

COURSE: FoodChemistry

ACADEMIC YEAR: 20017 - 2018

TYPE OF EDUCATIONAL ACTIVITY: Characterizing

TEACHER: Prof. Antonella Calabretti

e-mail: antonella.calabretti@deams.units.it

website:

phone: +39 040 5587084

mobile (optional):

Language: Italian

ECTS: : 6 (5L + 1E)

n. of hours: 56 (40L + 16E)

Campus: Potenza
Dept./School: School of
Agriculture, Forest, Food and
Environmental Sciences
Program: MSc in Food Science and
Technology

Semester: 1

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Provide the student with knowledge about the chemical composition of foods, with an emphasis on the interactions between the different components (water, proteins, fats, carbohydrates) and the possible reactions of their degradation. In this way the student can deal the technological problems related both to the stability and the preservation of food. Provide information on the main analytical approaches useful to assess the genuineness and quality of food

- **Knowledge and understanding:** For each subject, the student must be able to demonstrate what he has learned, highlighting the significant and critical points.
- **Applying knowledge and understanding:** respect the knowledge gained, the student will have to apply the different analytical evaluations or methods on the various food matrices that are proposed to him.
- **Making judgments:** Students must be able to develop their own learning, on the basis of the various analytical regulations present on food
- **Communicative Skills:** Ability to express, through an appropriate technical language, the information acquired by disseminating in a coherent and appropriate manner, to different types of audience (professional, public, consumer, etc.).
- **Learning Skills:** The notions acquired must make the student autonomous in updating food matter both in chemical-analytic procedure and normative terms.

PRE-REQUIREMENTS

For a better course attendance the following knowledges are needed (these are provided in BSc course in Food Science e Technology):

- elements of organic and biochemical chemistry.

SYLLABUS

Block 1: Food and Nutrition. Acquisition of knowledge on the organic characteristics of the main classes of foods: protein, fatty and carbohydrates

Block 2: Acquire knowledge about the role of water in foods and natural systems. Control of water content and availability: water activity. Water texture in foods: interactions with ionic and non ionizable polar solutes, with polar and non polar macromolecules. Methods of assessment of water content, physical and chemical methods

Block 3: Acquisition of knowledge about the nitrogen content of foods: roles and protein distribution in foodstuffs. Proteins in foods: interactions with other components: stability and protein degradation (thermal degradation, enzymatic and microbial degradation). Total Proteins and Separation: their meaning in some foods (dairy products, meat and dairy products, fishery products) Free amino acids and biogenic amines in fish foods

Block 4: Acquisition of knowledge on the food component: role and distribution of mono-, oligo- and polysaccharides in nature. Food fiber and its role in food and technology treatments. Analytical methods of the glucidic fraction: physical, chemical and enzymatic methods. Function of prebiotic fiber and relationship with

probiotics

Block 5: Acquisition of knowledge on the lipid fraction of foods: role and distribution of lipids in nature and in foods. Saponifiable and unsaponifiable lipids. Composition of fatty acids and acylglycerols. Mono and diacylglycerols: natural sources and their use in the food industry. The components of the unsaponifiable: distribution in foodstuff. The oxidation of lipids and antioxidants. Analytical methods for quantitative determination of fat in foods. Extraction techniques: extraction with and without hydrolysis. Metals in natural systems and food: Roles and Distribution. Food contaminants of a chemical nature and allergens.

Block 6: Practical laboratory exercises related to the analytical determination of specific parameters for the qualitative characterization of the main foods. Determination of bioactive molecules with antioxidant activity.

TEACHING METHODS

The course includes 56 hours: 40 h of lectures and 16 h of laboratory exercises.

During the lectures, students will be stimulated to active learning through involvement in case studies that are the topic of the lesson.

EVALUATION METHODS

The aim of the examination is to check the level of achievement of the learning objectives and the understanding of the topics discussed during the lessons.

The examination is divided into 2 phases that may take place on the same day.

- a written test on all the topics discussed in the course. The purpose is to evaluate the study of matter and the understanding of the basic topics. It is organized in two parts: a) three open questions, structured with a precise sequence of topics to be developed; and b) 20 multiple choice questions, of which only the correct answers will be evaluated.
- In order to improve the written test, the student will be able to take an oral examination. It can be obtained if the written vote is greater than or equal to 18/30.

The final score is given by the sum of the 2 scores.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

During the course, at the end of each lesson cycle, the teaching material will be delivered by the teacher. It is also advisable to consult the following textbooks:

- P. Cabras, A. Martelli "Chimica degli alimenti" Piccin editore 2004
- P. Cappelli, V. Vannucchi "Chimica degli alimenti. Conservazione e trasformazioni" Zanichelli Editore, Bologna
- T.P. Coultate – La Chimica degli alimenti. Zanichelli editore

INTERACTION WITH STUDENTS

At the beginning of the course the program, the teaching methods and the evaluation methods will be highlighted.

The teaching materials will be provided to students attending the course, directly from the teacher at the end of each lesson block. It will be available on a pen drive.

The results of the examinations will be communicated via e-mail or direct contact with the students.

Reception hours can only be formalized following the schedule of lessons, but they will include at least two hours after the lesson.

The teacher is still available for contact with the students, outside of the reception time, by appointment by telephone or by e-mail

EXAMINATION SESSIONS (FORECAST)¹

15/02/2018, 15/03/2018, 19/04/2018, 17/05/2018, 14/06/2018, 18/07/2018, 13/09/2018, 18/10/2016, 15/11/2018, 13/12/2018; 17/01/2019

SEMINARS BY EXTERNAL EXPERTS YES NO

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.



**SCUOLA DI SCIENZE
AGRARIE, FORESTALI,
ALIMENTARI
ED AMBIENTALI**

EVALUATION COMITEE

Prof. Antonella Calabretti (President); Prof.ssa Angela Capece (member); Prof. Patrizia Romano (member)
