# <u>V35 –2:   35-hour short course (Cost: £310)</u>

## Course Title:  Exploring and Modelling of Spatial Data in Veterinary Epidemiology

This course consists of two units:

1. Exploring Spatial Data
2. Modelling of Spatial data

Aims of each unit and your learning outcomes are outlined in the following section.

### Unit 1:  Exploring Spatial Data

### Aims of the unit

- To introduce methods for describing point data – particularly methods for describing the density of point data.
- To describe methods for describing spatial autocorrelation in point data.
- To familiarize you with the methods for describing disease count data, recorded on an area basis.
- To familiarize you with methods for describing spatial autocorrelation in area data.

### What you will learn

By the end of this unit you should be able to:

- plot point data using the GIS package ArcView for Windows
- create a kernel density surface, based on plotted point data
- explain the term 'extraction mapping'
- describe the situations in veterinary epidemiology where K-function plots of a spatial process would be useful
- explain the term 'standardized mortality ratio'
- describe the use of Bayesian smoothing of disease count data collected on an area basis.

## Unit 2: Modelling of Spatial data

### Aims of the unit

- To familiarize you with fixed-effect Poisson regression models, as used in classical (frequentist) statistics.
- To introduce you to full Bayesian methods fixed-effect Poisson regression modelling – an alternative the frequentist approach.
- To enable you to use methods for detecting clusters of disease.

### What you will learn

By the end of this unit you should be able to:

- describe the structure of a fixed-effects Poisson model of disease count data
- interpret the regression coefficients from a fixed-effects Poisson model of disease count data
- explain a Bayesian approach to analysis
- describe the situations where a Poisson model of disease count data that accounted for spatial autocorrelation would be preferred over a model that ignored spatial autocorrelation entirely
- interpret the regression coefficients from a mixed-effects Poisson model of disease count data.

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