

CHEM4078A: AQUATIC ECOLOGY

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Aquatic Ecology

Subject Code

CHEM - Chemistry

Course Number

4078A

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

CHEM2067/BCH2067 Diversity of Life and Evolution and/or
CHEM3068/BCH3068 General Ecology

Equivalent Courses

BCH4078A Aquatic Ecology

Exclusive Courses

Nil

Additional Information

Note: CHEM4078A does not contain any practical component, and has a credit unit value of three (3).

Part II Course Details

Abstract

In this course, students will:

- explore the physical and chemical characteristics and processes, as well as biodiversity, of aquatic ecosystems;
- identify and examine biotic interactions and physical and/or chemical factors determining the community structure in aquatic habitats;
- review and evaluate contemporary issues related to human impacts on the aquatic ecosystems.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe and understand physical and chemical characteristics and processes, as well as the ecological structure, of aquatic ecosystems.	40	x	x
2	Possess investigative skills in conducting scientific investigations on aquatic ecosystems and interpreting species interactions and their significance in the determination of community structure and patterns.	30		x
3	Able to critically evaluate the impact of human activities on the ecology of aquatic ecosystems.	30		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, tutorials, and quizzes	Students will learn to identify and describe factors determining the ecological characteristics of aquatic ecosystems through lectures, tutorials, and quizzes.	1	Lecture (2 hrs), tutorials(0.5 hrs)
2	Group activities	Students will work in small groups and employ basic ecological techniques to discover physical, chemical and biological characteristics of aquatic ecosystems.	2	3 hrs

3	Small group project	Students will design a small-scale laboratory/ field study to investigate an ecological question in aquatic ecology	2	1 hr
4	Group presentations/ debates, investigation of the literature or other data	Through large and small group presentations/ debates, investigation of the literature or other data, students will critically evaluate the impact of anthropogenic activities on aquatic ecosystems.	3	

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Short Quizzes	1, 2	10
2	Desktop reviews	2, 3	20
3	Group Activities / Presentations/Debates	3	20

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

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

Understanding of the topic and reading materials; correctness of interpretation and analysis of the experimental data

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

Desktop Reviews

Criterion

Understanding and critical review of the topic and reading materials; clarity and organization of the essays; extensiveness and depth of the literature study

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

Group Activities / Presentations / Debates

Criterion

Understanding of the topic and material; completeness of the presentation; logic of the presentation structure; clarity of talk; appropriate use of photos and figures in the illustration of concepts; ability to discuss the presented topic

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

Laboratory / Field Investigation Reports, Small Group Project

Criterion

Completeness and correctness of data interpretation and analysis; quality of experimental work and data collection; clarity and organization of report writing; quality and depth of discussion on experimental data

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

Completeness and correctness of calculations/answers; correctness of interpretation and analysis of experimental data; application of knowledge in solving real life problems; logic of argumentation and intelligent use of course content/ original thinking

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

- Hydrological cycle
- Physiography of standing water and flowing water
- Ocean circulation, physical and chemical parameters

- Diversity of aquatic organisms
- Aquatic communities
- Species and community interactions
- Nutrient cycling and energy flow
- Water pollution, Ocean acidification, Marine debris
- Introduced species

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Ecology of Freshwater: Earth's Bloodstream, 5th edition. Moss, B.R. John Wiley & Sons, 2018.
2	Freshwater Ecology: Principles and Applications. Jeffries, M., Mills, D. John Wiley and Sons, 1995.
3	Marine Biology (Botany, Zoology, Ecology and Evolution). 10th edition. Castro, P., Huber, M.E. McGraw-Hill Education, 2015.
4	The Biology of Rocky Shores (Biology of Habitats Series). 2nd edition. Little, C., Williams, G.A., Trowbridge, C.D. Oxford University Press, 2009.
5	The Ecology of Sandy Shores. 3rd edition. McLachlan, A., Defeo, O. Academic Press, 2017.
6	The Biology of Soft Shores and Estuaries (Biology of Habitats Series). 1st edition. Little, C. Oxford University Press, 2000.