



Diponegoro University
Faculty of Science and Mathematics
Undergraduate Program Of Chemistry

Module designation	Chemometrics (KEMO)
Semester(s) in which the module is taught	5
Person responsible for the module	Didik Setiyo W., S.Si., M.Si., Drs. Abdul Haris, M.Si Dr. M. Cholid DJ., S.Si., M.Si
Language	Indonesian
Relation to curriculum	Compulsory/ elective / specialisation
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Face to face : 1 x (2 x 50") Structured tasks + Self Study = 1 x [(2 x 60") + (2 x 60")]
Credit points	2
Required and recommended prerequisites for joining the module	MD2, KAI1

<p>Module objectives/intended learning outcomes</p>	<p>Demonstrate an attitude of being responsible for work in their field of expertise independently.</p> <p>Able to demonstrate independent, quality, and measurable performance.</p> <p>Able to make decisions regularly in the context of solving problems in their area of expertise, based on the results of analysis of information and data.</p> <p>Able to be responsible for the achievement of group work results and supervise and evaluate the completion of work assigned to workers under their responsibility.</p> <p>Able to analyze several alternative solutions in the fields of identification, analysis, isolation, transformation, and synthesis of available chemicals and present analysis conclusions for appropriate decision making.</p> <p>Able to use software to determine the structure and energy of macromolecules, software to assist analysis and synthesis in the field of chemistry.</p> <p>Mastering complete operational knowledge about functions and analysis of data and information from classical and modern (instrumental) measurement results.</p> <p>Able to apply (C3) basic statistical methods in practicum and research data analysis through quantitative data analysis and decision making/experimental conclusions, as well as developing the basis for research and analysis strategies to prove hypotheses.</p>
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Content	<ol style="list-style-type: none"> 1. Chemical analysis problem, Quantitative Analysis Error, Random and systematic error handling" 2. Mean and standard deviation, distribution error, Average sampling distribution" 3. Confidnesni level, Presentation of analysis results, Error propagation" 4. Comparison of analysis results with known values, Average comparison of 2 samples/data, paired-t . test (case method and project based learning)" 5. One-tailed and two-tailed test, F test compares 2 standard deviations, test (case method and project based learning) 6. Chi-squared test, Comparison of several averages, Data Normality Test (case method and project based learning) 7. Analysis of Variance (case method and project based learning) 8. Quality of analytical measurement: Sampling and sampling strategy, Separation and estimation of variance with ANOVA, Introduction to quality control methods, Collaborative trial 9. Calibration Method (Regression and correlation): analysis calibration chart, Regression line, correlation coefficient, Errors in the slope and intercept of a regression line, Calculation of concentration, Determination of measurement detection limits 10. Calibration curve: standard addition method, Application of the regression line on the comparison of the two methods, Weighted regression line, intersection of two straight lines, Calculation of ANOVA and regression, Nonlinear Regression 11. Nonparametric statistics: Median, the sight test, The Wald-Wolfowits runk test 12. Nonparametric statistics: Wilcoxon Signed runk test, Non parametric test two or more samples, Nonparametric regression (case method and project based learning) 13. Trial design and optimization: Randomization and blocking, two-way ANOVA (case method and project based) 14. Trial design and optimization: Latin Square design interaction, Factorial Design (case method and project based)
Exams and assessment formats	Mid-Semester Exam and Final Exam
Study and examination requirements	Participatory Activities -30% Project Results -30% Task -5% Quiz -5% Mid-semester -15% Final exams -15%

Reading list

1. Miller, C.J. dan Miller N.J., 2005, *Statistics and Chemometrics for Analytical Chemistry*, edisi ke-5, Ellis Horwood Limited, rt, Hants, GBR
2. Meier P.C. dan Zund R.E., 2000, *Statistical Methods in Analytical Chemistry*, edisi ke-2, John Wiley and Sons, Inc., Toronto
3. Skoog D.A., West D.M. dan Holler F.J., 1994, *Analytical Chemistry: An Introduction*, edisi ke-6, Saunders College Pub., Philadelphia
4. Skoog D.A. dan West D.M., 1985, *Principles of Instrumental Analysis*, edisi ke-3, Saunders College Pub., Philadelphia