Joint Master Programme in Analysis and Control of Food Products

FOOD CHEMISTRY AND BIOCHEMISTRY, MSFP101

SYLLABUS

**I. Food Chemistry**

1. Interactions of water with food components. Water and water activity – significance and influence on the quality of the foodstuffs.

2. Carbohydrates – definition, representatives, importance. Chemical reactions of carbohydrates. Carbohydrates as participants in the chemical processes in the food technology.

3. Lipids – definition, classification, representatives. Chemical transformations and their significance on the foodstuffs.

4. Carbonyl-amine interactions (Maillard reaction) – significance, mechanism and kinetics. Factors, influencing the Maillard reaction. Degradation of Strecker – importance.

5. Thermal transformations of proteins and vitamins – importance.

6. Thermal-oxidative transformations of food lipids – influence on the nutritive values of foodstuffs and importance.

7. Caramelization.

8. Polyphenol coloration – types and mechanism. Importance.

9. Alternative methods for food treatments – irradiation.

10. Flavor – perception, analysis, importance. Off-flavor. Taste and aroma.

11. Contaminants.

**II. Food Biochemistry**

1. Proteins. Chemical composition of the proteins. Properties of α-amino carboxylic acids.

2. The basic structure of proteins: primary, secondary, tertiary and quaternary. Physico-chemical properties of proteins. Denaturation.

3. Nutritive function of proteins. Methods for evaluation of the biological value of the proteins.

4. Plant proteins: proteins of cereals and legumes.

5. Proteins with animal origin: proteins of meat, milk and eggs.

6. Protein interactions: protein-water and protein-protein interactions.

7. Protein cross-linking in food – structure and applications. Implications for health and food safety.

8. Protein-carbohydrate and protein-lipid interactions.

9. Biochemical alteration of food during postharvest and storage. Endogenous enzymes.

10. Enzymes in food processing.