Course Specification
(Bachelor)

Course Title:	Fresh and Marine Water Algae
Course Code:	EVS 1244
Program:	Bachelor of Science in Environmental Science
Department:	Biology
College:	Science
Institution:	Imam Mohammed Ibn Saud Islamic University
Version:	1
Last Revision Date:	-

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 Lecture + 2 Lab)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		

3. Level/year at which this course is offered: (Level 4 / Second Year)

4. Course general Description:

The course is designed to study marine and freshwater algae genera, their phenotypic characteristics, reproduction. The systematic position of each division, the relationship between the algae and other organisms, the distribution of algae in different environments (snow, lake, river, pond freshwater, semi-saline water, the sea, the ocean). Benthic algae and plankton and chemical, natural and biological factors that influence their distribution and proliferation. Harmful algal species as well as the economically important species in industrial, medical, and agricultural fields.
Practical Section: include the following topics:

- Isolation, purification, identification and preservation of ubiquitous algal genera in Saudi environment (i.e terrestrial , fresh and marine species).

5. Pre-requirements for this course (if any)**:**

EVS 1214 Marine and Fresh Water Processes

None

7. Course Main Objective(s):

Upon successful completion of this course, the student must be able to:

1- **To outline the fundamental methods of identification, classification, and differentiation of algal groups and their life cycles according to the scientific systems.**
2- **To define and describe different algae genera, their distribution, and classification.**
3- **To clarify the biotic and abiotic factors affecting algae growth & distribution.**
4- **To demonstrate methods of algae isolation, purification, and identification from their habitats.**
5- **To recognize the environmental and economic impacts of algae.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-
5	**Other**	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Method

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	State the fundamental concepts and methodology of Phycology.	K1	Lecture and take-home research assignment	Quizzes, midterm exam and final exam
1.2	State the types of algal division and the scope and its function within the Environment.	K2	Lecture and take-home research assignment	Quizzes, midterm exam and final exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.3	Define the diversity, characteristics, economic importance, and classification of main groups of algae	K3	Lecture and take-home research assignment	Quizzes, midterm exam and final exam
2.0	**Skills**			
2.1	Compare different structures, characteristics, and the life cycle of algae.	S1	Laboratory and take-home research assignment	Lab reports & activity and Lab exam
2.2	Perform different experiments to examine and identify different types of algae safely and effectively.	**S2**	Laboratory and take-home research assignment	Lab reports & activity and Lab exam
3.0	**Values, autonomy, and responsibility**			
3.1	Show ability to work in a team to conduct a specific project and solve problems.	V1	Lecture, laboratory and take-home research assignment	Quizzes, midterm exam, Lab reports, project presentations, Lab exam and final exam
3.2	Demonstrate ability to monitor and examine different kinds of algal species, their growth and interaction with the environment.	V2	Lecture, laboratory and take-home research assignment	Quizzes, midterm exam, Lab reports, project presentations, Lab exam and final exam

C. Course Content

No	List of Topics (lectures)	Contact Hours
1.	- The relationship between the algae and other organisms. - The distribution of algae in different environments.	4
2.	- Chemical, natural and biological factors affecting growth and distribution of algae. -Benthic algae and plankton -Methods of reproduction in algae.	4
3.	Classification of algae Division: Cyanobacteria (blue-green algae)	4
4.	Division: Chlorophyta	4
5.	Division: Bacillariophyta	4
6.	Division: Euglenophyta Division : Charophyta,	2
7.	Division: Chrysophyta	2
8.	Division: Phaeophyta	2
9.	Division: Rhodophyta	2
10.	The economic and biotechnological importance of algae in agricultural, medical and industrial field.	2
Total		30

No	List of Topics (labs)	Contact Hours
1.	Introduction to algae structure, function and classification	2
2.	Experimenting with the Cyanophyta growth, reproduction, and phenotypic examination	4
3.	Experimenting with Chlorophyta (i.e. species types , reproduction and phenotypic examination)	4
4.	Experiment with the Euglenophyta (i.e. species types , reproduction and phenotypic examination)	4
5.	Experimenting with the Chrysophyta (i.e. species types , reproduction and phenotypic examination)	4
6.	Experimenting with the Bacillariophyta (i.e. species types , reproduction and phenotypic examination)	4
7.	Experimenting with the Phaeophyta (i.e. species types , reproduction and phenotypic examination)	4
8.	Experimenting with the Rhodophyta (i.e. species types , reproduction and phenotypic examination)	4
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	Around 4th - 5th week	15%
2.	Midterm 2	Around 7th - 8th week	15%
3.	Quizzes, Participation, Attendance	During the semester	10%
4.	Lab reports	During the semester	5%
5.	Lab Exam	15th week	15%
6.	Final Exam	16th week	40%
Total			**100%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential Textbooks	• **Title:** "Algal Biology: A Comprehensive Guide"
	  ○ **Author:** Linda E. Graham, Lee W. Wilcox, and Aaron J. Hehman
	  ○ **Year:** 2023
	• **Title:** "Algal Ecology: Freshwater Benthic Ecosystems"
	  ○ **Author:** Edited by Brian A. Whitton, Michael F. Buchheim, John D. Wehr
	  ○ **Year:** 2022
	• **Title:** "Microalgal Biotechnology: Potential and Production"
	  ○ **Author:** Eduardo Jacob-Lopes, Leila Queiroz Zepka, and Maria Isabel Queiroz
	  ○ **Year:** 2021
	• **Title:** "Phycology: Fourth Edition"
	  ○ **Author:** Robert Edward Lee
	  ○ **Year:** 2020
	• **Title:** "Algae-Based Biopharmaceuticals"
	  ○ **Author:** Hesham Ali El-Enshasy and Se-Kwon Kim
	  ○ **Year:** 2020

Essential References Materials	- **Journal of Phycology** - This is a premier journal for phycological research, covering a wide range of topics related to algae. - **Phycologia** - Another leading journal in the field of phycology, offering research articles, reviews, and discussions on various aspects of algae. - **Algal Research** - A multidisciplinary journal focusing on algal research, including topics like cultivation, biotechnology, ecology, and applications. - **Journal of Applied Phycology** - This journal highlights applied research in the field of algae, including its role in biotechnology, environmental science, and more. - **Aquatic Botany** - A journal that publishes research on aquatic plants, including algae, in various aquatic ecosystems. - **Marine Biology** - While not exclusively focused on algae, this journal often features research on marine algae and their interactions with marine environments. - **Journal of Algal Biomass Utilization** - This journal emphasizes the utilization of algae for bioenergy, bioproducts, and environmental applications. - **Phycolgia Balcanica** - Focusing on algae in the Balkan region, this journal provides insights into algal diversity and ecology in this specific geographical area. - **Harmful Algae** - This journal is dedicated to the study of harmful algal blooms and their ecological, health, and economic impacts. - **Journal of Eukaryotic Microbiology** - While not algae-specific, it covers a wide range of topics related to protists, including various algal groups.
Electronic Materials	• http://zendahscience.jeeran.com/ • http://algae.sourceforge.net/algae.html • http://algae.sourceforge.net/ • http://www.algaebase.org/ • http://en.wikipedia.org/wiki/Algae • http://www.kingdomplantae.net/
Other Learning Materials	Videos, slides and presentations that are available with the instructor. Scientific video in http://www.youtube.com/ related to course contents

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Environment-related instruments

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of Students assessment	Program Leader	Direct
Quality of learning resources	Peer Reviewer	Indirect
The extent to which CLOs have been achieved	Program Leader	Direct
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Head of Biology Department**
REFERENCE NO.	
DATE	