

# ECE 792-027

## Routed Network Design

**Instructor(s):** Yannis Viniotis, candice@ncsu.edu

**Objective or Description:** The objectives of this course are to:

1. Expose the students to (some of) the [fundamental issues that arise in the design and management of routed networks](#), with special emphasis on enterprise networks and data center switch fabrics. Such issues include, among others:
  - Business objectives and technical design requirements
  - Design tradeoffs
2. Provide the students with [practical experience on routing protocols](#). Demos and several lab exercises are used for that purpose.
3. Provide the students with [practical experience on data center switch fabric design and operation protocols](#).
4. Expose the students to the [fundamental issues that arise in virtualization of WAN and switch fabrics](#).

**Prerequisites:** ECE/CSC577

**Textbook:** We use my own notes and selected handouts

**Topics:** Details are supplied in the course moodle page. The topics we will cover in this course include:

- OSPF
- Policy Based Routing
- Route redistribution
- BGP primer - emphasis only on its use in data centers (not the Internet)
- Switch Fabrics in data centers
  - Virtualization (NVGRE, VxLAN, GENEVE data planes)
  - Control planes (EVPN)
  - Hyperconvergence (if time permits)
- Server load balancing
  - Across data centers
  - Within a data center
- Interconnecting data centers
  - Single Provider
  - Multicloud (if time permits)
- Virtualization in WAN - SDN solutions (if time permits)
- Telemetry (if time permits; guest lecture by Carlos Pignataro, Cisco DE)

**Grading:** Your grade will be based upon:

- two midterm exams (25% each)
- homework (25%)

· lab exam (25%)

**Cross-listing in other departments:** CSC792-020

**Include anything else that is unique to the course - this information will be posted on the ECE Current Graduate/Undergraduate Student Portals for all students to view**