

This syllabus is a general representation of the course as previously offered and is subject to change.

BIOL 303 – Green Planet: Biology and History of Plants that Changed Civilizations

General Course Syllabus (as of June 2023)

About the Course:

Course Description: BIOL 303 covers foundational biological principles and establishes the scientific basis that underscores the selection of plants as food, medicine, or raw materials by different societies. Within each module, the learning activities will integrate the scientific foundation with the economic, cultural, and societal significance of these plants, which will help students contextualize the role of these plants in the development of agricultural practices and the rise and fall of civilizations.

Course Format: Lecture

Credits: 3 credits

Prerequisites: A minimum of 3rd year standing

Course Learning Objectives:

By the end of the course, students will be able to:

- Articulate how biological principles governing plant genetics, physiology, nutrition, and specialized metabolism are important to understanding the selection of staple crops.
- Explain how humans have modified plant life over time through selective breeding and genetic engineering.
- Describe the versatility of human uses of plants and the impact on societies over time.
- Describe how agricultural practices have changed over time and discuss the ethical, economic, cultural, environmental, and societal significance of specific agricultural practices.
- Interpret scientific data, explain scientific results, and discriminate the quality of information from different sources based on the scientific evidence provided.
- Develop advanced writing skills with an emphasis on structure, content, and language.
- Discover the power of group work and iterative writing where the quality of the work improves when constructive feedback is provided.

Textbooks and Additional Resources:

- 8th Edition of the Levetin and McMahon. 2020. Plants and Society. McGraw-Hill (recommended)
- Additional resources/references provided on Canvas.

Evaluation:

Assessments	Weight
Pre-reading – Canvas quizzes	10%
Homework – Canvas quizzes	10%
In-class assignments	10%
Distance to food project	20%
Infographic assignment	10%
Summary reflection	10%
Food / alcohol manufacturing assignment	10%
Final Exam	20%

Details on Assessments:

Pre-reading / Homework - Canvas quizzes

For Modules 1-9, knowledge of unit content will be assessed by a Canvas quiz. Format will be multiple choice/choose all that apply. There will be no make-up quizzes but we will only count the best seven out of nine quizzes.

In-class assignments

These activities will be completed each day in lecture and handed in at the end of class. No make-up activities are possible but we will allow two misses without penalty to accommodate absences (e.g., i-clickers, worksheets, minute papers, question formulation activities; case studies; assignment preparation activities).

Distance to food project

This assignment will investigate, at the level of the whole class, the travel distances of the most common fresh foods (key issues: ecological footprint of food, supply chain in British Columbia, food sustainability), and the personal access to fresh and healthy foods (distance to grocery stores, equity issues)

Infographic assignment

In small groups (4 students), the students will formulate a scientific question about the staple food crops of their choice, then create an infographic to communicate their findings to two different audiences (Experts and general public) following clearly defined

instructions. The groups will work together to research their topic and will collaborate in the preparation and presentation of both infographic assignments in a venue TBD.

Summary reflection assignments

A 300 words summary in response to provided prompts designed to reflect the Learning Objectives of each module. The reflection is expected to be an original piece of writing that incorporates students' personal experiences and interests as well as correct use of scientific information and citations.

Food/alcohol manufacturing assignment

This is a two stage assignment. In the first stage, a panel of experts from reputed alcohol/food manufacturing companies, or experts in the topic from different universities, will provide an introduction and general information about their businesses and products. This activity will preferably be in person, but Zoom meetings could be arranged based on availability. In the second stage, students will work in small groups (3-4 students) and will select to visit either a brewery/winery (only available to students 19 years-old and older), a bread/cheese manufacturer (available to all students). The students will prepare questions in advance, and ask for information about the origin of the raw materials, manufacturing practices, equipment, and quality control. After the visits, the students will write a report including the questions formulated and assessing the quality of the information received using a scientific lens.

Final exam

The final exam will contain randomized combinations of data analyses and short answer questions (generally requiring one paragraph or 3-5 sentences to answer). The questions will cover fundamental learning objectives of the course and will be heavily focused on reasoning rather than memorization.

Course Policies:

Academic Honesty and Plagiarism:

- Academic integrity is important. Cheating and plagiarism in any form will not be tolerated. See the following resources for details: [Academic Integrity | Science Writing Resources \(new\) \(ubc.ca\)](#)
- Work that you submit (assignments & tests) must be your own. Written work must be in your own words, and sources must be appropriately cited. You may not "copy and paste" from source materials. You may not submit work that has already been submitted elsewhere for credit, even if it is your own work. Your exams must be written individually, using only permitted resources/materials. Usage of any other resources will be investigated.
- Any attempt to pass off someone else's work as your own (including, but not limited to instances listed above) are considered to be acts of Academic

Misconduct by the university. If academic dishonesty is suspected the incident will be reported to the Associate Head of Biology for further investigation, and there is the potential for severe penalties.

- We take academic integrity very seriously – individuals caught cheating and/or plagiarizing will receive 0 on their exams, and have their cases escalated to the Associate Head of Botany and/or to the Dean of Science. Please make sure that you understand what falls under Academic Misconduct.

Copyright:

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the Course Instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline.

Schedule of Topics:

Unit	Topic
Module 1 – The origins of agriculture. <i>Taming the diversity of wild plants.</i>	
1	Introduction to Green Planet
2	The origins of Agriculture and farming
Module 2 – Genetics, trait selection, and methods of plant domestication. <i>Bigger, better, faster, stronger.</i>	
3	Plant Domestication Genetic Basis
4	Plant Domestication Selected traits
5	Methods of domestication - Organismal level
6	Methods of Domestication - Molecular approaches
Module 3 – Plant yield and the Green Revolution. <i>A 20th century “solution” to famines.</i>	
7	Green Revolution - Food Security
8	The Green Revolution legacy – Genetic Erosion
9	The Green Revolution legacy – Pesticide Resistance
10	The Green Revolution legacy – Unsustainable use of resources
Module 4 – Cultivation and social significance of staple food crops. <i>A vegan food journey around the world.</i>	
11	Grasses that feed the world
12	Food or Fuel? – Ethanol crops
13	Starchy staples
14	Fruits, vegetables, and legumes

Module 5 – The science of flavor and the spice trade. <i>Old trade stories that are anything but bland.</i>	
15	The world of flavors: Herbs and Spices
16	How spices and herbs shaped our history
Module 6 – The isolation of active principles: From herbalism to modern pharmacology. <i>Known healers and killers of the plant kingdom.</i>	
17	Herbalism and the origin of Western medicine
18	Case studies in modern herbal pharmacology and herbalism
Module 7 – Psychoactive plant metabolites and the science of addiction. <i>These plants will blow your mind.</i>	
19	The Science of addiction
20	Addictive plant products
Module 8 – Plant biochemistry and the production of plant oils and alcoholic beverages. <i>Green gold for industry and society.</i>	
21	Plant oils and fats
22	Fermented foods and Alcoholic beverages
Module 9 – Plant cell biology and the isolation and processing of natural fibers. <i>Keeping up with fashion and culture.</i>	
23	Natural fibers - Clothing
24	Natural fibers - Pulp and paper

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence.

UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.

UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.

UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on [the UBC Senate website](#).