DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

COURSE PLAN (2025-2026 Even Semester)

Name of the Faculty				
Designation/Department	Assistant Professor / Information Technology			
Course Code/Name	U23CSV35/Software Defined Networks			
Year/Section/Department	III/A,C/IT			
Credits Details	L: 3	T: 0	P: 0	C: 3
Total Contact Hours Required	45			

Syllabus:

UNIT I - SDN: INTRODUCTION	**No. of Periods: 9**
Evolving Network Requirements – The SDN Approach – SDN architecture - SDN Data Plane , Control plane and Application Plane	
UNIT II - SDN DATA PLANE AND CONTROL PLANE	**No. of Periods: 9**
Data Plane functions and protocols - OpenFLow Protocol - Flow Table - Control Plane Functions - Southbound Interface, Northbound Interface – SDN Controllers - Ryu, Open Daylight, ONOS - Distributed Controllers	
UNIT III - SDN APPLICATIONS	**No. of Periods: 9**
SDN Application Plane Architecture – Network Services Abstraction Layer – Traffic Engineering –Measurement and Monitoring – Security – Data Center Networking	
UNIT IV - NETWORK FUNCTION VIRTUALIZATION	**No. of Periods: 9**
Network Virtualization - Virtual LANs – Open Flow VLAN Support - NFV Concepts – Benefits and Requirements – Reference Architecture	
UNIT V - NFV FUNCTIONALITY	**No. of Periods: 9**
NFV Infrastructure – Virtualized Network Functions – NFV Management and Orchestration – NFV Use cases – SDN and NFV	
TOTAL HOURS: 45	
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Objectives:

CO1: Describe the motivation behind SDN
CO2: Identify the functions of the data plane and control plane
CO3: Design and develop network applications using SDN
CO4: Orchestrate network services using NFV
CO5: Explain various use cases of SDN

CO6:Describe various use cases of NFV

Text Books:

T1: William Stallings, "Foundations of Modern Networking: SDN, NFV, QoE, IoT and Cloud",Pearson Education, 1st Edition, 2015

T2: Goransson, Paul, Chuck Black, and Timothy Culver. Software defined networks: comprehensive approach, 1st edition, Morgan Kaufmann, 2016.

Reference Books:

R1: Ken Gray, Thomas D. Nadeau, "Network Function Virtualization", Morgan Kauffman, 2016.
R2: Thomas D Nadeau, Ken Gray, "SDN: Software Defined Networks", O'Reilly Media, 2013.
R3: Fei Hu, "Network Innovation through Open Flow and SDN: Principles and Design", 1st Edition, CRC Press, 2014.
R4:Paul Goransson, Chuck Black Timothy Culver, "Software Defined Networks: A Comprehensive Approach", 2nd Edition, Morgan Kaufmann Press, 2016.
R5:Oswald Coker, Siamak Azodolmolky, "Software-Defined Networking with Open Flow", 2nd Edition, O'Reilly Media, 2017

Web Link

W1: https://www.studocu.com/in/document/anna-university/software-defined-networks/ccs365-software-defined-networksl-sylabus/88388548

Online Mode of study (if any)

W1: https://www.**course**ra.org
W2: https://www.classcentral.com

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I – SDN: INTRODUCTION						
1	Evolving Network Requirements	T1	2	BB	2	2
2	The SDN Approach	T1	5	BB	2	4
3	SDN architecture	T1	5	BB	2	6
4	SDN Data Plane	T1	12	PPT	1	7
5	Control plane	T1	12	BB	1	8
6	Application Plane	T1	14	BB	1	9

Outcome of Unit I:

CO1: Examine the challenges and opportunities associated with adopting SDN compared to traditional approaches to networking(K2)

UNIT II - SDN DATA PLANE AND CONTROL PLANE						
7	Data Plane functions and protocols	T1	2	BB	2	11
8	OpenFLow Protocol	T1	4	BB	1	12
9	Flow Table	T1	6	BB	1	13
10	Control Plane Functions	T1	8	BB	1	14
11	Southbound Interface, Northbound Interface	T1	9	BB	1	15
12	SDN Controllers	T1	11	BB	1	16
13	Ryu, Open Daylight, ONOS - Distributed Controllers	T1	12-14	BB	2	18

Outcome of Unit II:

CO2: Analyze the functions and components of the SDN architecture (K2)

UNIT III - SDN APPLICATIONS						
14	SDN Application Plane Architecture	T1	2	BB	2	20
15	Network Services Abstraction Layer	T1	4	BB	1	21
16	Traffic Engineering	T1	7	BB	1	22
17	Measurement and Monitoring	T1	12	BB	2	24
18	Security	T1	18	BB	1	25
19	Data Center Networking	T1	20	BB	2	27

Outcome of Unit III:

CO3: Discuss the major requirements of the design of an SDN Protocol (K3)

UNIT IV - NETWORK FUNCTION VIRTUALIZATION						
20	Network Virtualization	T1	2-7	BB	2	29
21	Virtual LANs	T1	11	BB	1	30
22	Open Flow VLAN Support	T1	18	BB	1	31
23	NFV Concepts	T1	19	BB	1	32
24	Benefits and Requirements	T1	22	BB	2	34
25	Reference Architecture	T1	24	BB	2	36

Outcome of Unit IV:

CO4: Design and create an SDN network consisting of SDN switches and a centralized Controller (K3)

UNIT V - NFV FUNCTIONALITY

26	NFV Infrastructure	T1	2-13	BB	2	38
27	Virtualized Network Functions	T1	13-16	BB	1	39
28	NFV Management and Orchestration	T1	16-20	BB	2	41
29	NFV Use cases	T1	18-20	BB	2	43
30	SDN and NFV	T1	29	BB	2	45

Outcome of Unit V:

CO 5: Analyze the performance of the SDN network by using verification and troubleshooting Techniques. 6. Evaluate the emerging SDN applications. (K3)

CO6: Evaluate the emerging SDN applications. (K3)

Course Outcome:

At the end of course:

Students should be able to do:

CO 1: Examine the challenges and opportunities associated with adopting SDN compared to traditional approaches to networking.(K2)

CO 2: Analyze the functions and components of the SDN architecture.(K2)

CO 3:. Discuss the major requirements of the design of an SDN protocol. (K3)

CO 4: Design and create an SDN network consisting of SDN switches and a centralized Controller. (K3)

CO 5: Analyze the performance of the SDN network by using verification and troubleshooting Techniques. 6. Evaluate the emerging SDN applications. (K3)

CO6: Evaluate the emerging SDN applications. (K3)

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	1	2	3	1	3	-	-	-	2	3	1	3	2	1
CO 2	2	1	2	2	3	-	-	-	2	2	2	2	1	3
CO 3	2	2	2	3	3	-	-	-	3	1	1	2	1	3
CO 4	2	2	2	3	1	-	-	-	1	3	1	2	2	2
CO 5	3	3	1	1	3	-	-	-	1	2	1	2	2	1
CO 6	2	2	2	1	2	-	-	-	1	2	2	2	2	1
AVG:	**2**	**2**	**2**	**2**	**2.6**	**-**	**-**	**-**	**1.8**	**2.2**	**1.2**	**2.2**	1.4	**2.2**

Content beyond Syllabus:

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Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment I (60)	-	CO 1 & CO2
	1	Assignment Handwritten (20)	1. SDN architecture, 2. Control plane and Application Plane	CO 1
	2	Poster / PPT Presentation (20)	1. Control Plane Functions 2. SDN Controllers	CO2
Webportal 2	--	Assessment II (60)	-	CO3 & CO4
	3	Seminar (20)	1. SDN Application Plane Architecture 2. Security	CO3
	4	Case Study Report/ Mini Project/Model Making (20)	1. Network Virtualization 2. NFV Concepts	CO4
Webportal 3		Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
		Course Attendance (10)	-	-

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Before Model Exam)
Assignment 1 & 2		**Assignment 3 & 4**		**Assignment 5**

Google Class Code Details :

Google Classroom Name :

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
AT-1	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
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AT-2	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
MODEL	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6

Prepared By **Verified By**

AP/IT **HOD/IT**

Approved By
PRINCIPAL