COMPUTER NETWORKS AND INTERNET PROTOCOL

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INTENDED AUDIENCE : CSE, ECE, EE students

INDUSTRIES APPLICABLE TO : IT industries

COURSE OUTLINE :

The domain of Internet has grown in a rapid pace from traditional circuit switched and packet switched small scale networks to modern high-speed mobile and wireless Internet. A large number of methods, architectures and designs came up at every protocol level to cope up with the demands for developing a secure and highly dependable information technology infrastructure. The broad objective of the course is to understand - (i the architecture and principles of today's computer networks, (ii the protocols and their functionalities, (iii the requirements for the future Internet and its impact on the computer network architecture. In this course, we'll broadly cover the basic TCP/IP protocol stack and touch on the next generation computer networks. We'll take a top-down approach to cover different protocols at the TCP/IP protocol stack.

ABOUT INSTRUCTOR :
Prof. Soumya K. Ghosh received Ph.D. and M.Tech. degrees from Department of Computer Science and Engineering, Indian Institute of Technology (IIT, Kharagpur. Presently, he is a Professor with Department of Computer Science and Engineering, IIT Kharagpur. Before joining IIT Kharagpur, he worked for the Indian Space Research Organization in the area of satellite remote sensing and geographic information systems. He has more than 200 research papers in reputed journals and conference proceedings. His research interests include spatial data science, spatial web services and cloud computing.

Prof. Sandip Chakraborty received Ph.D. and M.Tech. degrees from Department of Computer Science and Engineering, Indian Institute of Technology (IIT, Guwahati. Presently, he is an Assistant Professor with Department of Computer Science and Engineering, IIT Kharagpur. He has around 100 research papers in reputed journals and conference proceedings. His research interests include computer systems, distributed systems and mobile computing.

COURSE PLAN :

 Week 1 : Introduction to Computer Networks History, Circuit Switching and Packet Switching

 Week 2 : TCP/IP Protocol Stack – Basic Overview

 Week 3 : Application Layer Services (HTTP, FTP, Email, DNS)

 Week 4 : Transport Layer Primitives – Connection Establishment and Closure

 Week 5 : Flow Control and Congestion Control at the Transport Layer

 Week 6 : Transmission Control Protocol – Basic Features, TCP Congestion Control

 Week 7 : Network Layer Primitives – IP Addressing

 Week 8 : IP Routing – Intra Domain Routing Protocols, Inter Domain Routing Protocols (BGP)

 Week 9 : IP Services – SNMP, ARP

 Week 10 : Data Link Layer Service Primitives – Forwarding, Flow Control, Error Control

 Week 11 : Media Access Control - Channel Access Protocols, Framing

 Week 12 : End to End Principles of Computer Networks