COURSE OUTLINE

(1) GENERAL

SCHOOL	Food and Nutritional Sciences		
ACADEMIC UNIT	Food Science & Human Nutrition		
LEVEL OF STUDIES	Bachelor		
COURSE CODE	1075	**SEMESTER**	8th
COURSE TITLE	Physical Properties of Foods		

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 and laboratory experiments	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	5	5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialised general Knowledge
PREREQUISITE COURSES:	Food Engineering, Food Preservation
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	no
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

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*

The course material includes the:

Theory, methodology and use of physical properties of foods. The physical properties include the: thermal, mass, structural, optical, rheological, electrical and acoustic ones.
The objectives of the course are to:
a) Acquire the fundamental knowledge of physical properties that is needed for the product design, testing and analysis of systems, processes, storage and handling of biological materials. Their application in formulation engineering and nanotechnology of foods is also an objective.
b) to master the use of experimental testing equipment with respect to physical properties and to correlate objective tests to subjective ones such as sensorial trials.

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Retrieve, analyze and synthesize data and information
- Team working
- Working independently

(3) SYLLABUS

1. Introduction.Course structure and objectives.
2. Applications of physical properties in food process. Examples
3. Density, Porosity and structural properties. Theory and specific examples (Lab. 1)

4. Thermal properties. Theory, methodology, applications (Lab. 2)
5. Rheological properties I. Theory, methodology, applications. Viscosity and viscoelasticity. Components' selection upon their viscosity (Lab. 3)
6. Rheological properties II. Texture. Sensorial and fundamental definitions. Examples (Lab.4)
7. Acoustic properties. Theory, methodology, applications.
8. Optical properties. Theory, methodology, applications. (Lab.5)
9. Mass transfer properties. Theory, methodology and applications (Lab. 6)
10. Electrical properties. Theory, methodology, applications
11. Examples of food quality evaluation using combined physical properties data. Case studies (Lab.7)
12. Objective-Subjective measurements of physical characteristics. Sensorial vs. fundamental characteristics (Lab. 8)
13. Overview. Evaluation of P.P. use in several applications

The above lectures will be complemented with laboratory experiments on the following topics:

1. Density- porosity determination in several foods (dry foams, fruits)
2. Rheological properties of food. Temperature effects (chocolate, honey, starch)
3. Texture measurements (foamy structures, fruits, candies)
4. Colour and structural parameters' measurements (bread, coloured candies)- Image analysis software
5. Diffusivity (mass transfer). Moisture transfer in dried baked rolls or water activity measurements
6. Quality evaluation upon physical properties characteristics (combined measurements)
7. Sensory evaluation of specific foods. Example: Oral texture vs. fundamental values

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In class teaching (power point presentations) Distance learning (ppt, selected sites, review papers, ift news) Communication: e-class aua, e-mail
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Ppts , e-learning Notes Image Analysis Software (Image ProPlus) Sensory Evaluation Testing Software (SIMS 2000)
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.*	

Activity	*Semester workload*
Lectures	36
Laboratory meetings	24
Term papers	35

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	Personal study: 32 Total contact hours and training: ***127***
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.*	I. Final written examination (50% of the final course grade) that includes: - Short answer questions - Judgment questions - Graphs interpretation - Short problems II. Laboratory performance (10%) III.Lab reports (20%) IV. Individual report (selected physical property) (20%)

(5) ATTACHED BIBLIOGRAPHY

Books

- Lazou A. 2019. Physical Properties of Foods.
- Steffe J.1996. Rheological Methods in Food Process Engineering Freeman Press www.egr.msu.edu/~steffe/ ISBN 0963203614, 9780963203618
- Rao M.A. Rheology of Fluid and Semisolid Foods: Principles and Applications Aspen Publishers ISBN 0-8342-1264-1
- De-Wen Sun series editor 2012. Physical Properties of Foods - Novel Measurement Techniques and Applications Compemporary Food Engineering Series ISBN-10: 1439835365
- Moskowitz H.R. 1987. Food Texture: Instrumental and Sensory Measurement M. Dekker, New York
- MCKenna M., 2003, Texture in Food Volume I: Semi-solid foods, Texas, USA
- Kilcast D., Texture in Food, Volume II: Solid Foods, C.H.I.P.S., Texas, USA
- Figura L. and Teixeira A. 2007. Food Physics. Springer ISBN 3540341943, 9783540341949
- Rao, Rizvi and Datta 2010 (third ed.) Engineering Properties of Foods. Taylor & Francis. ISBN 0824753283, 9780824753283
- Karel M. & Lund D. B. Physical Principles of Food Preservation
- Sahin S. & Sumnu S. G. 2006. Physical Properties of Foods. Springer

- Shafiur Rahman*2010 (2nd edition) Food Properties Handbook Taylor & Francis 1420003097, 9781420003093

Journals

- Journal of Food Engineering
- Journal of Food Science. Special catergory: Food Engineering and Material Science
- Journal of Texture Studies

Links

Ift.org