

### Assignment 3

#### UPP 465

Due: 03/20/2020 via Blackboard

Three point pattern event data - Pattern 1, Pattern 2, and Pattern 3 - have been provided to you. Your task in this assignment is to examine these three patterns and report back on your findings. Specifically, answer the following questions:

1. Examine the three patterns. Populate the following table:

Data	Number of events	Area of observation	Average intensity
Pattern 1			
Pattern 2			
Pattern 3			

2. Assessment of point patterns requires you to compare your event data against a pattern of CSR with the same level of average intensity. For each of the three patterns, if you were to carve out a 2 square unit area:

- how many points do you expect to see in that area if the pattern is CSR?
- what is the probability of observing exactly 5 events in the 2 square unit area if the pattern is CSR?

Populate the table below. **Show your detailed work for both a and b for one of the patterns.**

Data	Expected count in 2 Square unit area	Probability( $X=5$ ) in the 2 square unit area
Pattern 1		
Pattern 2		
Pattern 3		

3. For each pattern, estimate the Kernel Density and show a plot overlaid with the point patterns. (hint: after plotting the density, use `plot(pattern1, add=TRUE)`)

4. Using the G function and the Ripley's K function assess whether each point pattern resembles a CSR, a clustered pattern, or a regular pattern. Include figures that show the envelope and the values of the G and K functions for all three patterns. Briefly explain the figures and your conclusion.

Data	Pattern type
Pattern 1	
Pattern 2	
Pattern 3	