



**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
KIM720	Mathematical Methods in Chemistry	1-2	E	2+0+0		5	Turkish

**COURSE INFORMATION**

<b>Course Catalog Description (Content)</b>	Linear Plots: Michaelis-Menten, Lineweaver-Burk, Langmuir, Freundlich, Clausius-Clapeyron, Least Squares Method, Regression and Correlation, Data Processing.
<b>The Aim of the Course</b>	To give basic information about some special mathematical methods used in chemistry.
<b>Course Level</b>	Bachelor degree
<b>Course Language</b>	Turkish
<b>Teaching method</b>	(X) Formal ( ) Online ( ) Mixed/Hybrid
<b>Teaching Staff of the Course</b>	Related Lecturers
<b>Prerequisite Course(s) of the Course</b>	
<b>Learning Outcomes from the Course</b>	<ol style="list-style-type: none"><li>1. Solves problems related to significant numbers.</li><li>2. Explains problems related to logarithm, matrix and determinant in chemistry problems.</li><li>3. Will be able to express chemical reaction rates and the effect of temperature on the reaction rate graphically.</li><li>4. Will be able to find line equations by calculation and explain the solution of equations graphically.</li><li>5. Will be able to distribute error types, systematic and random error.</li></ol>

**COURSE CONTENT**

Week	Theory	Practice/Laboratory
1	Significant Numbers: Significant number, operations with significant numbers and their defects	
2	Use of logarithm matrix and determinant in chemistry problems	
3	Chemical Reaction Rates and Graphical Demonstration of the Effect of Temperature on Reaction Rate: Finding line equations graphically	
4	Finding line equations by calculation, solving equations with graphics	
5	Interpolation and Extrapolation	
6	Interpolation and extrapolation with graph and calculation	
7	Evaluation of Error and Chemical Data: Error types	
8	Distribution of systematic and random error	
9	Detection of systematic and random error	
10	Evaluation of a limited number of samples using statistical methods (normal distribution, t distribution)	
11	Evaluation of a limited number of samples using statistical methods (khi square distribution, F distribution)	
12	Regression and correlation analysis of chemical data	
13	Regression and correlation analysis of chemical data	

14	Regression and correlation analysis of chemical data
15	Final Exam

### Course Learning Resources

1- James R. Barrante - Çeviren: Zeki Büyükmumcu, Kimyacılar İçin Uygulamalı Matematik (3. Baskıdan Çeviri, 2009), Nobel Yayınevi, ISBN: 978-605-395-232-9

2- G. Stephenson, Mathematical Methods for Science Students (earson Education Canada; 2nd edition (January 1, 1996), ISBN: 978-0-582-44416-4

3- E.Kreysig, Advanced Engineering Mathematics (Wiley), ISBN: 978-0-470-91361-1.

### ASSESSMENT CRITERIA

Work Activities During the Semester	Number	Contribution
Midterm Exam	1	%50
Practice		
Forum/ Discussion Application		
Short Exam (Quiz)	1	%50
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		

*Bozok*