Université de Thessalie
Département d'Aménagement,
d' Urbanisme et de Développement Régional
Master Franco-hellénique
Population Développement Prospective (PODEPRO)

Semestre 2
UE 4: Techniques, méthodes et outils
Cours U4.3: Geographic Information Systems
Intervenant :
Durée : 20 heures

Course description and objective:

An advanced postgraduate course on Geographic Information Systems and their applications in population analysis and its spatial aspects. The course includes hands-on training on selected GIS software plus the preparation of specific applications – exercises.

The objective of the course is to provide the students with both a solid theoretical background to the Geographical Information Science and at the same time hands on experience in state of the art GIS software.

The course includes presentation of raster and vector data structures in a comparative way, advanced use of attribute tables, map algebra, spatial analysis and other relative topics. The emphasis is on the use of GIS in population analysis.

Indicative content - Course Schedule:

1. Introduction. Geodatasets and thematic mapping. Conceptual approach on GIS.
2. GIS data representations. Structure and relationships of geographic data. Spatial databases. Introduction to vector and raster data structures.
3. Designing spatial databases. Constructing geometry. The meaning of topology.
4. Creating and Editing geodatasets.
5. Spatial Adjustment and Georeference.
6. Attribute tables and Spatial Queries.
7. Thematic mapping with GIS: Map composition, Data classification, Symbology, Labeling.
8. Interpolation and Spatial Relations.
9. GIS and spatial analysis (Spatial models, Spatial indices, point densities, etc.)
10. GIS for population analysis. Capabilities and limitations.

Basic Bibliography:

1) Burrough P., McDonnell R., Principles of Geographical Information Systems (Spatial Information Systems), Oxford University Press, USA, 1998.
2) Date C. J., An introduction to database systems, The systems programming series, 6th edition, Addison-Wesley, 1995
3) Dickinson G., Statistical mapping and the presentation of statistics, second edition, Edward Arnold, London, 1973
4) Haining R., Spatial Data Analysis. Theory and Practice, Cambridge University Press, 2003
5) Harmon J., Anderson S., The Design and Implementation of Geographic Information Systems, Science, J. Wiley & Sons, 2003

6) Laurini R., Thompson D., Fundamentals of Spatial Information Systems, The Apic Series, Academic Press, 1992
7) Longley P., Batty M., Advanced Spatial Analysis: The CASA book of GIS, ESRI Press, USA 2003
8) Longley P., Goodchild M., Maguire D., Rhind D., Geographic Information Systems and Science, John Wiley & Sons, UK, 2002
9) Macdonald H., Unlocking the census with GIS, ESRI Press, USA, 2004
10) Mitchell A., The ESRI Guide to GIS Analysis. Volume 1: Geographic Patterns & Relationships, ESRI Press, Redlands, USA 1999
11) Monmonier M., How to Lie with Maps, University Of Chicago Press; 2nd edition, 1996,
12) Plane D., Rogerson P., The Geographical Analysis of Population: with Application to Planning and Business, John Wiley and Sons, Inc., 1994
13) Robinson A., Morrison J., Muehrcke P., Kimerling A., Guptil S., Elements of Cartography, John Wiley & Sons, NY, 1995
14) Stillwell J., Clarke G., Applied GIS and Spatial Analysis, John Wiley & Sons, New York, 2004
15) Suchan T., Brewer C., Mapping Census 2000, The Geography of U.S. Diversity, ESRI Press, USA, 2001.
16) Wyatt P., Ralphs M., GIS in Land and Property Management, Spon Press, Taylor & Francis Group, London, 2003
17) Zeiler M., Modeling our World, The ESRI Guide to Geodatabase design, ESRI Press, USA, 1999