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of NORTH CAROLINA  
at CHAPEL HILL

## **GENI in the Classroom: Course Modules for Teaching Networking Concepts**

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### **Research → Teaching**

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- Significant methodological advances in empirical networking research
- Large-scale collaborative research testbeds, including the GENI infrastructure
- Bring these resources into our classrooms – potentially powerful teaching tools



## Goals for this Project

- Curriculum modules for teaching core networking concepts in an undergraduate networking class
- Modules based on concepts from two widely used textbooks (Kurose and Ross, Tanenbaum and Wetherall)
- Example topics: socket programming, TCP congestion control, IP routing and forwarding, network security
- Modules available on the GENI wiki

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## Two kinds of Modules

- In-class demo module - illustrates a concept
- Assignment module - reinforces a concept through homework assignment

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## Examples: Demo Modules

- Demonstrate how two FTP flows (between GENI VMs in different aggregates) share the available bandwidth
- Demonstrate two FTP flows (TCP) sharing bandwidth, then competing unfairly for available bandwidth when a UDP flow is introduced

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## Examples: Assignment Modules

- Use GENI VMs to teach socket programming and develop an HTTP client and server
- Run two TCP flows, each using a different congestion control algorithm to demonstrate the effect of congestion control algorithms on throughput and fairness

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## What's in a Module?

- Presentation material
- Canned demonstrations
- Detailed assignment instructions (tutorial style)
- Notes and solutions for the course instructor
- Spring 2014: test run in Kevin's 80-student undergraduate networking course

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## GENI Resources

- **GENI Portal** - setup and project management for instructors
- **LabWiki** for documentation
- **GEMINI** for instrumentizing, demonstrating results, graphs

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## Schedule

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- Watch for our **poster** at the next GEC demo at Georgia Tech in March
- Sign up for our **tutorial** on using our modules at UC-Davis in June
- Six **modules** available for Fall 2014 courses

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# Thank you!

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# Questions?

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