INSTRUMENTAL ANALYSIS AND ELECTROCHEMISTRY A

Module designation	*Instrumental Analysis and Electrochemistry A*
Semester(s) in which the module is taught	*1*
Person responsible for the module	*1.* Prof. Dr. apt. Amirudin Prawita.**(Course Coordinator)** *2.* Prof. Dr.rer.nat. apt. M. Yuwono, MS.
Language	*Bahasa Indonesia*
Relation to curriculum	~~*Compulsory / elective /*~~ *specialisation*
Teaching methods	*lecture, discussion, assignment*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload:* *Contact hours (structured activities.): 90,67 hours* *Private study including independent learning activites*: *90,67 hours*
Credit points	*2 SCU / 6 ECTS*
Required and recommended prerequisites for joining the module	*NA*

Module objectives/intended learning outcomes	Students are: LO1: Able to realize excellence based on religious morals (excellence with morality), able to work together, and show a responsible attitude to work in their field of expertise independently LO2: Able to internalize the spirit of independence, struggle, and entrepreneurship LO4: Able to develop a pharmaceutical professional performance with analytical acumen in solving pharmaceutical problems and managing research in the pharmaceutical field related to national and global systems and policies, both inter and inter-disciplinary approaches. LO5: Able to access and review information through an Information and Communication Technology (ICT) system, decide on a specific subject of study, maintain the feasibility of implementing research designs, conduct research, analyze data, conclude research results comprehensively, and create strategic issues based on the study that reflect the latest updates in the field of pharmaceutical sciences, and communicate them in the media and scientific forums at the national and international level through an interdisciplinary or multidisciplinary approach in the form of a thesis or other equivalent forms. LO6: Able to make decisions in the context of solving problems related to science and technology development based on analytical or experimental studies through collaboration with colleagues, colleagues in institutions and research communities at both national and international levels and utilizing research results for the benefit of the user and other communities. LO11: Able to develop systems for evaluating the bioavailability of drugs in the body, pharmaceutical products circulation permits, and their in-vitro and in-vivo evaluations with specific delivery systems with appropriate analytical methods. LO12: Able to develop analytical methods to ensure the quality of drugs, cosmetics, foods, and beverages. LO15: Able to plan and organize concepts and procedures for quality assurance and recommendations on pharmaceutical products, which include drugs, cosmetics, foods, and beverages as products and therapeutic goods.
Content	Instrumental & Electrochemical Analysis Courses present material on Flame Atomic Absorption Spectroscopy (FAAS), Graphite Furnance AAS, Cold Vapor Technique, Hydride Methode, Flame Atomic Emission Spectroscopy (FAES), ICP-AES, UV-Vis Spectrophotometry, FT-IR Spectrophotometry (NIR-MIR), Mass Spectrometry, Gas Chromatography, HPLC, TLC, Voltammetry, and Polarography and Their Development.
Exams and assessment formats	*take-home written assignments*
Study and examination requirements	*the final grade in the module is composed of 25% presentation 65% take-home assignments, 10% in-class participation and soft-skills assessment. Students must have a final grade of 70% or higher to pass*

Reading list	1. *Skoog, DA, 2007, Principles of Instrumental Analysis, 6th Ed., Canada Thomson Corporation* 2. *AOAC, 2012, AOAC Guidelines for standard Methode Performance Requirement, Arlington, AOAC* 3. *Davis R et al, 1991, Mass Spectrometry, John Wiley & Sons, Toronto* 4. *Watson, DG, 2000, Pharmacetucal Analysis A Textbooks for Pharmacy Student and Pharmaceutical Chemist. Churchill Living Stone Harcourt. Publisher Limited* 5. *The USP Convention, 2015, United States Pharmacopeia, 38th Ed. Washington DC., American Pharmaceutical Association and Pharmaceutical Press* 6. *Keliner R ett al, 1998, Analytical Chemistry, Wiley-VCH, New York* 7. *Harris PI, 2003, Spectroscopy International Journals, Vol. 17 No. 2,3* 8. *Ahuja S, and Dong M. W Eds. 2005. Handbook of Pharmaceutical Analysis by HPLC 1st Ed. United Kingdom, Elsevier Inc.*