**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | Health Sciences |
| **ACADEMIC UNIT** | Department of Biological Applications & Technologies |
| **LEVEL OF STUDIES** | Undergraduate |
| **COURSE CODE** | BEE611 | **SEMESTER** | **6th**  |
| **COURSE TITLE** | Food Microbiology and Hygiene |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures, seminar, visits to food industries | 3 | 2 |
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| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* |  |  |
| **COURSE TYPE***general background, special background, specialised general knowledge, skills development* | Specialised general knowledgeSkills Development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (in English) |
| **COURSE WEBSITE (URL)** | http://ecourse.uoi.gr/course/view.php?id=559 |

1. **LEARNING OUTCOMES**

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| **Learning outcomes** |
| *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.**Consult Appendix A* * *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
* *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
* *Guidelines for writing Learning Outcomes*
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| The Food Microbiology and Hygiene class through a theoretical and practical training is providing the students the knowledge on various factors (microbiological, chemical, physical) influencing the hygiene and safety of foods, which may have an adverse impact on human health. More specifically, after the successful completion of this class the students shall acquire knowledge in:* biological factors (microorganisms and their toxins) contaminating foods
* physico-chemical factors (chemical, toxic substances) contaminating foods
* the infestation mode of food contaminants
* the food contaminants’ consequences on the consumer’s health
* food preservation techniques
* public health issues as a results of modern food processing methods (ultra-high temperature, modified atmosphere packaging etc) that may favour certain pathogens’ growth in foods
* bacterial, fungal, algal toxins contaminating foods
* short-term and long-term implications to human health of residual drug substances (pesticides, insecticides, antimicrobials etc), preservatives and additives in foods.
* the impact of environmental pollution on the food-chain safety
* emerging and re-emerging foodborne and waterborne diseases
* control and preventions strategies and legislation related to food safety
* laboratory diagnosis of microorganisms and their toxins in food and drinking water
* risk assessment and management of foodborne/waterborne outbreaks
* knowledge/data dissemination/exploitation using digital media and databases
* competences in the assessment and management of food related crises.
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| **General Competences**  |
| *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* |
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work**Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*  | *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking**……**Others…**…….* |
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1. **SYLLABUS**

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| In the Food Microbiology and Hygiene class, the biological (microorganisms) and physic-chemical (toxic) factors contaminating the foods and influencing the public health are analyzed and discussed. Also, the currently used methods for the safe food preservation are described and potential implications to the consumer’s health due to processing inadequacies are discussed. The production and presence of bacterial, fungal and algal toxins in foods and their consequences to human health are described and discussed. The short-term and long-term effect on health of residual substances (pesticides, insecticides, antimicrobials etc) in plant and animal derived foods are described and discussed. The use and side-effects of food preservatives and additives are presented and discussed accordingly. The impact of the environmental pollution and climate change on the food-chain and food-safety and hygiene, the emergence of new foodborne/waterborne pathogens, the prevention and control strategies at national, international and global level, including the WHO guidelines and EU legislation are described and discussed in the class. The afore mentioned syllabus is providing applied knowledge in the field of Food Microbiology, Hygiene and Safety, which have been in the front-lines during the recent years of some well publicized “food scandals”. Such knowledge is necessary for the graduates of Health Sciences departments, who are interested to be professionally involved in the Public Health Sector. The aim of this class is to offer supplementary know-how through specialized knowledge to those who are interested to get a job related to Public Health and Food Production. Analogous classes are offered in respective departments and schools abroad (e.g. EU, USA, Australia, Canada).  |

1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **DELIVERY***Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | Use of PC and projector for slide presentations and videos. Practicals in the lab and visits to the food industries in the proximity of the UOI. Provision of the class text-book through the EUDOXOSsystem, and leaflets , interesting articles, relevant topics of current interest etc are uploaded in the e-course platform of the UOI. |
| **TEACHING METHODS***The manner and methods of teaching are described in detail.**Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.**The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* |

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| ***Activity*** | ***Semester workload*** |
| Lectures | 20 |
| Seminar on laboratory methodologies and practice | 2 |
| Educational visits in food industries | 2 |
| Essay writing related to the class topics | 15 |
| Study and analysis of bibliography | 15 |
| Individual not supervised study | 15 |
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| Course total  | 69 |

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| **STUDENT PERFORMANCE EVALUATION***Description of the evaluation procedure**Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other**Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 1. Submission of an essay in .doc file
2. Public oral presentation of the essay.
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1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:*1. Food Microbiology and Hygiene-Methods for the microbiological examination of foods. C. Papadopoulou, 3rd Edition, Kostarakis Publ. 2016.
2. Microbiology and Epidemiology of Water-Theory and Techniques. A. Mavridou, A. Vantarakis, M.A. Efstratiou, M. Arvanitidou-Vagiona. Paschalides Publ. 2014.
3. Parasitology notes. C. Papadopoulou. UOI Publications. 2007
4. Microbiology of the aquatic environment-basic principles. Papapetropoulou M and Mavridou A. 2nd Edition, Travlos Publ. 2001.

*- Related academic journals:*1. M.P. Doyle, L.R. Beuchat, T. Montville (Editors). Food Microbiology-Fundamentals and Frontiers.  ASM, Washington DC. 2007.
2. Jay J.M. Modern Food Microbiology. 6th Edition. Ann Aspen Publ. Gaithersburg, Maryland, USA, 2000.
3. Marshall RT. Standard Methods for the examination of dairy products. 17th Edition. APHA, Washington DC., USA.
4. Downes FP. Compendium of Methods for the Microbiological Examination of Foods, 4th Edition.
5. Standard Methods for the Examination of water and wastewater. 22nd Edition APHA, AWWA, WEF. USA.
6. Garcia LS., Bruckner DA. Diagnostic Medical Parasitology. 3rd Edition. ASM Press., Washinghton DC., USA.
7. Harris M. 2001.The sacred cow and the abominable pig. 1989. Touchstone Books-Simon and Schuster Inc. Florida, USA.
8. Ηobbs BS., Roberts D. 1993. Food Poisoning and Food Hygiene. 6th Edition. E. Arnold-Hodder Headline PLC, London, UK.
9. Hocking AD., Arnold G., Jenson I., Newton K., Sutherland P. 1997. Foodborne Microorganisms of Public Health Significance. 5th Edition. Australian Institute of Food Science and Technology Inc. North Sydney, Australia.
10. Hurst GJ., Knudsen GR., McInerney MJ., Stetzenbach LD., Walter MV. 1997. Manual of Environmental Microbiology. ASM Press, Washington USA.
11. Codex Alimentarius. 1994. 2nd Edition. Volumes 1-18. FAO/WHO Rome, Italy.
12. Cohen J., Powderly W.G. 2004.. Infectious Diseases. 2nd ed Mosby.
13. D’Mello J.P.F. 2003. Food Safety Contaminants and Toxins.. CABI Publ. Oxon, UK
14. Donalson R.J. 1989. Essential Food Hygiene. The Royal Society of Health, London, UK.
15. Adams MR., Moss MO. 1997. Food Microbiology. The Royal Society of Chemistry, Cambridge, UK
16. ΑΟΑC. Official Methods of Analysis of the Association of Official Analytical Chemists.19th edition, 2012, AOAC International, Gaithersburg, MD., USA.
17. Batt C.A. (1999) Rapid Methods for Detection of *Listeria*. In Ryser E. and Marth E.H. eds. Listeria, Listeriosis and Food Safety. 2nd edition. Marcell Dekker, New York,
18. CDC. 1997. Cryptosporidium and Water: A public health Handbook. CDC, Atlanta GA., USA.

-*Additional literature is uploaded in E-course* |