IS 590: Problems in Information Sciences: Biological Informatics

Course Overview:

The course would focus on the interdisciplinary field of biological informatics. When information science encountered the capabilities of computers and telecommunications in the late twentieth century, the discipline of informatics came into being. As does information science, informatics addresses the collection, classification, storage, retrieval, and dissemination of recorded knowledge. Application of computers and telecommunications—especially the Internet and the World Wide Web — to these functions has created new opportunities and new challenges for information management and delivery. And in the natural sciences, information science and computing technology are joined by the relatively new technology of geographic information systems to allow for an even greater depth of knowledge to be stored and applied.

A real world approach, through case studies, class projects, and guest lectures, will be employed to allow the students to experience the challenges facings researchers, land managers, decision makers, information professionals, and policy makers in the area of biological data acquisition, management, and delivery. The emphasis of the class will be on the data and information science aspects of biological informatics through discussions in the areas of: information life cycle, metadata management, data and information standards, geospatial technologies, and the impacts of social science.

Course Outline:

I. Biological Informatics
   a. What it is and isn't
   b. Major components
   c. Relationship to other scientific areas

II. Disciplines required & their role
   a. Biological science
   b. Information science
   c. Computer science
   d. Geospatial science
   e. Social sciences

III. The Information Life Cycle
   a. Cradle to grave management of scientific data and information
   b. Why some organizations succeed and others fail

IV. Metadata basics for science
   a. What is it
   b. Why is it important
   c. What standards exists
      i. FGDC Biological Data Profile
      ii. Dublin Core
      iii. Open GIS
      iv. Darwin Core
      v. Others
   d. Metadata resistance
      i. The scientific model
      ii. Publish or parish paradigm
      iii. Incentives and rewards for data sharing
   e. Real world examples of its usage and failures

V. Web Development basics
   f. Existing Standards
   g. Underlying infrastructure
   h. Common tools for development
   i. What makes a good website
   j. The role of portals, intranets, and collaboration tools
   k. Gathering metrics, statistics, user feedback
   l. What is unique about science sites

V. Geospatial Technologies basics
   a. Why is it important
   b. Basic concepts and terms
   c. Mapping standards

d. Mapping tools

VI. Decision Support Tools & Theories
   a. Why are they needed
   b. Current deployments
   c. Current limitations

VII. The role of Social Sciences
   a. Why is it important
   b. Value of social sciences
   c. Developing a feedback/measurement strategy
   d. Measuring Results

VIII. Case Studies

IX. Integrative closer project