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Date:

CSXX2841: *Software Defined Networks*

L-T-P-Cr: 3-0-0-3

Pre-requisites: Undergraduate Computer Networks course.

Objectives/Overview:

- Introduce software defined networking: the background, the development, and the challenges.
- Hands-on experience with SDN using a popular simulator Mininet.

Course Outcomes:

Upon successful completion of this course student should be able to:

- Explain OpenFlow, challenges in SDN, and recent development in t SDN
- Use and program Mininet and write basic SDN applications using FloodLight open-sourced SDN controller.

UNIT I:

Lectures: 8

History and Evolution of SDN: Separation of Control Plane and Data Plane, IETF Forces, Active Networking.

Control and Data Plane Separation: Concepts, Advantages and Disadvantages, the OpenFlow protocol.

UNIT II:

Lectures: 8

Network Virtualization: Concepts, Applications, Existing Network Virtualization Framework (VMWare and others), Mininet based examples.

Control Plane: Overview, Existing SDN Controllers including Floodlight and OpenDaylight projects.

UNIT III:

Lectures: 10

Customization of Control Plane: Switching and Firewall Implementation using SDN Concepts.

Data Plane: Software-based and Hardware-based; Programmable Network Hardware.

UNIT IV:

Lectures: 8

Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs.

Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications.

UNIT V:**Lectures: 8****Data Center Networks:** Packet, Optical and Wireless Architectures, Network Topologies.**Use Cases of SDNs:** Data Centres, Internet Exchange Points, Backbone Networks, Home Networks, Traffic Engineering**Text/Reference Books:**

1. SDN: Software Defined Networks, An Authoritative Review of Network Programmability Technologies, By Thomas D. Nadeau, Ken Gray Publisher: O'Reilly Media, August 2013, ISBN: 978-1-4493-4230-2, ISBN 10:1-4493-4230-2.
2. OpenFlow standards, <http://www.openflow.org>, 2015.