



DUBLIN INSTITUTE OF TECHNOLOGY

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**DT228B/2 MSc. in Computing)**

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WINTER EXAMINATIONS 2017/2018

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**GEOGRAPHIC INFORMATION SYSTEMS [CMPU4032]**

MR. MARK FOLEY

WEDNESDAY 3<sup>RD</sup> JANUARY

9.30 A.M. – 11.30 A.M.

TWO HOURS

ANSWER **THREE** QUESTIONS.  
ALL QUESTIONS CARRY EQUAL MARKS

1. (a) Why is it important to pay attention to Map Design? What are the common elements on a map for presentation?  
(9 marks)
- (b) What is visual hierarchy in Map Design? How is the hierarchy related to the map purpose?  
(8 marks)
- (c) How does a general reference map differ from a thematic map?  
(8 marks)
- (d) Mapmakers apply visual variables to map symbols. What are visual variables?  
(8 marks)
2. (a) Explain the notion of *Spatial Interpolation*. Discuss *Inverse Distance Weighting* (IDW) as a method of spatial interpolation. Your answer should highlight the pros and cons of this method.  
(12 marks)
- (b) Describe the usefulness of *slope* and *aspect* measures from a *Digital Elevation Model* (DEM). How are these calculated?  
(12 marks)
- (c) Explain the difference between a global method and a local method of spatial interpolation.  
(9 marks)

3. (a) Describe a *point-in-polygon* overlay operation.  
(5 marks)
- (b) A *line-in-polygon* operation produces a line layer, which typically has more records (features) than the input line layer. Why?  
(5 marks)
- (c) Define slivers from an overlay operation.  
(5 marks)
- (d) Describe a scenario in which *intersect* is preferred over *union* for an overlay operation.  
(9 marks)
- (e) Suppose the input layer shows a county and the overlay shows a forest. Part of the county overlaps the forest. We can express the output of an *intersect* operation as [county] AND [forest]. How can you express the outputs of a *union* operation and an *identity* operation?  
(9 marks)
4. (a) Define *isopleth* and *choropleth* maps. Comment on their uses and how they might be constructed.  
(12 marks)
- (b) Describe the four basic classification schemes to divide interval and ratio data into categories. Comment on the difficulties in choosing one scheme over another.  
(15 marks)
- (c) It has been said that digital cartography and GIS free map-makers from many of the constraints inherent in traditional (non-GIS) paper mapping. Describe these constraints.  
(6 marks)