



TEL AVIV אוניברסיטת תל אביב
UNIVERSITY תל אביב

סילבוס מפורט

Course name

Geoinformatics: Data, Earth, and Decision-Making

Lecturer

Prof. Alexandra Chudnovsky

Semester

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Requirements

Final grade

Home works: 30%, final written report, personal for each student:70%

Course structure/ Lesson topic and content

Introduction to Geoinformatics and Spatial Thinking

- What is geoinformatics?
- Geospatial technologies in sustainability and policy
- Case examples from environmental research
- Bring your own example
- Introducing geoinformatics as a field– vector vs. raster concept in data analyses in ArcGIS environment

Lesson 1

Geographic Data Foundations: Coordinates, Maps, and Projections

- Earth representation systems: Coordinate Systems and Map Projections
- Common projections and distortions
- Fundamentals of Cartography: Map elements (scale, legend, symbology)
- Types of maps: thematic, topographic, reference, choropleth, iso-map
- Principles of effective map design

Lesson 2

Continuing Geographic Data Foundations

- Hands-on: Creating your first map in QGIS

Lesson 3

Spatial Data Models: Vector and Raster. Spatial analyses with overlay and buffering, Sources of Geospatial Data

- Points, lines, polygons, grids
- Overlay and buffering
- Data resolution and accuracy
- Satellite imagery, aerial photography, GPS, open datasets
- Practical: Downloading and importing data. Examples from several environmental applications. Download and spatial presentation

Lesson 4



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Remote Sensing Basics - Electromagnetic spectrum and sensors - Spectral signatures, Sensors, spectral bands, resolutions - Spectral Indexes to assess vegetation cover and spectral classification - Hands-on: Working with Landsat and Sentinel imagery. Land cover products and NDVI (vegetation cover)	Lesson 5
Continuing Remote Sensing Basics; Applications of Geoinformatics in Environmental Studies - Land use/land cover change - Natural resource management - Hands-on: NDVI and land cover classification	Lesson 6
Monitoring Urban Health and Air Quality: General overview with several examples - Urban thermal environments - Health and sustainability implications - Satellite and ground-based measurements of air pollution, synergy of both- vector and raster formats - Linking satellite data with ground-based measurements - Hands-on: Deriving Land Surface Temperature (LST) from satellite data	Lesson 7
Continuing: Monitoring Urban Health and Air Quality: General overview with several examples Hands-on: Air quality data download and spatial representation	Lesson 8
Methods of Spatial Analysis - Moran's I, hot spot analysis - Hands-on: Spatial statistics in practice	Lesson 9
Define your own project: Decision-Making with Geospatial Evidence - Integrating data into policy and planning - Communicating results with maps and dashboards - Examples on geospatial applications from different environmental subjects Search for data, satellite imagery, how would you process the data	Lesson 10
Hands-on: Creating a geospatial story map using your own example Class presentations and examples	Lesson 11



Future Directions and Student Project Presentations • AI/ML in geoinformatics • Citizen science and participatory GIS • Class presentations and examples	Lesson 12
Concluding remarks – course summary highlights, students discussion	Lesson 13
Reading	
Jensen 2014. Introduction to Remote Sensing of Environment Selected book chapters will be uploaded per each lecture for mandatory reading from all the different sources	