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

BIOL 462 / FRST 413 / BOTA 528 – Ecological Plant Biochemistry

General Course Syllabus (as of May 2019)

About the Course:

Course Description: A course on the biochemistry, biological functions, and applications of specialized (secondary) plant metabolites.

Course Format: Lecture
Credits: 3
Prerequisites: BIOL 200 and BIOL 201. (BIOL 209 or BIOL 210 recommended)

The course is for **advanced students** with background from other courses in plant or animal physiology, biochemistry, molecular biology and/or organic chemistry. This course **will not repeat basic plant biochemistry**. The course is designed to help students develop advanced understanding of research topics in plant biology. The course will not be all-inclusive but will build on selected themes and topics.

Course Learning Objectives:

By the end of this course, students should be able to:

- Discover and understand principles of chemical interactions of plants with other organisms.
- Develop an appreciation and fundamental knowledge of specialized plant chemicals, their chemical diversity, biochemical pathways, evolutionary origins, and their ecological functions.
- Discover well-known and possible new applications of plant chemicals based on their biological activities.

Textbooks and Additional Resources:

Texts: There is no textbook that covers the large and rapidly developing field of "Ecological Plant Biochemistry". The course requires reading of **original research articles** and **review articles** as the primary source of information on topics covered during the tern. The instructor will provide selected references for relevant review articles and original research papers related to each course topic. As a course requirement, students must research additional papers for each topic (see below).

Textbook: For background reading on plant biochemistry:
Biochemistry and Molecular Biology of Plants, 2nd Edition
Editors: R. B. Buchanan, R. L. Jones, W. Gruissem,
Publisher: Wiley

Evaluation:

Assessment	Weight
Active Participation & Presentation	50%
Midterm Exam	20%
Final Exam	30%

Midterm Exam: The midterm exam will cover material from the course outline, introductory parts of the course, assigned papers, and student presentations prior to the date of the midterm exam.

Final Exam: The final exam will cover material from all parts of the course, including materials from the course outline, introductory parts of the course, assigned papers, and student presentations.

Discussion of Assigned Papers: The instructor *and* students will start by summarizing the main concepts, ideas and discoveries presented in the assigned papers. Students can volunteer or may be asked to summarize assigned papers. The summary will be followed by discussions of the more specific details presented in assigned papers. These discussions can focus on (i) originality of the question addressed in the paper, (ii) research methods, (iii) evaluation of the data and results presented in the paper, (iii) conclusions of the authors and your own conclusions. Ultimately, the class will evaluate the relevant new contributions of each paper. **All students are required to actively participate in summarizing and discussion of assigned papers**. In discussions of assigned papers, the instructor will help students understand the context and content of assigned papers.

Student Presentation: Students will do a presentation on a selected topic in groups of up to 5 students per presentation. **Presentations should be timed to ~ 30 minutes and must** provide a critical assessment of the work being presented, not just a summary of the paper.

Schedule of Topics:

Course Calendar

Week 1	General Introduction, Course Outline, Expectations
Week 2	Overview of course topics
Week 3	Assignment of Presentations & Literature Search
Week 4	Literature Search and In-class Preparations
Week 5	Student Presentations
Week 6	Student Presentations
Week 7	*Quiz*, and guest lecture
Week 8	*Midterm Exam*
Week 9	Student Presentations
Week 10	Student Presentations
Week 11	Student Presentations
Week 12	Comprehensive Review of Course Materials

Synopsis

- The overarching and guiding question that will be explored in this course: ***How do plants as sessile autotrophs survive among mobile heterotrophs?***

- The course provides an introduction to **specialized plant metabolites**. Such metabolites have traditionally been referred to as **secondary metabolites** or **natural products**.

- The course covers topics on **functions** of specialized plant metabolites in a context of plants interactions with other organisms.

- The course will guide a detailed analysis of well-established and new **concepts of plants interacting with other organisms**, including “friends” and “foes”.

- The chemicals covered in the course include **alkaloids**, **terpenoids**, **phenylpropanoids**, **glucosinolates**, **cyanogenic glycosides**, and various other organic compounds produced by plants or produced by other organisms that interact with plants.

- The **ecological interactions mediated by these chemicals**, and covered in this course, include for example:

    - Chemical communications between plants and insects
    - Chemical communications between plants and birds
    - Chemical communications between plants and plants
    - Direct chemical defence against herbivores
    - Indirect chemical defence against herbivores

    Please see the list of selected course topics in the course learning objectives above.

- **Biological activities** of specialized plant chemicals are also highly important for humans, including discovery and development of new **pharmaceuticals**, as compounds for the **food flavour**, **fragrance** and **cosmetics industries**, and for the development of **new strategies for environmentally benign plant protection**.

- The instructor and others at UBC have **active research programs** in subject areas of Ecological Plant Biochemistry. During the course, the instructor and invited guest lecturers may present aspects of their ongoing and active research programs.

Course Policies:

Self Assessment: Instead of using strict prerequisites in the form of previous courses, each student will self-assess her/his readiness for this advanced course. On or before the first day of the course, students will be given references for 3 - 6 papers that are representative of the course reading and learning material. Each student must assess her/his ability to comprehend the example papers.

Active Participation - What is expected?

- This course is not a traditional lecture course.
- This course is not for students who come only to listen and to memorize facts.
- The course requires all students to research and read assigned papers prior to every class.
- The course emphasizes on every student's active involvement in discovery, presentation, analysis and discussion of course materials during every class.

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 ae 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.