

## Course Syllabus

Τίτλος (ΕΛΛ.)	Τίτλος (Αγγλ.)	Υπεύθυνος	Διδάσκοντες
Μη Καταστροφική Εκτίμηση της Ποιότητας Αγροτικών Προϊόντων	Non-destructive Evaluation Techniques for Analysis of Agricultural Products Quality.	ΞΑΝΘΟΠΟΥΛΟΣ	ΞΑΝΘΟΠΟΥΛΟΣ
<b>Course</b>			
<p>This course will present the fundamentals principles of non-destructive food quality assessment as these have been evolved the recent decades. The non-destructive techniques have been significantly improved the last decades in terms of hardware, have become portable and applicable in pre- and post-harvest applications. This course aims to analyse the technological part of them, the theoretical background, their advantages and limitations, and finally the experimental data analysis in the basis of machine learning techniques.</p>			
<b>Learning objectives</b>			
<p>This course will be focused on scientific achievement, acquisition of knowledge and enhancement of comprehension of information regarding food quality as this is obtained by non-destructive technologies. MSc students will practice knowledge-based critical thinking and solution offering about established and emerging non-destructive technologies for food quality assessment.</p> <p>The master degree students completing this course will be able to:</p> <ul style="list-style-type: none"> <li>- Identify non-destructive technologies and their potential.</li> <li>- Chose the best technology/ies for food quality assessment regarding their specific application.</li> <li>- Become familiar with the use of such technologies and their potential limits.</li> <li>- Comprehend the data acquisition from such technologies and their specific features.</li> <li>- Familiarise with the data analysis acquired from these technologies based on machine learning techniques.</li> </ul>			

Week	Course Contents
1 <sup>ST</sup>	Food quality and safety: An overview (Xanthopoulos)
2 <sup>ND</sup>	Influence of reference methods on the calibration of non-destructive methods (Xanthopoulos)
3 <sup>RD</sup>	Spectroscopic techniques - Colour analysis, instrumentation and data analysis (Xanthopoulos)
4 <sup>TH</sup>	Spectroscopic techniques –Ultraviolet radiation, applications in food processing and safety (Xanthopoulos )
5 <sup>TH</sup>	Spectroscopic techniques –Ionizing radiation and potential use in food industry ( )
6 <sup>TH</sup>	Spectroscopic techniques - Near Infrared Spectroscopy – applications and data analysis ( )
7 <sup>TH</sup>	Spectroscopic techniques - Hyperspectral imaging – applications and data analysis ( )
8 <sup>TH</sup>	Spectroscopic techniques - Thermal Imaging Systems and data analysis (Xanthopoulos, ?)
9 <sup>TH</sup>	Computer/machine vision systems – Applications and integration in processing lines (Arvanitis, Loukatos?)
10 <sup>TH</sup>	Electronic nose and tongue-Applications in the Food Industry – applications and data analysis (Loukatos)
11 <sup>TH</sup>	Textural analysis – instrumentation, applications and data analysis (Xanthopoulos)

12 <sup>TH</sup>	Biosensors in food quality evaluation – theoretical approach, practical implications ( )
13 <sup>TH</sup>	Acoustic Techniques - ultrasonic technology – applications and data analysis ( )

### **Assignments –**

1. Colour analysis of fresh-cut fruits or vegetables. Browning effect. Data analysis
2. Texture analysis of whole and fresh-cut fruits and vegetables. Quality characteristics analysis.
- 3.
- 4.

### **Exams, marking and student assessment**

Assignments (four): 100%, Written exams: 0%

### **Proposed reference material**

- Jha, Shyam. (2010). Nondestructive Evaluation of Food Quality. 10.1007/978-3-642-15796-7.
- Gunasekaran, Sundaram. (2000). Nondestructive Food Evaluation: Techniques to Analyze Properties and Quality. 10.1201/9781482270655.
- Irudayaraj, Joseph & Reh, Christoph. (2008). Nondestructive Testing of Food Quality. 10.1002/9780470388310.
- Chen, Quansheng & Lin, Hao & Zhao, Jiewen. (2021). Advanced Nondestructive Detection Technologies in Food. 10.1007/978-981-16-3360-7.