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The computational bottleneck in performing large-scale geospatial analyses with conventional GIS has created an urgent need for GIS users and GI scientists to learn about what cyberGIS could offer. The course intends to cover three major domains of competence: (1) fundamentals of cyberGIS, (2) cyberGIS platform and software, and (3) high-performance geospatial computing. Three course modules will be developed; each will be designed to be self-contained and easily incorporable into teaching already popular GIS courses as needed. The idea is to strategically fit the most important cyberGIS topics into the current GIS curricula in a relatively flexible yet pedagogically sound manner. Detailed lecture notes and lab instructions will be developed in synergy to create an effective learning experience for students. Some of the real computation problems encountered by geospatial researchers at my institution (e.g., massive production of vegetation index maps from global satellite imagery) will be included as lab exercises to link teaching with research activities. The developed course materials will be put on the open source learning platform Moodle for easy sharing with other educators of the same teaching interest.

Module 1

- CyberGIS Reading List
- Big Geospatial Data
- Geospatial CyberInfrastructure
- Introduction to Cloud Computing
- CyberGIS for Scientific Discoveries

Module 2

- Introduction to XSEDE
- Introduction to HPC
- Introduction to Amazon AWS
- Introduction to Hadoop
- Lab: Getting Started with CyberGIS Gateway
- Lab: Getting Started with AWS

Module 3

- Fundamentals of Python Programming
- Python for HPC
- Multiprocessing Module of Python
- AWS with Python
- Lab: Getting Started with Boto
- Lab: HP Geocomputing in Amazon Virtual Machine
- Lab: Multiprocessing and ArcPy