GIS – 915   Spatial Analysis and Modeling (2+1=3)

1. **Course Objectives:**
    a. The enable students to develop an advanced understanding of geospatial analysis and modeling.

2. Course Outcome:
    a. Plan, design and implement a spatial analysis and/or modeling investigation demonstrating the ability to select, apply and critically interpret appropriate methods for the analysis and/or modeling of geographical information.

3. **Course Code:**
    a. GIS – 915

4. **Credit Hours:**
    a. Theory   =   02
    b. Practical   =   01
    c. Total =   03

5. **Detailed Contents:**
    a. Treatment of more advanced topics in the application of spatial analysis in a GIS environment
    b. Introduction to GI analysis
    c. Spatial Data
    d. Spatial Processes
    e. Point Pattern Analysis
    f. Spatial Autocorrelation
    (1) Moran's I
    (2) Getis Ord Gi
    g. Spatial Interpolation
    (1) Inverse Distance Weighted (IDW)
    (2) Spline
    (3) Trend surface
    (4) Kriging
    (5) Co-kriging
    h. GIS models and Modeling
    i. Multivariate Data Analysis
    j. Modeling spatial relationships
    (1) Ordinary least square modeling
    (2) Geographically Weighted Regression

6. **Lab work:**
    a. Point pattern analysis
    b. Modeling spatial relationship
    (1) OLS
    (2) GWR
    c. Spatial Regression
    d. Geostatistical analysis
    e. Multivariate data analysis

7. **Textbooks/Reference Books:**

a. Smith, MJ, MF Goodchild and PA Longley, 2018. Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools, 6th Edition.
b. O'Sullivan, D, and DJ Unwin, 2010. Geographic Information Analysis, 2nd Edition. John Wiley & Sons.
c. Kemp, K.K., ed. 2008. Encyclopedia of Geographic Information Science, Sage Publications. (http://web-app.usc.edu/soc/syllabus/20121/35754.pdf)
d. Related Journal Papers (Class handouts)