

**CS 798 -041:       Advanced Network Architectures**  
(Short title: **Advanced Network Architectures**)

**Objectives:**

This course is one of two companion courses on network softwarization offered simultaneously in the Winter 2020, the first course (this one) introduces concepts and principles of network softwarization while the second course focuses on hands on experience with technology enablers. The courses will be offered simultaneously in 4 Universities, namely University of Waterloo, University of Toronto, University Laval and École de technologie supérieure (ETS).

Students must successfully complete both courses in order to qualify for CREATE industry internships in the area of network softwarization.

**Schedule:**

The course will be offered in flip mode. Pre-recorded video lectures will be provided prior to class and weekly interactive sessions (remotely attended by students in other universities) will provide an opportunity to discuss lecture material and answer students' questions.

Day/time of classes: Monday 12:00 PM – 2:50 PM

**Outline:**

Part 1: Software-Defined Networking Principles and Design

- Introduction to SDN (Week 1)
- SDN Data, Control Planes, and APIs (Week 2)
- Network Virtualization (Week 3)

Part 2: Cloud Computing, Network Function Virtualization and Orchestration

- Introduction to Cloud Computing (Week 4)
- Programmable Networks (Week 5)
- Network Function Virtualization (Week 6)
- IoT, Smart Cities, and 5G Use Cases (Week 7)

Part 3: Sustainable Management of Clouds and Networks

- Energy efficient and sustainable management (Week 8)
- Data Analytics (Week 9)

Part 4: Software-Defined Optical WAN and Radio Access

- 5G Fronthaul requirements (Week 10)
- Trends in multicarrier optical physical layer (Week 11)

Part 5: 5G Network Architecture

- How SDN, NFV, and MEC come together in 5G (Week 12)

**Grading scheme:**

- Class participation: 10%
- Weekly quizzes: 40%
- Course project proposal: 10%

- Course project: 30%
- Final project video presentation: 10%