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**Syllabus**

**BSc. Food Science and Biotechnology**

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| **Subject** | | **FOOD PHYSICS** | | | | | |
| **Type** | **Semester** | **ECTS** | | **Code** | |
| (O) | 3 | 4 | | 130PHF257 | |
| **Course Lecturer**  **Course Assistant** | | Prof. Dr. Violeta Lajqi Makolli: Prof. Dr. Sami Makolli  Prof. Dr. Violeta Lajqi Makolli: Prof. Dr. Sami Makolli | | | | | |
| **Aims and Objectives** | | The following topics will be covered in this course: Physical quantities, units and dimensions; Rheology, rheological properties of liquid foods (Newtonian and non-Newtonian fluids); Transport / fluid movement; Factors affecting rheological properties, viscoelasticity; Rheological properties of doughs; Methods and apparatus for determining the rheological properties of liquid and semi-liquid materials; Rheological properties of suspensions; Rheological characteristics of granules and powder materials; Rheological properties of solid materials - textures. Thermophysical properties of food; Methods for determination of thermophysical properties; Phenomena in the boundary phase of foods; Water activity and properties of food sorption; Dielectric electric and optical properties of food. | | | | | |
| **Learning Outcomes** | | After completing the course students will gain knowledge and skills to:   * know the physical and derived quantities necessary for measuring the physical and thermophysical properties of foods, * recognize and apply the rheological properties of liquid materials, the movement of effluents and factors affecting these rheological properties, * define, interpret, and apply problems related to the rheological characteristics of the doughs, suspensions and solids, * know the phenomena at the boundary stages and methods for determining the thermophysical properties of food, * recognize and describe the electrical and optical properties of foods etc. | | | | | |
| **Course Content** | **Weekly plan** | | | **Week** | |
| Introduction, units and dimensions in food physics | | | 1 | |
| The differences between physical and thermophysical properties of foods. | | | 2 | |
| Rheology, rheological properties of food | | | 3 | |
| Rheology and factors affecting the rheological properties of foods. | | | 4 | |
| Viscometry and instruments for measuring viscosity | | | 5 | |
| Rheological properties of solid materials | | | 6 | |
| Rheological properties of suspensions, granules and powder materials | | | 7 | |
| Rheological properties of doughs | | | 8 | |
| Thermal properties of foods | | | 9 | |
| Phenomena in the boundary stages of foods and Water activity | | | 10 | |
| Electrical properties of Food | | | 11 | |
| Optical properties of Food | | | 12 | |
| Presentations | | | 13 | |
| Presentations, Repetition of the subject or by agreement with the students, study visits or preliminary exams can be foreseen. | | | 14 | |
| Final exam | | | 15 | |
| **Weekly plan – Exercises (numerical exercises)** | | | **Week** | |
| Density of composite foods and porosity | | | 1 | |
| Calculation of Specific Heat of food products | | | 2 | |
| Calculation of Latent Heat of food products | | | 3 | |
| Flow regimes, fluid flow and fluid velocity | | | 4 | |
| Study visits to the food industry (to get to know with production lines and specific equipment/apparatus for measuring the rheological properties of foods) | | | 5 | |
| Rheological properties of foods | | | 6 | |
| **Literature/**  **References** | | * Skript interne. * Ludger O.Figura Arthur A. Teixeira ©2023. Food Physics Physical Properties - Measurement and Applications, Second Edition, [Springer International Publishing](https://www.jpc.de/s/springer+international+publishing?searchtype=ctxverlag) * Ludger O.Figura ArthurA.Teixeira Food Physics, Physical Properties – Measurement and Applications, USA, © Springer-Verlag BerlinHeidelberg2007 * M. J. Lewis, Physical properties of foods and food processing systems, UK Woodhead Publishing Limited Cambridge England, Woodhead Publishing Limited Reprinted 2002,2006 * Serpil Sahin and Servet G¨ul¨um Sumnu, Physical Properties of Foods, Middle East Technical University Ankara, Turkey, 2006 Springer Science+Business Media, LLC. * M.J. Lewis: Physical Properties of Foods and Food Processing Systems, Ellis Horwod, Chichester 1987. * T.Lovric, Procesi u prehrambenoj tehnologiji s osnovama prehrambenog inzinjerstva, Hinus, Zagreb, 2003. * A.Kopalli, I. Malollari (2007), Proceset themelore në teknologjinë ushqimore, Maluka,Tiranë. * I.G. Mandala, S.V. Protonotariou, Chapter 3 - Physical properties of food materials, Editor(s): Seid Mahdi Jafari, Engineering Principles of Unit Operations in Food Processing, Woodhead Publishing, 2021, Pages 45-64, https://doi.org/10.1016/B978-0-12-818473-8.00015 | | | | | |
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**Academic and Etiquette Rules:**

Regular attendance at lectures and exercises and rules of etiquette such as: respecting the class schedule, entering the classroom on time, keeping calm in class, turning off mobile phones, etc.