Karta przedmiotu / Course description

Informacje ogólne o przedmiocie / General information about the course	
1. Kierunek studiów / Major of study: **Pharmacy**	**2. Poziom kształcenia / Study level:** Master 's Program **3. Forma studiów / Form of study:**
4. Rok / Year: I, II	**5. Semestr / Semester: I**
6. Nazwa przedmiotu / Course name: Small molecule analysis for biotechnology using HPLC QTof	
7. Status przedmiotu / Course status: Facultative classes	
8. Jednostka realizująca przedmiot, adres, e-mail: **Name of Department, mailing address, e-mail:** **Department of General and Inorganic Chemistry, Faculty of Pharmaceutical Sciences in Sosnowiec, Medical University of Silesia, wbaran@sum.edu.pl**	
9. Treści programowe przedmiotu Course contents: The student learns the basics of chemical and physical theories used in advanced analytical techniques, understands the course of chemical analysis and the principles of interpreting its results. The student is able to practically use the theory and independently plan the course of analysis and interpret its results using extensive IT techniques. The student is able to predict the mechanisms of biochemical processes based on the results of analyzes conducted using the HPLC-QTof technique.	
10. liczba godzin z przedmiotu / Number of hours for the course	**30**
11. liczba punktów ECTS dla przedmiotu / Number of ECTS points for the course	**3**
12. Formy i tematy zajęć / Forms and topics of classes This course is designed to cover multiple topics associated with biochemical and pharmaceutical analysis including method development, validation (i.e., regulatory), instrumentation (i.e., mass spectrometry), sample preparation, and handling of biological and product samples.	**Liczba godzin** **Number of hours** **30h**
12.2. Seminars and practical exercises	
1. Introduction to chromatographic techniques coupled with a mass spectrometer.	**2h**
2. Types, operation and construction principles of mass spectrometers.	**2h**
3. Preparation of analytes from biological matrices.	**2h**
4. Optimization of separations performed using HPLC methods. HPLC separation programming, calibration and validation of the method.	**4h**
5. Programming the HPLC separation based on literature data and own observations. Preparing the QTof detector for operation.	**4h**
6. Obtaining correct MS spectra. Ion fragmentation. Methods for interpreting HPLC/QTof results.	**2h**
7. Databases and software used to interpret results. Generating chemical patterns.	**4h**
8. Analysis of chromatograms and MS spectra.	**4h**
9. Analysis of MS/MS spectra.	**4h**
10. Summary	**2h**

13. Literatura / Readings
1. Lasking J, Lifshitz C, Principles of mass spectrometry applied to biomolecules. John Wiley & Sons, Inc. Homoken, New Jersey, 2006 2. Pedersen-Bjergaard S, Gammelgaard B, Halvorsen TG, Introduction to Pharmaceutical Analytical Chemistry, 2 ed. Wiley, 2019. 3. Ciborowski P, Silberring J. Proteomic Profiling and Analytical Chemistry. Elsevier VA, Waltham, MA 02451, USA, 2013.
14. Kryteria oceny – szczegóły / Detail evaluation criteria Zgodnie z zaleceniami organów kontrolujących / In accordance with the recommendations of the inspection bodies Zaliczenie przedmiotu - student osiągnął zakładane efekty uczenia się / Completion of the course – student has achieved the assumed learning outcomes Szczegółowe kryteria zaliczenia i oceny z przedmiotu są zamieszczone w regulaminie przedmiotu / Detail criteria for completion and evaluation of the course are specified in the course regulations