UNIVERSITY OF PRETORIA
UNIVERSITEIT VAN PRETORIA
Department of Geography, Geoinformatics and Meteorology
Departement Geografie, Geoinformatika en Meteorologie

# GIS 310

**PRACTICAL Examination / *PRAKTIESE Eksamen***
GIS / GIS

**Internal Examiner / *Interne Eksaminator***
G. D. BREETZKE

**External Examiner / *Eksterne Eksaminator***
I. S. J. NETTERBERG

| TYD / TIME: | DATUM / DATE: | PUNTE / MARKS |
|---|---|---|
| 210 MIN | *24 MEI 2006/* 24 MAY 2006 | 70 |

## INSTRUKSIES / INLIGTING
## INSTRUCTIONS / INFORMATION

Answer all the questions.
Remember to write down any assumptions you make.
Write down the process of how you got to the answer.

*Beantwoord al die vrae.*
*Onthou om telkens enige aannames wat jy gemaak het, asook die denkproses wat jy gebruik het om by die antwoord uit te kom, neer te skryf.*

**INTRODUCTION:**

The GIS practical sessions this semester has introduced you to ArcGIS. So far most of the applications of GIS that you have been exposed to, concentrate on processing parcels of land, or area based features. In your exam, however, you will be asked to do an application of GIS involving the analysis of point and line based features.

Suppose that a new sewerage pipeline is to be laid between a village and a sewerage treatment plant. You are required to find the cheapest route for the pipeline. The 'cost' of the pipeline is to be based, rather simplistically, on the land cover over which it passes. In addition, it is desirable that the pipeline should run 'down-hill' as much as possible to minimise the need for the installation of expensive pumping equipment.

**OBJECTIVE:**

For this practical exam you must: -

1. Extract a sub-region from an original coverage
2. Create an aspect map from a digital elevation model (DEM)
3. Assign relative costs based on land use and direction of slope (**State assumptions!!**)
4. Add land use and direction of slope maps
5. Create a 'cost-distance' surface
6. Determine the least-cost pathway
7. Improve the presentation of the final map
8. Display the final map
9. Display the model that you have used to create your answer

**DATA:**

| File Name | Type | File Type |
|---|---|---|
| topo | Topography | Raster dataset |
| Landcov | Land coverage | Raster dataset |
| Sewerage_source | Sewerage source | Raster dataset |
| Sewerage_plant | Sewerage plant | Raster dataset |

**FUNCTIONS TO USE:**

- Clip (Raster)
- Aspect
- Reclassify
- Plus
- Cost Distance
- Cost Path

**DELIVERABLES:**

1. A half-page description briefly describing the route that is taken by your pipeline. I.e. the land over which it passes, etc. (10)
2. A complete digital model (built in Modelbuilder), together with set parameters, conditions, environmental settings etc. (30)
3. A map illustrating the route taken from the sewerage source to the treatment plant. (30)

[70]

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