COURSE TITLE	**SOFTWARE DEFINED NETWORKS**
COURSE CODE	**01CT0726**
COURSE CREDITS	**4**

Objective:

1 This course introduces software defined networking, an emerging paradigm in the field of networking which allows a logically centralized software program to control the behavior of an entire network.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the concepts of Software Defined Networks

2 Apply various SDN Principles with different Architectures

3 Apply concepts of Virtualization, Framework solutions on Data Centers

4 Analyze a given scenario and implement Social Defined Networks

Pre-requisite of course: Cloud computing

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to SDN** History of Software Defined Networking (SDN), Modern Data Center, Traditional Switch Architecture, need of SDN, Evolution of SDN, Working principle of SDN, Centralized and Distributed Control, Date Planes	8
2	**Open flow and SDN controllers** Open Flow Specification, Drawbacks of Open SDN, SDN via APIs, SDN via Hypervisor- Based Overlays, SDN via Opening up the Device, SDN Controllers	8
3	**Data centers** Multitenant and Virtualized Multitenant Data Center, SDN Solutions for the Data Center Network – VLANs, EVPN, VxLAN, NVGRE	8
4	**SDN Programming** Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs, Network Functions Virtualization (NFV), Software Defined Networks: Concepts, Implementation and Applications	9

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Contents : Unit	Topics	Contact Hours
5	**SDN** Juniper SDN Framework, IETF SDN Framework, Open Daylight Controller, Floodlight Controller, Bandwidth Calendaring, Data Center Orchestration	9
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment 1** Introduction to Mininet	2
2	**Experiment 2** To perform distributed system and autonomous decisions using BGP for legacy networks.	2
3	**Experiment 3** To establish the semi static forwarding paths.	2
4	**Experiment 4** Introduction to SDN	2
5	**Experiment 5** To configure SDN network	2
6	**Experiment 6** To configure VXLAN to provide network traffic isolation	2
7	**Experiment 7** Introduction to OpenFlow protocol management	2
8	**Experiment 8** To preform routing within SDN network	2
9	**Experiment 9** To establish the interconnections between legacy networks and SDN networks.	2
10	**Experiment 10** To configure virtual private LAN service	2
11	**Experiment 11** To apply equal cost multi path protocol within SDN networks.	2
12	**Experiment 12** To apply the algorithm for a self-stabilizing control plane	2
Total Hours		**24**

Textbook :

1 SDN and OpenFlow for Beginners, Vivek Tiwari, CCIE, 2013

2 Network Innovation through OpenFlow and SDN: Principles and Design, Fei Hu, CRC Press, 2014

3 Software Defined Networking with OpenFlow, Siamak Azodolmolky, Packt Publishing, 2013

References:

1 Software Defined Networks: A Comprehensive Approach, Software Defined Networks: A Comprehensive Approach, Paul Goransson , Kaufmann Publications, 2014

2 SDN: Software Defined Networks, An Authoritative Review of Network Programmability Technologies, SDN: Software Defined Networks, An Authoritative Review of Network Programmability Technologies, Thomas D, Ken Gray Publisher: O'Reilly Media, 2013

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	30.00	20.00	15.00	5.00

Instructional Method:

1 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

2 Practical examination will be conducted at the end of the semester for evaluation of performance of students in laboratory.

3 Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory, etc.

Supplementary Resources:

1 https://www.coursera.org/learn/sdn

2 https://www.udemy.com/course/sdn-openflow-nfv-introduction/

3 https://www.coursera.org/learn/network-virtual

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