

Study program: Geoinformation Technologies

Qualification: PhD

General Information	
University	Yerevan State University (YSU)
Course title	Spatial Decision Support Systems
Course/Module code	Geoinformation Technologies
Course type	Elective
Year of Study	1 st year, 1 st Semester
Term/Semester	Autumn (Semester)
Credits awarded	5(ECTS), 150 Hours,
Degree	PhD/Master's
Enrollment status	Full-Time
Prerequisites and co-requisites (if applicable):	<ul style="list-style-type: none">- Data analytics- Knowledge of GIS and and geovisualization- Basic knowledge of spatial analysis- Competence in algebra

Lecturer's details	
Name, surname	Dr. Artak Piloyan
Academic title	Assistant professor
Contact details	Email: artakpiloyan@ysu.am ; artakpiloyan@yahoo.com
Office hours and consultation schedule	11:00-14:00 Monday, Wednesday

Course Structure	
Type (compulsory/ optional):	Elective
Course Goal	The objective of this course is to introduce students to the concepts of Spatial Decision Support Systems (SDSS) and methods of Multi-Criteria Analysis applicable to solving spatial decision problems including site selection, resource allocation, and trade-off analysis of location decision alternatives such as business location selection, real estate choice, or evaluation of landfill site candidates.

<p>Learning Outcomes</p>	<p>On completion of this course, participants should be able to:</p> <ul style="list-style-type: none"> - explain the principles of decision-making processes and decision support systems - distinguish between various phases of the decision-making process and their required types of information - discuss the linkages between GIS and decision support systems - apply spatial multicriteria decision analysis techniques to combine various layers of information; of different quality, format and type to support the planning and decision-making process - classify and compare different multicriteria evaluation techniques - use spatial multicriteria evaluation techniques in proposing an appropriate solution to a spatial problem - assess and interpret the results of the multicriteria evaluation process.
<p>Course contents:</p>	<ul style="list-style-type: none"> - Introduction to Spatial Decision-Making Methods - Introduction to Multiple Criteria Decision Analysis - Evaluation Criteria - Decision Alternatives and Constraints - Criterion Weighting Technique - Decision Rules/Aggregation Function - Lab #1: Landfill Site Selection - Site selection with multiple criteria and Geographic Information Systems (GIS) - MCDM Technique with Implicit Preferences - Lab #2: Real Estate Evaluation
<p>Assessment methods and criteria</p>	<p>This course is evaluated as follows:</p> <p>60% Assignments</p> <p>15% Final Exam</p> <p>25% In-class Exercises and Quizzes</p>
<p>Recommended textbooks and links (in order of relevance):</p>	<p>Recommended Textbooks:</p> <ol style="list-style-type: none"> 1. "Geographic Information Analysis for Sustainable Development and Economic Planning: New Technologies" by Giuseppe Borruso

2. "Spatial Decision Support Systems: Principles and Practices" by Yao-Yi Chiang, Robert R. Gil-Garcia, and Suzanne P. Weisberg
3. "GIS and Multicriteria Decision Analysis" by Jacek Malczewski
4. "Multi-Criteria Decision Analysis for Supporting the Selection of Engineering Materials in Product Design" by Ali Bagheri and Paul Cooper

Online Resources:

1. "Introduction to Spatial Decision Support Systems" by Dr. R. Quentin Grafton and Dr. A. Jon Kimerling:
<https://www.youtube.com/watch?v=ChLpV09u0mc>
2. "Introduction to Multiple Criteria Decision Analysis (MCDA)" by Dr. Daniel H. Burnham: <https://www.youtube.com/watch?v=miRWEDzuTy4>
3. "GIS and Decision Making" by Esri: <https://www.esri.com/en-us/what-is-gis/overview>
4. "Spatial Multi-Criteria Decision Analysis (MCDA) with ArcGIS" by Esri: <https://www.esri.com/training/catalog/57630432851d31e02a43bba8/spatial-multi-criteria-decision-analysis-mcda-with-arcgis/>
5. "Spatial Decision Support Systems" by University of Illinois at Urbana-Champaign: <https://www.geog.psu.edu/course/geog-497d-spatial-decision-support-systems>