

## PhD-course in Spatial Analysis autumn 2017, 5 hp

Target group: The main target group is the PhD-student in GIScience at LU; i.e., the course is designed to fit to their interest. Other PhD-students are welcome if they have a master in geomatics or similar.

The course contains four themes. All themes should correspond to 4 days full time work (i.e., correspond to 1.25 credits). Each theme contains a lecture, a writing/practical exercise and a final seminar.

Course coordinator: Petter Pilesjö <petter.pilesjo@gis.lu.se>

### 1) Introduction and programming

Responsible: David Tenenbaum/ Petter Pilesjö + intro to spatial analysis by Jonathan Seaquist

Content: Will discuss the use of scripting languages in order to make a geographic information system efficiently perform functions that it may not necessarily already be designed to support.

Includes: One lecture, one set of practical exercises, where all students will carry out a number of preliminary exercises to familiarize themselves with the scripting language, and then use their acquired knowledge to solve a simple practical problem. Students will report their results and reflections on the process in the form of a written report), and a feedback session in the form of a seminar, plus individual feedback on the reports.

### 2) Data mining

Responsible: Ali Mansourian

Content: starts by describing different areas of spatial analysis and how they are interrelated to each other. The position of data mining in the area will be described, data mining will be defined and some data mining techniques will be reviewed.

Includes: One lecture and an exercise (either with own data or data provided) including a report, and a feedback session in form of a seminar plus individual feedback on the reports.

### 3) Spatial data mining

Responsible: Ali Mansourian /Mahdi Farnaghi

Content: Explains including spatial components within data mining techniques to create spatial data mining. Some techniques will be reviewed. An emphasis will be on GWR, as a well-known spatial analysis to determine spatial heterogeneities.

Includes: One lecture and an exercise (either with own data or data provided) including a report, and a feedback session in form of a seminar plus individual feedback on the reports.

#### 4) Spatial interpolation

Responsible: Lars Harrie/Andreas Persson

Content: Will provide an overview of spatial interpolation techniques both for point data and for area data. The focus is on the theory behind the interpolation methods and that the selection of an interpolation method must be based on these theories.

Includes: One lecture, a practical exercise (either with own data or data provided) including a report, and a feedback session in form of a seminar plus individual feedback on the reports.

#### Schedule

Date	Time	Teaching form	Teacher	Room
10 October	13.00-13.15	Opening of the course	AM	Gotland
10 October	13.15-14.00	Overview of spatial analysis	JS	Gotland
10 October	15.15-17.00	Programming exercise	DT	Gotland
24 October	10.15-12.00	Feedback session	DT, PP	Gotland
24 October	13.15-15.00	Data mining lecture	AM, PP	Gotland
8 November	10.15-12.00	Data mining seminar	AM, PP	Litosfären
8 November	13.15-15.00	Spatial data mining lecture	AM	Gotland
21 November	10.15-12.00	Spatial data mining seminar	AM	Gotland
21 November	13.15-14.30	Spatial interpolation lecture	LH	Gotland
22 November	13.15-15.00	Spatial interpolation lecture	LH	Gotland
11 December	13.15-15.00	Spatial interpolation seminar	LH	Gotland

#### Student requirements

To fulfill the course all the students have to:

- Attend all lectures and seminars
- Complete all the exercise
- Give one oral presentation in a one seminar in either: (a) Data mining lecture, (b) Spatial data mining and (c) Interpolation.

If a student cannot attend a lecture or seminar he/she will either be given an extra assignment or there will be a reduction in the number of credits on the course.