



No:-

Date:

CSX4223: Software Defined Networks

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

Pre-requisites: Undergraduate Computer Networks course.

Objectives/Overview:

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

Course Outcomes:

At the end of the course, a student should be able to:

S.No	Course Outcome	Mapping to POs
1	Understand the basic architecture of SDN and its working	PO1, PO3
2	Differentiate the SDN and its functioning compared to legacy network	PO1, PO3
3	Identify Challenges in SDN	PO1, PO2, PO3
4	Identify Challenges that can be solved using SDN	PO1, PO2, PO3
5	Develop solutions to Data Center traffic engineering challenges using SDN.	PO1, PO2, PO5

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.