CS543: **Software-Defined Networking**

Instructor: Dr Nik Sultana (http://www.cs.iit.edu/~nsultana1/)

Course Description
Many important services—including Internet services many of us use—operate over networks that support reconfigurable, fine-grained processing of traffic, and are said to be "software-defined". Software-Defined Networks (SDNs) enable the deployment of larger and richer network services, but they also introduce new technical challenges. This course provides an overview of SDN concepts and techniques. It will teach practical skills for SDN engineering, and will prepare students for careers in designing and operating different kinds of networks.

Course Objectives
The main learning goals of this course are the following:

- Understand the opportunities and challenges associated with SDNs.
- Learn the P4 programming language for SDN, and its toolchain. (https://p4.org/)
- Several example applications of Software-Defined Networking.

Prerequisites
CS450

Workload
Three credit hours.

Course format and grading

- Assignments: 20%
- Project: 50%
- Mid-term and Final exams: 30%

Detailed Syllabus
1. Introduction to Software-Defined Networking (3 hours) 2. Network architecture (6 hours) 4. Switch and Network OS (3 hours) 3. Routing (6 hours) 5. P4 (6 hours) 6. Traffic patterns (3 hours) 7. Network monitoring (3 hours) 8. Distributed data models (3 hours) 9. Security (3 hours) 10. Failure modeling (3 hours) 11. In-network computing (6 hours)

Total: 45 hours

Textbooks

- *Software-Defined Networks: A Systems Approach*. Peterson, Cascone, O'Connor, Vachuska, and Davie.
- *Computer Networking: A Top-Down Approach*. Kurose and Ross. 8th Edition.