Next Generation Networks – Teaching SDN in Academia

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Interdisciplinary Telecom Program (ITP)

- **Master’s & Ph.D. Program**

- **Focus on hands-on labs with industry-grade equipment**

- **Four specialization tracks**
  - Network Engineering, Network Security, Policy and Strategy, & Wireless

- **Network Engineering Curriculum - (industry evolution)**
  - Technical Core Courses
    - *Routing Protocols (BGP); Telecom Lab (Cisco Routing and Switching); Network Programming (Python); UNIX/Linux; Network Mgmt/Automation*
  - Technical Lab Electives
    - *Data Center; VoIP; Service Provider, Next Gen. Networks (SDNFV); etc.*
SDN - Academia

• Vendor Neutral

• Everyone does SDN in their own way

• Focus on core technology = OpenFlow

• Incorporate variety
  – OpenDaylight, OpenContrail, OpenStack, Floodlight, Ryu, ONOS, etc.

• Certification (something to prove knowledge)

• Competitive advantage and marketability
NGN - Labs

- Mininet, Miniedit, & GNS3
- OpenFlow / Wireshark
- Controllers & OVS
  - OpenDaylight, Floodlight, ONOS, Ryu
- OpenStack & OpenContrail
- Hardware Lab
  - Hardware & Virtual

- Arista, Dell, HP, Pica8
- Network Design (physical and virtual), configuration, Python programming

- Applications
  - REST API
  - Firewall
  - Load-balancer
  - DNS Blacklist
  - BGP Path Manipulation
  - Shortest/Longest Path
  - Cisco OFM
Get Involved with ITP SDN

- **Student sponsorships to industry leading conferences**
  - ODL, ONS, Layer123, OpenStack, etc.

- **Guest speakers**
  - Seminar series
  - Courses

- **Capstone / Thesis / Ph.D. Topics**
  - Improving QoS in SDN
  - Traditional and SDN via DevOps
  - Manipulating SDN via BGP Peering
  - Improving Security of OpenDaylight

- **Industry training**
  - ITP Academy