<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>BDA5102 Graphs for Big Data and Applications</td></tr>
<tr><td>Course Semester</td><td>Fall/Spring</td></tr>
<tr><td>Catalog Content</td><td>To learn the role of graph databases</td></tr>
<tr><td>Textbook</td><td>Data, Storage and Index Models for Graph Databases</td></tr>
<tr><td>Supplementary Textbooks</td><td>1. DIESTEL, R.: Graph Theory. Springer–Verlag (2005)
2. GROSS, J. & YELLEN, J.: Graph Theory and Its Applications. CRC Press (2006)
3. ANDRÁSFAI, B.: Graph Theory: Flows, Matrices. The Institute of Physics
4. GROSS, J. & YELLEN, J.: Handbook of Graph Theory. CRC Press (2003)</td></tr>
<tr><td>Credit</td><td>8</td></tr>
<tr><td>Prerequisites of the Course
(Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course
70% attendance is required.</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>To find matrices and eigenvalues related to graph theory</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Learns the basic concepts of graphs
2. Learns matrix representation of graphs
3. Learns using graph theory for databases</td></tr>
<tr><td>Instruction Methods</td><td>The mode of delivery of this course is Face to face</td></tr>
<tr><td>Weekly Schedule</td><td>1. Basic Concepts of Matrix
2. Eigenvalues and Eigenvectors
3. Fundamental Concepts of Graphs
4. Matrix Representation of Graphs
5. Finding a Boundary for the Spectral Radius of a Graph
6. Rings, Paths and Cayley Graphs
7. Trees and Algorithms
8. Digraphs, Middle Exam
9. Weighted Graphs
10. Data, Storage and Index Models for Graph Databases
11. Graph Indexing and Querying Techniques
12. Graph Pattern Matching over Large Graphs
13. Labelling Scheme Based Subgraph of Graph Data
14. Matrix Decomposition of Graph Data</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course
Reading Activities
Internet browsing, library work
Preparation of Midterm and Midterm Exam
Final Exam and Preparation for Final Exam</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td></td><td></td></tr>
<tr><td>Application</td><td></td><td></td></tr>
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Projects			
Practice			
Quiz			
Percent of In-term Studies (%)		40	
Percentage of Final Exam to Total Score (%)		60	
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 information from different disciplines.		x			
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	Prof.Dr. Şerife BÜYÜKKÖSE, www.websitem.gazi.edu.tr/sbuyukkose sbuyukkose@gazi.edu.tr