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| **Title and Code** of the subject:  **Nutritional Sciences,** **MTMEL7009A** | **ECTS Credit Points: 3** |
| **Type** of the subject: **compulsory** | |
| **Ratio of theory and practice** (credit%) 100 % theoretical, 0 % practical | |
| **Type and number of classes per semester**: 28 hours lecture per **semester**  Number of teaching hours per week : 2 lectures + 0 seminar | |
| **Type of exam**: **colloquium** | |
| **Subject in the curriculum**: **2nd semester.** | |
| **Preliminary requirements:**  MTMEL7004A **Quality and safety in food technologies (HACCP in practice)** | |

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| **Summary of content - theory**: |
| Course objectives:  Acquisition of the chemical bases of the processes that determine the production and quality assurance of foods and raw materials, their scientific foundation, and the understanding of the chemical bases. Developing skills to accommodate new knowledge.  Education of selected general and inorganic chemical knowledge, grounding of chemical studies, and the foundation of related primer and subject areas.  1st week: Content of subject “Nutritional Sciences”, organs and their functions of the gastrointestinal tract  2nd week: Nutritional assessment and dietary planning. Dietary Reference Intakes (DRIs), Estimated Average Requirements (EARs), Recommended Dietary Allowances (RDAs), Adequate Intake (AI), Tolerable Upper Intake Levels (ULs), Safe Maximal Intakes, Energy Intake  3rd week: Chemical, biological and physiological aspects of nutrition. Acid-base equilibrium, passive and active transports, HCl synthesis in the stomach wall cells  4th week: Bio-catalysers. Role and structure of enzymes. Factors influencing enzyme activity: activators, inhibitors and destructors, temperature, pH-values, enzyme and substrate concentrations  5th week: Carbohydrates: structure and role of mono-, di- and oligosaccharides; functions of polysaccharides of plants and animals/human beings  6th week: Structure of protein building amino acids. Definition of non-essential, essential and conditionally essential amino acids. Amid and peptide bonds. Protein structures and shapes, way of protein synthesis and hydrolysis. Complete and incomplete proteins, protein complementation, protein quality  7th week: Structure and functions of gastro-internal hormones. Lipoids and lipids. Neutral lipids and phospholipids. Biosynthesis and metabolism of fatty acids and lipids. Essential and conditionally essential fatty acids, omega-3 fatty acids  8th week: Energy metabolism. Synthesis of ATP molecules: Reactions and energetic results of citric acid cycle (Szent-Györgyi - Krebs cycle) and the sequential oxidative phosphorylation processes  9th week: Energy balances and body weight regulation. Basal metabolic rate (BMR), basal energy expenditure (BEE), resting metabolic rate (RMR), resting energy expenditure (REE), standard metabolic rate (SMR)  10th week: Fat soluble vitamins (The “DEKA” vitamins) – their structure, chemical composition, physiological role, symptoms of hypo- and avitaminosis, reason and symptoms of hypervitaminosis. Night blindness, rickets. Natural sources of A-, D-, E- and K-vitamins  11th week: Water soluble vitamins – their structure, chemical composition, physiological role, symptoms of hypo- and avitaminosis. RDA values  12th week: The major mineral nutrient elements of foods – C, O, H, N, P, K, Ca, Mg, S, Na. Sources and role of the macroelements. Main function of water in the human body. Aging and water content of human body  13th week: The minor mineral nutrient elements of foods – Fe, Mn, Zn, Se, Ni, Cr, I, F. Sources and role of the microelements. Water hardness: definition, sources, determination methods, optimum physiological level, water softening methods  14th week: Human life cycle nutrition; babies, young children, teenagers, adult persons and seniors. Functional nutrition – definition, importance, possibilities |
| ***Compulsory literature:***  McGuire, M. – Beerman, K. A. (2013): Nutritional Sciences – From Fundamentals to food. Wadsworth Cengage Learning, Australia • Brazil • Japan • Korea • Mexico • Singapore • Spain • United Kingdom • United States. ISBN-13: 978-0-8400-5820-1  ***Optional literature:***  Ross, A.C. – Caballero, B. – Cousins, R.J. – Tucker, K.L. – Ziegler, T.R. (2014): Modern Nutrition in Health and Disease. Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia, USA. ISBN-13: 978-1605474618 |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge**   Students learn about the general and specific characteristics of Nutritional Sciences, their boundaries, their directions of development, and their attachment to related subjects.   1. **Ability**   Theoretical aspects of Nutritional Sciences and related terminologies can be used in innovative ways to solve the actual problems.   1. **Attitude:**   Student has a strong professional identity and professionalism that she/he can take for professional and wider social community.   1. **Autonomy and responsibility:**   Student sees the importance of general and special Nutritional Sciences knowledge so that it can formally incorporate into their further university studies and at the end of their studies. Students will be able to autonomously and responsibly use the knowledge acquired in the course of their work in a deliberate manner. |

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| **Responsible lecturer:**  **Assoc. Professor Dr. habil. Imre Vágó, CSc, deputy head of Institute** |
| **Other lecturer:** - |
| **Form of examination:**  **Oral (preferred) and/or written** (only if the subject is signed) |
| **Requirement(s) to get signature:**  Attendance at lectures is not compulsory, but highly recommended!  As an individual activity, all of the students have to complete and present to the other students two power point presentations. The theme of it will be jointly decided by the student and the lecturer. Form and content of presentations will be discussed by the group members, and will be accepted or denied. The denied presentation must be repeated. Requirement to get signature is, two accepted .ppt-presentations. |