Course Description Form	
Course Code and Name	BDA5103 Mathematics for Data Science
Course Semester	Fall/Spring
Catalog Content	Functions of two or more variables, Limits, Continuity, Differentiability, Integration, Matrix Norms, The Range and The Null Space of a Matrix, Solving Linear Systems, Convexity, Quadratic Forms, Linear Dynamical Systems, Optimization
Textbook	1. Modern Calculus and Analytic Geometry, Richard A. Silverman, Dover Publications, 2012. 2. Linear Algebra and Its Applications, David C. Lay, Steven R. Lay, Judi J. McDonald, Pearson Education Limited; 5th edition, 2015.
Supplementary Textbooks	Advanced Calculus, David V. Widder, Dover Publications Inc., 1989.
Credit	8
Prerequisites of the Course (Attendance Requirements)	There is no prerequisite or co-requisite for this course 70% attendance is required.
Type of the Course	Elective
Instruction Language	English
Course Objectives	To learn concepts of Data Science with Mathematics
Course Learning Outcomes	1. Introduces main tools of Linear Algebra and Multivariable Calculus. 2. Constitutes a substructure for research in Data science. 3. The knowledge, which are gained in the course, helps students to broaden their horizon.
Instruction Methods	This course is carried out only in the form of face2face training.
Weekly Schedule	1. Real-valued functions of two or more variables 2. Limits, Continuity 3. Differentiability, the Gradient 4. Applications of Derivative 5. Integration 6. Applications of Integration 7. The Taylor Expansion of a two-variable function 8. Vectors, Norms, Inner products 9. Matrix Norms, Positive Definite Matrices 10. The Range and The Null Space of a Matrix 11. Solving Linear Systems 12. Convexity, Quadratic Forms 13. Linear Dynamical Systems 14. Optimization
Teaching and Learning Methods	Weekly theoretical course Reading Activities Internet browsing, library work Preparation of Midterm and Midterm Exam Final Exam and Preparation for Final Exam

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	1	15
Application		
Projects		
Practice		
Quiz	1	15
Percent of In-term Studies (%)		50
Percentage of Final Exam to Total Score (%)		50
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	0	0	0
Reading Tasks	10	4	40
Studies	10	4	40
Material Design and Implementation	0	0	0
Report Preparing	0	0	0
Preparing a Presentation	0	0	0
Presentations	0	0	0
Midterm Exam and Preparation for Midterm Exam	10	4	40
Final Exam and Preparation for Final Exam	10	4	40
Other (should be emphasized)	0	0	0
Total Workload			202
Total Workload / 25			8.08
Course Credit (ECTS)			8

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Reaches the expansion of knowledge by conducting scientific research in the field of engineering and evaluation, interpretation and application of information.					x
2	Has extensive and in depth knowledge including the latest techniques, methods applied and their limitations in engineering.					x
3	Completes and applies knowledge by using scientific methods by using limited or missing data and integrates		x			

		information from different disciplines.					
	4	Be aware of new and developing practices of the profession, examines and learns when needed.					x
	5	Defines and formulates problems related to the field, develops methods to solve them and applies innovative methods in solutions.					x
	6	Develops new and / or original ideas and methods, designs complex systems or processes and develops innovative / alternative solutions in their designs.				x	
	7	Designs and applies theoretical, experimental and modeling based researches, examines and solves the complex problems encountered in this process.			x		
	8	Works effectively in disciplinary and multidisciplinary teams, leads such teams and develops solution approaches in complex situations, works independently and takes responsibility.			x		
	9	Communicates oral and written using a foreign language at least at the level of European Language Portfolio C1.				x	
	10	Conveys the process and results of the studies in written and oral form in a systematic and clear manner in national and international environments within or outside the field.				x	
	11	Knows the social, environmental, health, security, legal aspects of engineering applications; project management, and business life applications and be aware of the constraints of these engineering applications.			x		

	12	Considers social, scientific and ethical values in the stages of data collection, interpretation and announcement and in all professional activities.		x			
The Course's Lecturer(s) and Contact Information	Computer Engineering Department bmbb@gazi.edu.tr						