

CHEM1807: FOUNDATIONS OF ENVIRONMENTAL SCIENCE

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Foundations of Environmental Science

Subject Code

CHEM - Chemistry

Course Number

1807

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BMS1801 Biosphere: Diversity, Functions and Interactions
BCH1807 Foundations of Environmental Science

Exclusive Courses

Nil

Additional Information

CHEM1807 is currently offered only to:

- students undertaking the Bachelor of Social Sciences in Public Policy and Politics Major who have not obtained a sufficient background in Biology and Chemistry to pursue CHEM' s higher level courses in Environmental Sciences

Part II Course Details

Abstract

This course aims to provide essential knowledge on life systems and their environments to students without a background in Biology and Chemistry. The course will centre on three major themes:

- Cell structure and function, including nutrition, food-webs and energy requirements for the maintenance of life, and key material cycles in nature.
- The diversity of life and ecology and interactions of living organisms, including the concept of keystone species, from a habitat-based perspective.
- Basic environmental chemistry related to ecosystem health.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the key factors which contribute to the maintenance of life.		x		
2	Describe, using relevant examples, the diversity of life, including the differences between microorganisms, plants and animals.		x		
3	Relate effects of environmental parameters on living organisms and use this knowledge to explore critical environmental issues which may affect sustainability.			x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures and tutorials	Lectures and tutorials, including in-class activities such as interactive responses using laptops, "think-pair-share", video presentations, discussions and presentations.	1

2	Lectures and tutorials	Lectures and tutorials, including in-class activities such as interactive responses using laptops, “think-pair-share”, video presentations, discussions and presentations.	2	
3	Lectures, tutorials and problem-solving activities	Lectures, tutorials and problem-solving activities, such as web-based discussions, debates, and poster/oral presentations.	3	

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Short Quizzes	1, 2	5
2	Tutorial Activities / Assignments	1, 2, 3	20
3	Web-based Discussion / Presentations	3	15

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Additional Information for ATs

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM:

“A minimum of 40% in both coursework and examination components.”

Assessment Rubrics (AR)**Assessment Task**

Short Quizzes

Criterion

Ability to describe key concepts related to biodiversity, ecosystems, and their links to the environment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Tutorial Activities / Assignments

Criterion

Ability to explain relationships between environmental chemistry and ecosystem health

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Web-based Discussion / Presentations

Criterion

Capacity to explore fundamental environmental issues related to ecosystems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Ability to describe, explain and synthesize concepts and relationships related to ecosystems and the environment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information**Keyword Syllabus**

Cell structure and function

The diversity of life

Nutrition, energy requirements, and the maintenance of life

Food webs and material cycling in nature

Populations, communities and ecosystems

Basic environmental chemistry

Pollutant movements in an ecosystem

Effects of pollutants on living organisms and ecosystem health

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Campbell N.A., Reece J.B., Taylor M.R., Simon E.J., Dickey J.L. (2009) Biology Concepts and Connections, 6th Edition. Pearson, Benjamin Cummings, San Francisco.
2	Connell, D.W. (2005) Basic Concepts of Environmental Chemistry. 2nd Edition. Boca Raton, FL : Taylor & Francis/CRC Press.
3	Enger, E.D. (2008) Environmental Science: A Study of Interrelationships. Boston: McGraw-Hill.
4	Miller, G.T., Jr. and Spoolman, S.E. (2009) Essentials of Ecology. Belmont, CA: Brooks/Cole.
5	Raven P.H., Johnson G.B., Losos J.B. and Singer S.R. (2008) Biology. 8th Edition. McGraw Hill, New York.
6	Online Resources: To be provided, as required, in lectures and tutorials.