

FOOD 3001 FOOD CHEMISTRY

Instructor: Dr. Apollo Tsopmo, Food Science and Nutrition, Department of Chemistry, Faculty of Science
Office: 207D Steacie
Telephone: 520-2600 Ext 3122
Email: Use the CuLearn communications
Office Hours:

Description:

This course deals with the structure, properties, composition and reactions of food constituents. It is an application of fundamental laws and concepts of chemistry to properties that account for flavour, texture, colour, stability, and nutritional values of foods. Emphasis will be on mechanisms those reactions that involve carbohydrates, proteins, lipids, and pigments.

Learning Objectives:

Upon completion of the course, you should be able to

1. Understand the complex nature of foods and chemical composition & structure functions of macronutrients in foods.
2. Describe the major chemical reactions that occur in foods during processing cooking and storage.
3. Conduct appropriate laboratory experiments common to basic and applied food chemistry and interpret results.
4. Work cooperatively in a team to solve a food chemistry problem by designing and conducting the experiments, and analyzing and interpreting the data. Clearly communicate research results using appropriate written, oral, and visual communication techniques.

Pre-requisites:

For taking this course are FOOD 2001, CHEM 2203 (Organic Chemistry), BIOC 2200 (Cell Physiology and Biochemistry), BIOL 2303 (Microbiology)

Class Format:

The essential points for class notes will be on the PowerPoint text slides used in class. Other information will come from tables and figures in the textbook and other examples used by the instructor.

Evaluation on the mid-term test and final exam will focus on lecture material, including questions and discussions in class.

- | | |
|-----------------------------------|-----|
| – Evaluation A
(in-class text) | 10% |
| – Research Project | 15% |
| – Mid-term test | 20% |

- Final Exam comprehensive 25%

Final grades will be assigned as follows: A+ \geq 90%, A \geq 85%, A- \geq 80% B+ \geq 77% B \geq 73%, B- \geq 70% C+ \geq 67% C \geq 63%, C- \geq 60, D+ \geq 57%, D \geq 53, D- \geq 50%, and F $<$ 50%.

The referencing style in assignments should either be AMA (American Medical Association) or NLM (National Library of Medicine) styles (a handout with examples of these referencing styles will be provided in class).

If you are unable to complete an assignment or test due to medical reasons (medical certificate required) or compassionate reasons, please contact the instructor. In these circumstances, the instructor will make arrangements for an extension for the assignment or another date for writing the test.

If you do not attend the final exam, contact your Student Advisor or Carleton Exam Services for procedures for deferred exams.

Recommended textbook:

Food: the Chemistry of its Constituents 5th Edition by Tom Coultate, 2009. RSC Publishing
ISBN: 978-0-85404-111-4

Additional Resources:

Principles of Food Chemistry - Third Edition by John deMan, 1999, Aspen Publishers, Inc.,
Gathersburg, Maryland. – electronic book

Food Chemistry, 4th Edition,
By H. D. Belitz, Werner Grosch, Peter Schieberle, 2009. Springer Publishing,

Fennema's Food Chemistry 2007,
4th Edition, edited by Srinivasan Damodaran, CRC Press

Course outline

1. INTRODUCTION TO FOOD CHEMISTRY

2. WATER

- Fundamental Properties / Structure
- Availability in Foods
- Water Activity / Food Stability

3. PROTEINS

- Amino Acids / Basic Building Blocks
- Peptides and Proteins
- Denaturation
- Functional Properties

- Nutritional Properties
- Protein Modification / Processing and Storage
- Maillard Browning

4. CARBOHYDRATES

- Structure and Isomerism
- Reactions of Carbohydrates
- Functions of Monosaccharides and Oligosaccharides
- Functions of Polysaccharides

5. LIPIDS

- Fatty Acids
- Glycerides
- Physical Aspects
- Chemical Aspects
- Fat and Oil Processing
- Role of Food Lipids

6. ENZYMES

- Specificity, Catalysis and Regulation
- Factors Influencing Activity
- Endogenous Enzymes
- Enzymes Added to Food / Processing

7. COLOUR

- Carotenoids
- Anthocyanins
- Betalaines/Melanin
- Artificial foods colorants
- Molecular basis of food colorants

8. FLAVOUR

- Taste
- Odour

9. FOODS ADDITIVES

- Nitrites
- Benzoates
- Sulfites
- Sodium chloride

10. VITAMINS