

Spatial Databases

CSc 81040, 3 Credits

Mondays, 2:00 – 4:00 pm @ CUNY Graduate Center

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Spatial Databases plays a bridging role between databases and Geographical Information System (GIS). Spatial databases, as a discipline, is among the fastest growing sub-fields of databases and are the foundations for geographical data manipulation in modern GIS. The leading commercial and open source database systems, such as Oracle, DB2, PostgreSQL, MySQL, and more recently, Microsoft SQL Server, are providing increasing supports for spatial and geographical data. Spatial databases, in conjunction with GIS, have played important roles in both business and scientific data management. In addition, spatial databases technologies, with proper customization, have potential applications in other types of multimedia data management and computer vision applications.

The course includes the following units:

- Spatial concepts and representation of spatial objects
- Spatial access methods (or spatial indexing)
- Selected 2D computational geometry algorithms that are essential to spatial databases and GIS
- Spatial query languages, query processing and optimization
- An overview of the architectures and implementations of selected leading commercial and open source spatial databases.
- An introduction to spatial data mining.

The course is intended to be interdisciplinary between computer science and Earth and Environmental sciences.

- For **Computer science** graduate students with databases background, the course serves the purpose of expanding their knowledge and stimulating their research interests in spatial data management based on a database centric framework.
- For graduate students in **Earth and Environmental Sciences** that have taken introductory and/or advanced GIS courses, the course will provide them opportunities to learn more technical details on how geographical data are stored, indexed and queried internally beyond graphical user interfaces provided by GIS.

Textbook & References

- No textbooks are required – they are expensive.
- Slides and links to research articles will be provided before classes.
- Reference 1: Philippe Rigaux, Michel O. Scholl, Agnes Voisard, Spatial Databases: With Application to GIS. Morgan Kaufmann, 2002.
- Reference 2: Shashi Shekhar and Sanjay Chawla, Spatial Databases: A Tour. Prentice Hall, 2003.

Registration

- The course is open to all students in the Ph.D. Program in Computer Science.
- Students from Ph.D. disciplines other than Computer Science (e.g., Earth and Environmental Sciences) may register without special permission
- All other individuals interested in the course (including master students): please contact the instructor for assistance.