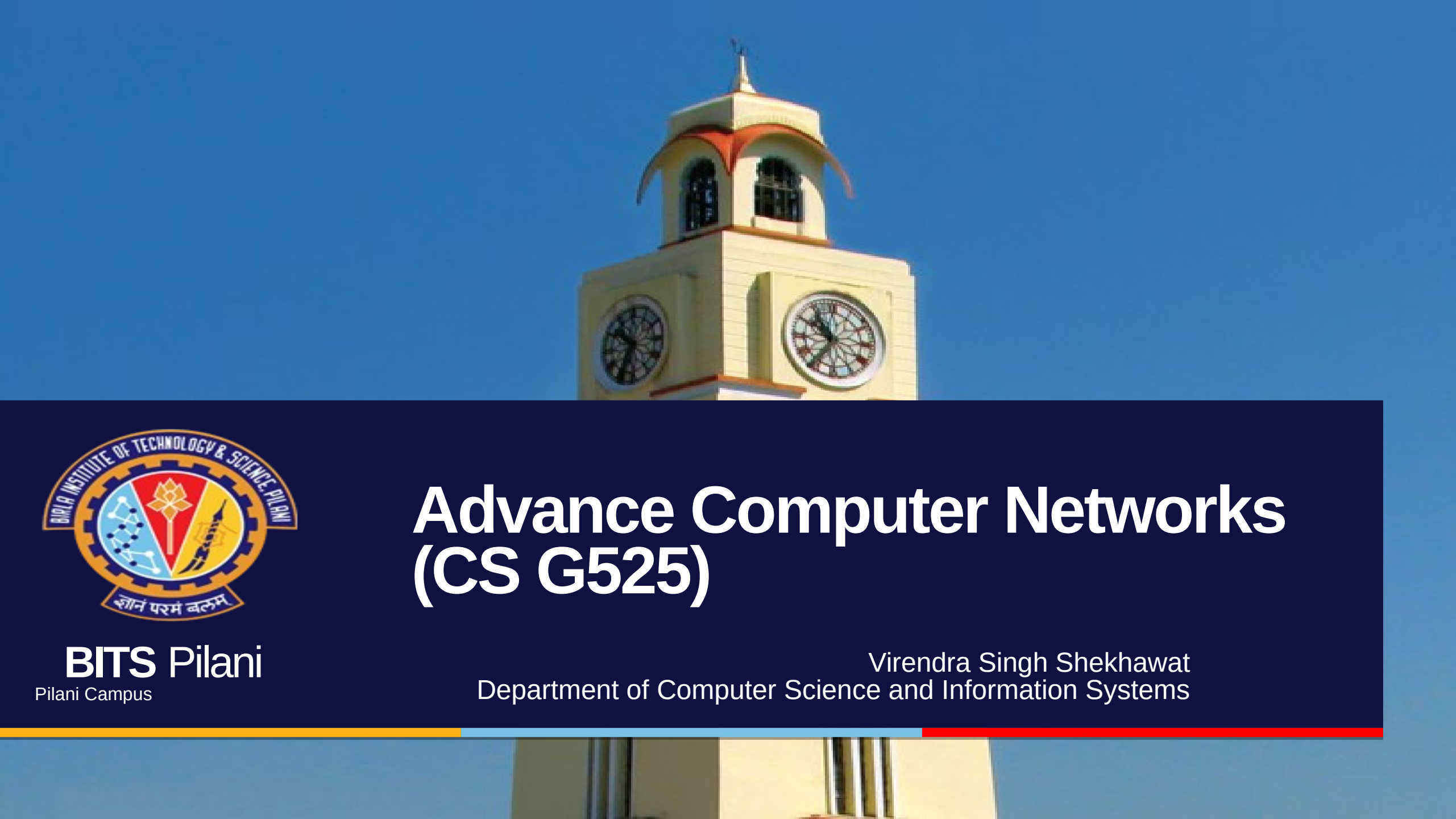

Advance Computer Networks (CS G525)

BITS Pilani
Pilani Campus

Virendra Singh Shekhawat
Department of Computer Science and Information Systems

innovate achieve lead

BITS Pilani

Pilani Campus

First Semester 2020-2021
Lecture-0 [19th Aug 2020]

Today's Agenda

- Introduction
- Course Overview
- Course Administration
- Let's start learning...

Course Objective

- To learn state-of-the-art about network architectures, protocols, systems, and network applications
- To learn “How to read research papers…?”
- To read other’s research work and critically analyze it
- To engage ourselves in the field of **Networking Research**

Resources

- There is no prescribed Text Book !!!
- Want to brush-up basics of Computer Networks
  - *Computer Networking*: A Top Down Approach by Kurose & Ross
  - *Computer Networks: A Systems Approach* by L. Peterson Davie

- Course content comprises
  - Around 25 research papers (List is in the course handout)
  - Read the research papers before coming to the class
  - Class participation is the key for the learning

Course Administration

- Lecture Class Timings
  - M W F @3:00 – 3:50 PM
- Practical
  - Network Simulation using ns-3, OpenFlow Network Simulation using Mininet, Data transfer using TCP/UDP sockets
- Course page Information
  - **http://nalanda.bits-pilani.ac.in**
  - **Microsoft Teams**

- Evaluation Plan
  - Test-1 @10%, Test-2 @10% and Test-3 @15%
  - Assignment @10% (Individual)
  - *Research Project @20% (Group of two students)*
    - *Beginning of the semester: Research project problem formulation*
    - *Mid Semester assessment: 8%*
    - *End Semester assessment: 12%*
  - Comprehensive exam @35%

Classroom Topics Coverage

- Little emphasis on undergraduate level stuff
  - Based on topics demand/requirement!
- Layer wise focus will be on the
  - Network Layer, Transport Layer, and Application layer
  - Less emphasis on Link and physical layer
- What will be covered:
  - Protocols and Algorithms, Network Architectures, Network Performance, Network Applications, Quality of Service (QoS)
  - Focus will be on 3 Ws (**What?, Why?, Why not?**)

Course Structure

- Five Modules
  - Internet Architecture & Principles [06 lectures]
  - Software Defined Networks (SDNs) [07 lectures]
  - Network Traffic Control & Management [12 lectures]
  - Wireless & Mobile Networks [08 lectures]
  - Overlay & Data Center Networks [07 lectures]

Let’s begin…

- What is Internet?

- What is Networking?

Challenges

- Interconnected networks are different in various ways
  - Address formats
  - Performance – bandwidth/latency
  - Packet size
  - Loss rate/loss handling
  - Routing
- How to transfer the data from one network to another???

Network Functionalities

- Find the nodes in the Internet
- Route the packets
- Deal with the different packet size requirements from different networks
- Meet the application requirements
  - Reliability
    - Data loss and data corruption
  - Congestion and flow control
  - In order delivery
- **How to implement these functionalities?**

Architect of the Internet?

- Internet architecture is evolving faster then ever…
  - Journey started around 1980
- How Internet will look like after 10 years from now?
- Interested to know the journey of the Internet?
  - A Brief History of the Internet [Leineret al., 2003]

Next Class

- Internet design philosophy
  - Compulsory Reading
    - The Design Philosophy of The DARPA Internet Protocols [Clark 1988]

Thank You!