SCUOLA DI SCIENZE AGRARIE, FORESTALI, ALIMENTARI ED AMBIENTALI

COURSE: Management of microbiological risk in foods			
ACADEMIC YEAR: 2017-2018			
TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characteristic, Affine, Free choiche, Other) Curricular			
LECTURER: Prof. Angela Capece			
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Language: Italian			
ECTS: 6 (5 Lectures + 1 practicals)	n. of hours: 50 h lectures + 16 h practicals	Campus: Potenza Dept./School: School of Agriculture, Forest, Food and Environmental Sciences Program: BSc in Food Technology	Semester: 2

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of this course is to provide food technologists the knowledge needed to identify the aspects and biological agents that can represent a risk for food microbiological safety.

- **knowledge and understanding:** Knowledge of basic concepts on the epidemiology of food-borne diseases. Knowledge of the evolution of food safety legislation. Knowledge of basic principles of risk analysis. Knowledge of the microbial groups which are involved in food-borne diseases. Knowledge of basic methods of predictive microbiology. Knowledge of the basics of Hazard Analysis Critical Control Points approach in food hygiene. Knowledge of microbiological criteria for safeguarding food safety.
- **applying knowledge and understanding**: Ability to identify the risk factors for microbiological food safety. Ability to develop and manage basic Hazard Analysis Critical Control plans. Ability to identify the main microorganisms used as food safety criteria and as process hygiene criteria. Ability to correctly read the results of microbiological analyses and to verify the compliance with the criteria established by current legislation.
- **making judgements**: Ability to identify the most effective tools to assure microbiological safety of foods, on the basis of production process and the criteria established by current legislation.
- **communication skills**: Ability to communicate the role of microorganisms on food safety to both non-technical and technical audiences. Ability to effectively communicate to food operators the importance of proper management and handling of foods to prevent risks for consumer health.
- **learning skill**: Ability to collect and interpret data from epidemiological studies and scientific publications to identify risk factors for food safety, taking into account ongoing environmental and social changes.

PRE-REQUIREMENTS

To understand the material presented in this course, knowledges regarding general microbiology are needed, in particular structure and physiology of microorganisms, microbial growth, genetics, microbial taxonomy.

SYLLABUS

The course is divided in 6 teaching blocks.

Block 1. Epidemiology and food law (6h, lectures)**.** Introduction to the course. General concepts on epidemiology of food-borne diseases, diffusion and national and international trends in food-borne infections. Recall of notions on new legislation on food safety

Block 2. Food hygiene and microbiological criteria (8 h, lectures). Definition and objectives of food hygiene procedures; the risk factors for the microbiological safety of foods. Definition and application of microbiological criteria for the assessment of the quality and safety of food products. Criteria for food safety and process hygiene, microrganisms as quality and typicality indicators. Sampling of food and sampling plans.

Block 3. **Food-borne diseases** (16 h lectures). Classification of food-borne diseases and bacterial agents involved. Characteristics of bacterial groups responsible for infections, intoxications and toxinfection: *Salmonella, Campylobacter*, *Escherichia coli* enteropatogeni, *Staphylococcus aureus*, *Listeria monocytogenes*, *Clostridium perfringens*, *Clostridium botulinum, Bacillus cereus*, *Vibrio cholerae* e *V. parahaemolyticus*. Other pathoenic

microorganisms. Algae toxins and mycotoxins. For each microorganism, it will be analyzed: eco-physiological characteristics, virulence factors, symptoms, sources and contamination pathways, food involved, control procedures, methods for determination and monitoring.

Block 4. **Concepts and methods of predictive microbiology** (4 h, lectures). Primary models for growth, inactivation and survival; probabilistic and secondary models; main database and software for predictive microbiology and risk management.

Block 5. **Risk analysis and development of HACCP plans.** (6 h, lectures). Objective of applications of HACCP system, approaches in the design and managing of control hygiene plans. Examples of application of the HACCP plans.

Block 6. **Microbiological analysis of foods.** (16 h, practicals). Study cases of microbiological analysis of foods to evaluate their compliance and / or hygiene quality, on the basis of criteria established by current legislation.

TEACHING METHODS

The course includes 40 h lectures and 16 h practical (laboratory). During practices, students will simulate microbiological analyses of foods by using traditional methods in order to verify the compliance of microbiological criteria.

EVALUATION METHODS

The objective of the exam is to check the level of achievement of learning outcomes previously indicated. The students attending the course need to pass two written (mid term, end of course) examinations (multiple choice, short and long text). Alternatively, o for the students who are unable to pass the written examinations, it will be necessary to take an oral examination, based on knowledge regarding all the topics of the course. Furthermore, to obtain top grades (>27) the students, working in groups, will have to develop and discuss a HACCP plan on a food chosen by the students.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

The teacher will provide the course material and handouts to the student. The students are also encouraged to widen their knowledge using textbooks available in the library:

- A. Galli Volonterio (2005) Microbiologia degli alimenti. Casa Editrice Ambrosiana. Milano.
- James M. Jay, Martin J. Loessner, and David A. Golden 2009 Microbiologia degli alimenti, Springer-Verlag
- Italia
- G. A. Farris, M. Gobbetti, E. Neviani, M. Vincenzini 2012 Microbiologia dei prodotti alimentari. Casa Editrice Ambrosiana.

INTERACTION WITH STUDENTS

During the first lecture, the structure and organization of the course and the evaluation procedure will be presented. The teaching material will be made available to students using a cloud storage system (Dropbox) or made available on a pen drive. The lecturer will be available for receiving students at least 2 h a week (on Monday and Thursday, approximately). Furthermore, the lecturer is available at any time for a contact with the students, after appointment by e-mail.

EXAMINATION SESSIONS (TENTATIVE)[1]

9/07/2018, 17/09/2018, 8/10/2018, 12/11/2018, 10/12/2018, 14/01/2019, 4/02/2019, 11/03/2019, 8/04/2019, 6/05/2019, 10/06/2019, 8/07/2019, 9/09/2019.

EVALUATION COMMITTEE

Prof. Angela Capece (president), Prof. Patrizia Romano (member), Prof. Eugenio Parente (replacement member), Prof. Annamaria Ricciardi (replacement member)

SEMINARS BY EXTERNAL EXPERTS YES X NO □

FURTHER INFORMATION

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