

**Tárgytematika / Course Description****Food analytics 1****MENB\_ÉTTA002****Tárgyfelelős neve /****Teacher's name:** dr. Ajtony Zsolt**Félév / Semester:** 2021/22/2**Beszámolási forma /****Assesment:** Vizsga**Tárgy heti óraszám /****Teaching hours(week):** 2/2/0**Tárgy féléves óraszám /****Teaching hours(sem.):** 0/0/0**OKTATÁS CÉLJA / AIM OF THE COURSE**

This course will be concerned with the theory and practice of instrumental methods for the separation, identification, and quantitative analysis of chemical substances. Satisfactory completion of this course will afford students a working knowledge of analytical instrumentation typically employed in food analytical laboratories. It will also provide the student with an appreciation of the relative strengths and limitations of different instrumental-based analyses.

**TANTÁRGY TARTALMA / DESCRIPTION**

- 1) Evaluation of analytical data. Reliability of analysis. Source of errors. Precision, accuracy, specificity, sensitivity, limit of detection, limit of qualification, recovery. Curve fitting, regression Analysis. Calibration, external standard method, standard addition method.
- 2) Potentiometry: First kind, second kind, red-ox, and ion-selective membrane electrodes. Measurement of pH. Potentiometric titration.
- 3) Conductometry: Conductivity, measurement of conductivity, conductometric titration. Voltammetry, amperometry, coulometry
- 4) Introduction to Optical Spectroscopy. Refractometry, polarimetry.
- 5) Ultraviolet and visual spectroscopy. Fluorescent spectroscopy.
- 6) Infrared Spectroscopy(IR). Theory and instrumentation.
- 7) Atomic spectroscopy. Flame photometry. Inductively coupled plasma source atomic emission spectrometry (ICP-AES). Atomic absorption spectrometry (AAS), flame (FL-AAS), and electrothermal atomization (ETA-AAS)

- 8) Introduction to hyphenated techniques. Classification. Theoretical basics of gas chromatography.
  - 9) Instrumentation of gas chromatography.
  - 10) High/ultra-high-performance liquid chromatography. (HPLC, UHPLC), Normal phase, reverse phase, and hydrophilic interaction liquid chromatography.
  - 11) Ion paired reverse phase, size exclusion, ion exclusion, and ion-exchange liquid chromatography.
  - 12) Instrumentation of high/ultra-high-performance liquid chromatography.
  - 13) Electrophoretic methods. Capillary electrophoresis. Capillary gel electrophoresis.
  - 14) Mass spectrometry. Electron impact and chemical ionization. Static and dynamic analyzers. Vacuum system. Interpretation of mass spectra
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## SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

**Exam:** The written examination is will be scheduled in the exam period and will be closed-notes and closed-book.

**Requirements:** Completion of at least 80% of the laboratory exercises. More than 50% performance on the exam.

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## KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

### Textbooks:

S. Suzanne Nielsen (Eds). Food Analysis. 5th Edition, Springer, 2017

Skoog, Douglas A.; Holler, James F.; Crouch, Stanley R. Principles of Instrumental Food Analysis. 7<sup>th</sup> Edition. Cengage Learning, 2018