(i), (ii) (iii) & (iv)
2. Video clips – demonstration of basic concepts in chemistry.	(ii) & (iii)
3. Live demonstration – demonstration of some basic scientific principles related to cosmetic functions/properties.	(ii) & (iii)

9. Keyword syllabus / topics:

1. Cosmetics & Chemists' Perspective; Classification & Production of Cosmetics
2. Vehicles in Cosmetics; Extractions of Botanical Ingredients
3. Surfactants in Cosmetics
4. Hair-Care Cosmetics: Shampoos, Hair-Conditioners and Treatment
5. Hair Waving & Hair Colors
6. Color Cosmetics: Essence of Makeup
7. Skincare: Cleansing, AHAs and BHAs
8. Photoaging and Antioxidants
9. Skin-whitening Agents
10. Sunscreens
11. Antiperspirants & Deodorants