

**Course Objective:**

This course is an advanced level course in the network protocols with an introduction to Software Defined Networks and Internet of Things. In addition, this course also introduces about network security as well as vulnerability assessment through penetration testing. It aims to provide a practical exposure into the design and functioning of network protocols and security mechanisms.

**Prerequisites:** Computer Networks and Cryptography.

**Course Syllabus**

**Unit 1:** Internetworking: Architectural principle, Layering, Names and addresses. TCP/IP suite of protocols, TCP extensions for high-speed networks, SCTP, RTSP, RTCP, RTP - IPv6: API for IPv6, MAC protocols for high Speed LANS, MANs, WLANs. QoS in IP Network, traffic engineering and analysis, SNMP and access control, SDN: Data and Control Plane, Open flow Control, Network Function Virtualization.

**Unit 2:** Recent trends in Wireless communication networks, wireless sensor networks, multimedia sensor networks, mobile ad-hoc networks, mobility based protocols, next generation IP networks, WIN – Wireless intelligent networking, information aggregation, information storage and query, localization. Internet of Things (IoT): Enabling Technologies.

**Unit 3:** Network security concepts, wired and wireless network security policies and protocols, IP Security and authentication mechanism, Intrusion detection and Prevention systems, Organizational security issues, Security policies for network operations, Disaster recovery and business continuity, vulnerability assessments & exploiting the vulnerability through Penetration Testing Tools.

Case study: Network management tools used at ICTS, AVVP, Coimbatore Campus, IoT protocols along with network security for any one Industrial Internet of Things.

**References:**

1. James F. Kurose & Keith W. Ross, Computer Networking: A Top-Down Approach, 7/E. Pearson Education India, 2017.
2. Goransson, P., Black, C., & Culver, T. Software defined networks: a comprehensive approach. Morgan Kaufmann, 2016.
3. Arshdeep Bahga, Vijay Madisetti, —Internet of Things – A hands-on approach, Universities Press, 2015
4. Mark Ciampa, “Security+ Guide to Network Security Fundamentals”, 2nd Edition, Cengage Learning, 2012.
5. Online Resources: Technical papers in course related topics and IEEE Standards documents

**Course Outcomes:**

At the end of the course the students will be able to

	<b>Course Outcome</b>	<b>BTL</b>
CO 1	Analyze roles of TCP/IP protocol as well as MAC protocols in high speed networks	4
CO 2	Understand the design principles in software defined network.	3
CO 3	Apply the various enabling technologies and protocols related with wireless and mobile networks for practical applications.	3
CO 4	Analyze the design and functioning of existing vulnerability assessment through penetration testing in network environment.	4
CO 5	Implement security algorithms over traditional networks as well as IoT systems	5

**CO-PO-PSO mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3		3		2	3	3	3
2	2		2		1	2	3	3
3	2		2	2	1	2	3	3
4	3	3	3	3	2	3	3	3
5	3	3	3	3	3	3	3	3

### Programme Objectives (PSO)

Hone the skill of computer science professionals in areas of research and innovation.

Develop experts with high professional competence in recent and futuristic technologies.

Create man power with technical competency in computer science to design and develop solutions for the societal problems.

### Program Outcomes (PO)

Ability to independently carry out research investigation and development work to solve practical problems

Ability to write and present a substantial technical report/document

Students should be able to demonstrate a degree of mastery over the area

Ability to design and develop computing solutions using emerging computing paradigms to interdisciplinary problems following standard practices, tools and technologies

Ability to demonstrate commitment to professional ethics

**Evaluation Pattern : 4B**

<b>Component</b>	<b>Weight (%)</b>
Assignments	15
Implementations	15
Case Study	10
Periodical 1	15
Periodical 2	15
End semester	30
Total	100

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