



YOZGAT BOZOK UNIVERSITY FACULTY OF ARTS AND SCIENCES
CHEMISTRY DEPARTMENT COURSE PLAN

Course Code	Course Title	Semester	Course Type (C/E)	T+A+L (Time/Week)	Credit	ECTS	Course Language
KİM746	Chemometry	1-2	E	2+0+0	1	5	Turkish

COURSE INFORMATION

Course Catalog Description (Content)	Importance and usage areas of chemometry and multivariate statistical analysis RStudio statistical program basic concepts and usage-I RStudio statistical program basic concepts and usage-II Multivariate analysis of variance (MANOVA) Principal component analysis (PCA) Decomposition analyzes (LDA, PLS-DA) Decomposition analyzes (SVM, SIMCA) Midterm Grouping analyzes (AHC, k-means) Multivariate linear regression (MLR) Principal component regression (PCR) Partial least squares regression (PLS-R) Chemometry applications in analytical chemistry Chemometry applications in food analysis
The Aim of the Course	To gain knowledge and skills to evaluate and interpret the data obtained in analytical chemistry and food analytical chemistry using chemometric techniques. To gain competence in the use of RStudio, an open source statistical analysis program.
Course Level	Bachelor degree
Course Language	Turkish
Teaching method	(X) Formal () Online () Mixed/Hybrid
Teaching Staff of the Course	Prof. Dr. Mustafa SAÇMACI
Prerequisite Course(s) of the Course	
Learning Outcomes from the Course	1. Gains the ability to communicate about the general characteristics of statistical information. 2. Have the ability to select and design optimum experimental methods. 3. Gains the ability to produce maximum information from experimental data. 4. Gains knowledge about the response style of systems. 5. Gains the ability to use a package program.

COURSE CONTENT

Week	Theory	Practice/Laboratory
1	Introduction to chemometrics, significant figures, units and statistical parameters	
2	Error types, accuracy, precision, Gaussian distribution of results, partial validation	
3	Null Hypothesis, confidence interval, t test, F test	
4	Q test, Grubbs test, measurement uncertainty	
5	Least squares method, plotting a calibration graph	
6	Sources of error of the calibration chart	
7	External calibration chart, standard addition, internal standard method	
8	ANOVA, Analysis of variance	
9	Matrix operations	
10	Experimental Design	

11	Partial and full factorial design	
12	Placket-Burman and Taguchi designs	
13	Central Composite Design	
14	Central Composite Design	
15	Final Exam	

Course Learning Resources

- Otto, M., Chemometrics, Wiley-VCH, 1999.
- Massart, D.L., Vandeginste, B.G.M., Buydens, L.M.C., Jong S.de, Lewi, P.J., Smeyers-Verbeke, J., Handbook of Chemometrics and Qualimetrics : Part A, Elsevier, 1997
- Hair, J.F., Anderson, R.E., Tahtam, R.L., Black, W.C., Multivariate Data Analysis, 4th Ed., 1995.
- Morgan, E., Chemometrics : Experimental Design, John Wiley Sons, 1995

ASSESSMENT CRITERIA

Work Activities During the Semester	Number	Contribution
Homework	1	%30
Practice		
Forum/ Discussion Application		
Short Exam (Quiz)	2	%35
Ratio Of Semester Studies To Semester Success (%)		%40
Ratio of Final to Success (%)	1	%60
Total		%100

COURSE WORKLOAD TABLE

Activity	Total Weeks	Duration (Weekly Hours)	Total Workload
Theory	14	2	28
Practice			
Forum/ Discussion Application			
Reading	14	3	42
Internet Scanning, Library Study	14	2	28
Material Design, Application			
Report Preparation			
Presentation Preparation			
Presentation			
Final Exam	1	2	2
Preparation for the Final Exam	4	6	24
Other(s) (Specify:)			
Total Workload			
Total Workload / 25 (s)			124/25
ECTS Credits of the Course			124/25 \cong 5

Note: The workload of the course will be determined by the instructor on a per-course basis.

PROGRAM LEARNING OUTPUTS CONTRIBUTION LEVELS

No	Program Learning Outputs	1	2	3	4	5
1	Gains extensive knowledge about the basic chemical properties of matter and uses this knowledge in daily life, industrial scale, and practical chemistry and shares them with the society.				X	

2	Performs experiments, collects data, interprets, evaluates results, defines problems parallel to current technological developments, produces solutions against problems encountered in the laboratory.		X			
3	Calculates and processes chemical information and data.			X		
4	Applies her/his knowledge and understanding of chemistry to the solution of unconventional qualitative and quantitative problems.				X	
5	Defines and comprehends chemical concepts and theories in Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry, Biochemistry.				X	
6	Can conduct research in the light of scientific data on any subject in the field of chemistry.					X
7	Writes, presents, discusses scientific material, and presents it orally to a knowledgeable audience.			X		
8	Brings a chemical approach to the solution of environmental problems, makes environmental analyzes and reports.		X			
9	Knows a foreign language at a level to read and understand the basic terms and processes of the chemist profession.			X		
10	Can use computer software and information and communication technologies at the level required by the field.				X	
11	Adapts and transfers the knowledge gained in the field to secondary education.			X		
12	Apart from the field of chemistry, she/he gains knowledge in different branches of science that she feels close to.				X	
13	Carries out a study independently, makes group work and gains the awareness of taking responsibility.				X	
14	They can develop a positive attitude towards lifelong learning and constantly renew their professional knowledge and skills.				X	
15	Have sufficient awareness of the universality of social rights, social justice, quality culture and protection of cultural values, environmental protection, occupational health and safety.			X		

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