**COURSE: WIIT - 7790 Networking Fundamentals**

**DESCRIPTION OF COURSE**

This course provides an In-depth analysis of data mobility including the hardware infrastructure (wires, wireless, and devices supporting them), the ISO stack, standards, Internet protocols, federations and grids, privacy & security.

**STUDENT LEARNING OUTCOMES**

Upon successful completion of this course, student will be able to:

* Explain the functions of all layers of the ISO OSI models, including how they are interconnected and supported.
* Explain the OSI representation of the various layers involved in networking, including the general functions of each layer and their interconnections
* Explain the concept of the Application layer
* Explain the concept of the Presentation layer
* Explain the concept of the Session Layer
* Explain the concept of the Transport layer
* Explain the concept of the Network layer
* Explain the concept of the Data Link layer
* Explain the concept of the Physical layer
* Explain connection-oriented versus connectionless communication

* Recommend components of networking hardware that meet standards and support information exchange.
* Transmission Terminology
* Network Media
* Connectivity Devices

* Describe enterprise architecture models, including centralization vs federation and grids, service oriented architectures, and local implementations.
* Standards development
* Incorporate professional and regulatory standards related to privacy, confidentiality, and security when implementing and maintaining networks

**SOFTWARE**

Wireshark and other free utilities will be used in the course.

**UNITS OF INSTRUCTION**

OSI Model

Network Types (LAN, MAN, WAN, PAN, SAN, WLAN, EPN VPN, etc.)

Topologies (Physical vs. Logical)

Wireless Networks

Wired Networks

Network Media & Transmission

Connectivity Devices

Cabling Standards

Network Standards (IEEE, etc.)

Network Protocols (UDP, TCP, IP, ARP, ICMP, etc.)

Connection-Oriented vs. Connectionless Services (UDP vs. TCP) and its importance

Data Packets

Packet Analysis using Wireshark

Frames

TCP/IP (IPv4 vs. IPv6)

Subnetting

Routing & Switching Fundamentals

Cloud Computing Overview (Cloud Services and Cloud Security Overview)

Virtualization

Security (Authentication, Protocols, etc.)

Authentication Methods and Protocols (RADIUS, Kerberos, IP Sec, SSH, SSL, etc.)

Domain Name System (DNS) and how it works

Dynamic Host Configuration Protocol (DHCP) and how it works

Network Monitoring

Analyzing Logs