

CHEM2070: DIVERSITY OF LIFE AND MICROBIOLOGY LABORATORY

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Diversity of Life and Microbiology Laboratory

Subject Code

CHEM - Chemistry

Course Number

2070

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

2

Level

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

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

CHEM1200/BCH1200 Discovery in Biology (for normative 4-year students) or A Level Biology (for advance standing I students)

Precursors

CHEM2013/BCH2013 Microbiology,
CHEM2067/BCH2067 Diversity of Life and Evolution

Equivalent Courses

BCH2070 Diversity of Life and Microbiology Laboratory

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to provide students with competent skills to discover different life forms in the natural environment including microbes, and deal with these specimens, living and preserved, from collection to design of protocols for detailed examination. This will include basic study and hands-on practice of the following:

- (a) principles of microscopy and the different microscopic techniques;
- (b) discovery fieldtrip, collection and treatment of live and preserved specimens;
- (c) documentation and presentation of observations.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Use compound and stereomicroscopes with competence and application of different light microscopy techniques to examine biological specimens.			x	
2	Master the technique of discovery of specific groups of microbes (e.g. bacteria, fungi, single-cell algae and protists), animals and plants and their collection from the environment for the purpose of laboratory investigation.			x	
3	Perform laboratory procedures to prepare samples of living and preserved plant, animal and microbe (e.g. bacteria, fungi, single-cell algae and protists) specimens to study their morphology and relate these features to their functions whenever applicable.			x	x
4	Make relevant and clear records of laboratory activities to document procedures and observations to reflect thorough understanding of the topic under investigation.		x	x	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	Video presentation and hands-on laboratory class	Video presentation and hands-on laboratory class on the use of compound and stereo microscopes using different light microscopy techniques to examine live and preserved specimens. Students will be working individually.	1
2	Field trips	Field trips to an appropriate ecological sites will be organised for students to discover how the different life forms exist in the natural environment and collect life specimens in groups for laboratory investigation whenever necessary or possible. Relevant government regulations in relation to collection of specimens in the wild will be explained.	2
3	Laboratory exercises	Laboratory exercises involving the examination of representative plant and animal kingdoms and the microbes using different microscope techniques. Students will be working in groups.	3
4	Report writing	Video presentations and readings will be assigned to help students to learn and develop the skills necessary to write a fieldtrip and / or a laboratory report including laboratory log book entries and biological drawings.	4

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Laboratory Class Performance(logbooks, skills demonstration, participation in class activities, attendance)	1	40	
2	Fieldwork / Group Presentation / Laboratory Reports	2, 3, 4	50	
3	Quizzes	1, 3, 4	10	

Continuous Assessment (%)

100

Examination (%)

0

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**

Laboratory Class Performance (logbooks, skills demonstration, participation in class activities, attendance)

Criterion

Capacity for self-directed learning to comprehend and explain in detail with accuracy the knowledge of biodiversity and microbiology

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

Fieldwork / Group Presentation / Laboratory Reports

Criterion

Ability to apply the knowledge of and techniques for biodiversity and microbiology in field 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

Quizzes

Criterion

Ability to explain skill and microscopy techniques for microbiology and diversity

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

Principles of microscopy and their applications.

Laboratory safety.

Aseptic techniques.

Differentiation of different bacterial groups – staining and biochemical methods.

Morphological and functional characteristics of

- Single-cell algae (diatoms, dinoflagellates, green algae), protists (protozoa, macro-algae)
- Major fungal groups (chytrids, zygomycetes, ascomycetes and basidiomycetes) and chromists
- Non-vascular plants (bryophytes, mosses)
- Vascular non-seed plants (whisk ferns, club mosses, horsetails, ferns)
- Vascular plants (conifers, flowering plants)

- Invertebrate animals (selected key phyla)
- Vertebrate animals (from fish to mammals)

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Practical Skills in Biology. Allan Jones, Rob Reed and Jonathan Weyers. 4th ed. 2007. Pearson / Benjamin Cummings.