Module Handbook

Module Name	Calibration of instrument Lab Work					
Module Level						
Code, if applicable	VKT435					
The subtitle, if applicable						
Courses, if applicable						
Semester(s) in which the module is taught	4th semester					
A person responsible for the module	Tri Esti Purbaningtias, M.Si.					
Lecturer	Tri Esti Purbaningtias, M.Si. Thorikul Huda, M.Sc. Bayu Wiyantoko, M.Sc.					
Language	Bahasa Indonesia					
Relation to curriculum	Compulsory					
Type of teaching, contact hours	Laboratory Practice (teaching, preparation, lab work, data analysis and report) and Exams: 11.3 hours x 16 week					
Workload	Total workload	91 hours; 2 CU				
		Face to face teaching	Laboratory preparation	Laboratory work	Data analysis and report	Exam (Theory and Practice)
	Hours	11	11	50	11	8
Credit Points	2 CU/3.4 ECTS					
Requirements according to the examination regulations	100% of requirements attendance in laboratory activities					
Recommended prerequisites	Laboratory work of lab technique					
Module objectives/intended learning outcomes	PLO 3: Students can express basic concepts of chemistry, chemical analysis, operation, and maintenance of chemical instruments that can be applied in their work PLO 9: Students are able to carry out validation and verification of testing methods Subject LO: Able to carry out verification and calibration of mass measuring instruments according to established procedures Able to carry out verification and calibration of volume measuring instruments according to established procedures Able to carry out the calibration of the electrometric type instrument Able to carry out verification and calibration of the spectrophotometer Able to carry out verification and calibration of chromatographic instruments Able to build teamwork in carrying out laboratory procedures Able to apply principles and build a culture of chemical safety and health Able to analyze data and report test results in writing and orally					

Content	1. Calibration/verification of measuring instruments for mass, volume, electrometry 2. Calibration/verification of the spectrophotometer 3. Calibration / verification of chromatographic instruments
Study and examination requirements and forms of examination	Assessment lab work (55%), team work (10%), analysis and report (25%), safety lab (10%)
Media employed	Google classroom, youtube, zoom meeting, google form, google doc, standard method, laboratory handbook
Reading list	1. Gupta, S.V., 2012. Measurement uncertainties: physical parameters and calibration of instruments. Springer Science & Business Media. 2. Duvernoy, J. and Dubois, A., 2006. Training Material on Metrology and Calibration. SL: World Meteorological 2006. 3. Castrup, H.T., Eicke, W.G., Hayes, J.L., Mark, A., Martin, R.E. and Taylor, J.L., 1994. Metrology: Calibration and measurement processes guidelines. NASA STI/Recon Technical Report N, 95. 4. Brereton, R.G., 2000. Introduction to multivariate calibration in analytical chemistry electronic Supplementary Information available. See http://www. RSC. org/Supp data/an/b0/b003805i. Analyst, 125(11), pp.2125-2154. 5. Cameron, J.M., Croarkin, M.C. and Raybold, R.C., 1977. Designs for the calibration of standards of mass, NBS Tech. Note 952.