Study program: Geoinformation Technologies

Qualification: PhD

General Information	
University	Yerevan State University
Course title	Geospatial Data Mining
Course/Module code	Geoinformation Technologies
Course type	Elective
Year of Study	1st year, 1st semester
Term/Semester	Autumn (Semester)
Credits awarded	5(ECTS), 150 Hours,
Degree	Phd
Enrollment status	Full-Time
Prerequisites and co-requisites (if applicable):	- Proficient knowledge of linear algebra, calculus, probability theory and statistics - Basic knowledge of GIS and and geovisualization - Basic knowledge of spatial analysis - Basic knowledge of relational and spatial databases: - Proficient knowledge in programming

Lecturer's details	
Name, surname	
Academic title	
Contact details	
Office hours and consultation schedule	

Course Structure	
Course Goal	This course treats a specific advanced topic of current research interest in the area of handling spatial, temporal, and spatio-temporal data. Major topics include data mining and machine learning techniques on clustering, association analysis, and classification. In addition, students will learn how to use popular data mining tools and how to implement applications in geosecience. The class will expose students to interdisciplinary research on spatial data mining and current industrial practices in handling spatio-temporal data.
Learning Outcomes	On the completion of this course, students should be able to: - Explain the purpose of spatial data mining - Describe a range of data mining techniques and their use in analyzing geomatics data - Identify and select the appropriate techniques for data mining geomatics data - Analyze and the data to construct models - Test models through validation and able to criticize their reliability
Course contents:	1. Characteristics of spatial data 2. Spatial data bases and data warehouses 3. Knowledge discover in databases 4. Pattern visualization 5. Spatial prediction (classification and regression) 6. Spatial segmentation and clustering 7. Spatial trends 8. Spatial associations 9. Spatial outliers 10. Spatio-temporal and moving object databases 11. Spatio-temporal and trajectory data mining 12. Emerging trends in spatial data mining: architectures and paradigms
Assessment methods and criteria	This course is evaluated as follows: 60% Assignments 15% Final Exam

	25% In-class Exercises and Quizzes
Recommended textbooks and links (in order of relevance):	**Recommended Textbooks:** 1. "Spatial Data Mining: Theory and Application" by Shashi Shekhar and Sanjay Chawla 2. "Data Mining for Geoinformatics: Methods and Applications" by Guido Cervone 3. "Geographic Data Mining and Knowledge Discovery" by Harvey J. Miller and Jiawei Han **Online Resources:** 1. "Spatial Data Mining" by University of California, Santa Barbara: https://www.geog.ucsb.edu/courses/geog576/ 2. "Introduction to Geospatial Data Mining" by Esri: https://www.esri.com/training/catalog/57630432851d31e02a43bba8/introduction-to-geospatial-data-mining/ 3. "Spatial Data Mining and Knowledge Discovery" by Dr. Dimitris Papadias: https://www.youtube.com/watch?v=0z7QDno4i8Q