GIS – 814 Remote Sensing Applications in Urban Areas (3+0=3)

1. **Course Objectives:**
   a. The course aims to give the students an in-depth understanding of the use of Remote Sensing data for various urban applications.

2. **Course Outcomes:**
   a. Students will be able to apply the knowledge of RS in different fields of urban areas.

3. **Course Code:**
   a. GIS – 814

4. **Credit Hours:**
   a. Theory   =   03
   b. Practical   =   00
   c. Total   =   03

5. **Detailed Contents:**
   a. Image classification, classification methods/ algorithms
   b. Introduction to Object-based image classification
   c. Integration of remote sensing and geographic information systems (GIS)
   d. Use of ancillary data in classification
   e. Application of Remote Sensing data in different fields
   f. Remote sensing of impervious surfaces in urban areas: Requirements, methods, and trends
   g. Impervious surface area extraction from IKONOS imagery using an object-based fuzzy method
   h. Urban Land Use and Land Cover Classification
   i. Urban Landscape Characterization and Analysis
   j. Urban Feature Extraction from High Spatial-Resolution Satellite Imagery
   k. Building Extraction from Elevation data (LiDAR Data)
   l. Urban Land Surface Temperature Analysis
   m. Integrated Remote Sensing–GIS Approach to Surface Runoff Modeling
   n. Approaches to Population Estimation with Remote Sensing–GIS Techniques
   o. Estimation of the relationship between remotely sensed anthropogenic heat discharge and building energy use

6. **Textbooks/Reference Books:**
   a. Rashed, T., & Jürgens, C. (Eds.). (2010). Remote sensing of urban and suburban areas (Vol. 10). Springer Science & Business Media.
   b. Weng, Q. (2009). Remote Sensing and GIS Integration: Theories, Methods, and Applications: Theory, Methods, and Applications. McGraw-Hill Education.
   c. Weng, Q., Quattrochi, D., & Gamba, P. E. (2018). Urban remote sensing. CRC press.
   d. Related Journal Papers (Class handouts)