



# MASENO UNIVERSITY

## UNIVERSITY EXAMINATIONS 2011/2012

SECOND YEAR SECOND SEMESTER EXAMINATIONS  
FOR THE DEGREE OF BACHELOR OF ARTS IN URBAN  
& REGIONAL PLANNING WITH INFORMATION  
TECHNOLOGY  
(MAIN CAMPUS)

### **NPL 211: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS**

*Date: 16<sup>th</sup> April, 2012*

*Time: 2.00 – 4.00 p.m.*

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#### INSTRUCTIONS:

- ◆ Answer QUESTION ONE and any other TWO questions.

**NPL 211: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS**

1.
  - a. Discuss **FOUR** main aspects that qualify data as spatial in a GIS environment. **8 Marks**
  - b. Discuss the advantages of raster GIS data compared to vector data. **8 Marks**
  - c. Explain the clean-up operations that are usually applied before elementary topology of polygons is established in the process of turning spaghetti data into polygons with topological structure. **14 Marks**
2. Explain any four measurement scales citing relevant examples in each case. In each case, identify the kind of mathematical operation that can be carried out on data represented. **20 Marks**
3. Identify and discuss **FIVE** data quality components that you must consider when dealing with GIS data. **20 Marks**
4.
  - a. Given the following query:

```
SELECT Owner, DeedDate  
FROM TitleDeed, Parcel  
WHERE TitleDeed.Plot = Parcel.Pid AND AreaSize > 1000
```

Explain the meaning of the following SQL codes. **15 Marks**

```
Owner, DeedDate  
TitleDeed, Parcel  
TitleDeed.Plot = Parcel.Pid  
Parcel.Pid  
TitleDeed.Plot  
AreaSize > 1000  
AND
```

- b. Answer the questions at the end of the two tables below given the relation schema presented below: **5 Marks**

Employee	(FName: string, Surname: string, SSN: number, DNo: number)
Department	(DName: string, DNo: number)
Works on	(ESSN: number, PNo: number, Hours: number)
Project	(Pname: string, PNo: number, PLocation: string, DNo: number)

Where:

FName = first name, SSN= social security number, DNo = department number, DName = department name, ESSN= employee SSN, PNo = project number, Pname = project name, PLocation = project location
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- c. What is the primary key in the Department relation?
  - d. Name a foreign key in the Project relation
  - e. What is the domain of the attribute "PLocation" in the Project relation?
5. You have obtained an existing printed geological map and you have to capture its spatial data into your GIS. The resulting map has to be a vector map with meaningful attributes assigned to each drawing object. Please indicate the correct sequence of steps to follow. **20 Marks**
6. Identify **FIVE** rules of topological consistency in two-dimensional space and show the rules in graphical forms. **20 Marks**