

FOOD 521 - Advances in Food Biotechnology

Winter Term 1 (SEP – DEC 2016)

4-5:30 PM Wednesday in FNH 50 & 4-5:30 PM Friday in FNH 320

Instructors: Dr. Simone Diego Castellarin & Dr. Vivien Measday

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Availability: Please make an appointment by contacting the instructor during class or by sending an e-mail.

1. Course Description and Format:

FOOD 521 is a topical course intended to provide an advanced understanding of key concepts and current applications of biotechnology in the production and processing of foods. The course utilizes lecturing, student-directed presentations and discussions to cover topics on recent advances in important areas of food biotechnology from an international perspective. The topics include genetic engineering, genome analysis, functional foods, bioconversion of food materials, as well as improvement of food quality and food safety.

2. Learning Outcomes:

Upon successful completion of this course, students will:

- Be able to discuss how molecular biotechnology is being used to address major challenges associated with healthier and safer food production, and processing.
- Develop an advanced understanding of current food biotechnologies with a focus on genetic engineering.
- Be able to describe the fundamental principles in implementing biotechnologies in various aspects of food production and processing.
- Improve oral communication through presentation and class-based discussion of food biotechnology.

3. Academic Integrity:

You are expected to act in accordance with the University of British Columbia policy on academic integrity (<http://learningcommons.ubc.ca/guide-to-academic-integrity/>). If you are unsure of appropriate behaviour, please consult the instructor.

4. Course Resources:

Book chapters and journal articles will be selected from the books and journals listed below for the preparation of the lectures. These resources can be accessed online.

Reference textbooks:

- Fundamentals of Food Biotechnology. Byong H. Lee. John Wiley & Sons Inc. 2015. Print ISBN: 9781118384954; eBook ISBN: 9781118384947 (available from UBC Library website).
- Genetically Engineered Crops: Experiences and Prospects. Committee on Genetically Engineered Crops: Past Experience and Future Prospects; Board on Agriculture and Natural Resources; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine. The National Academies Press, Washington, DC. ; eBook ISBN 978-0-309-43738-7 (available online).

Journals: Common scientific journals will be: IFT Food Technology Magazine; Journal of Agricultural and Food Chemistry; Food Microbiology; Journal of Food Science; Applied and Environmental Microbiology; Microbial Biotechnology; Journal of Biotechnology; Trends in Food Science & Technology.

Course slides: Course slides will be posted on Connect. Please be noted that the content of the course slides may not be found in the textbook.

5. Evaluation:

- Midterm		30%
- Group Project		30%
Oral presentation	15%	
Written report	15%	
- Final		35%
- Participation in discussion for group projects and in-class activities		5%

The course is composed of lectures, student presentation, and topical discussions. Evaluation will be based on (i) written examinations, (ii) presentations, and (iii) in-class participation.

Mid-term and final examinations: The mid-term and final examinations are in class written examinations.

Group project: Students will work in groups of two on a randomly assigned food biotechnology topic. Each group should submit a written report on this topic via the assignment section of the Connect site. The report is due at 12 PM Pacific Time by November 17, 2016. The written report should consist of 1,000- 1,500 words with proper citations using the APA Citation style. The reference list is excluded from the word count. All text should be Times New Roman 12-point font, double spaced. The last five classes will be dedicated to student presentations (20min for topic). It is expected that each student will present (10 minutes each). A class-based discussion (5 min) will follow the presentation. Details on the group presentation will be posted on Connect

by the midterm date. Please make sure that you check Connect promptly for announcements and updated information.

Participation: Active participation to the class will be considered.

6. Group Project Topics:

The project topics will be decided and assigned to the groups by September 30, 2016.

7. Schedule Term 1 (September – December 2016)

Lecture	Date	Topic
1	Sep 7	Course introduction and overview. Survey on student knowledge on biotechnologies (SDC&VM)
2	Sep 9	Review of role of biotechnology in food production (SDC)
3	Sep 14	Biotechnology in dairy industry: Fermented foods and starter culture I (Guest lecture by Dr. Azita Madadi-Noei)
4	Sep 16	Biotechnology in dairy industry: Fermented foods and starter culture II (Guest lecture by Dr. Azita Madadi-Noei)
5	Sep 21	Biotechnology in beverage industry: yeasts and fermentation (wine and beer). (VM)
6	Sep 23	Molecular Biology. DNA, RNA, and proteins. (VM)
7	Sep 28	Molecular Biology. Overview of bacterium, fungus, plant genomes (SDC)
8	Sep 30	Molecular Biology. Molecular tools/genetic engineering for food production and analysis – PCR, restriction digests, cloning, microsatellite (VM)
9	Oct 5	Molecular Biology. Protein engineering in food science. (Guest lecture by Dr. Rickey Yada)
10	Oct 7	Biotechnology in wine industry: Improvement of <i>Saccharomyces</i> yeast strains used in wine making (VM)
	Oct 12	Midterm
11	Oct 14	Biotechnology in agriculture: Crop Breeding (SDC)
12	Oct 19	Biotechnology in agriculture: Genetic modification of crops (SDC)
13	Oct 21	Biotechnology in agriculture: CRISPR/Cas system (Guest lecture by Dr. Abel Rosado)
14	Oct 26	Aquatic/Animal food biotechnology. (VM)
15	Oct 28	Functional foods and nutraceuticals (Guest lecture by Dr. David Kitts)
16	Nov 2	Production of nutraceuticals in plants (SDC)
17	Nov 4	Molecular tools. Sequencing genomes to improve crops (SDC)
18	Nov 9	Molecular tools. Investigating the natural yeast populations to improve wines (VM)
	Nov 11	Remembrance Day
19	Nov 16	Discussion on food biotechnology and ethical issues (SDC&VM)
	Nov 18	Food Biotechnology Topic I: Student Presentation

Nov 23	Food Biotechnology Topic II: Student Presentation
Nov 25	Food Biotechnology Topic III: Student Presentation
Nov 30	Food Biotechnology Topic IV: Student Presentation
Dec 2	Food Biotechnology Topic V: Student Presentation