

Certificate in Introduction to Computer Networks

Necessity of This Course

Computer networking classes combine lectures and hands-on practice to provide skills in computer network system configuration. Courses may include discussions, lectures and projects that deal with basic networking principles and current developments in the field. Computer networking courses train students to connect local area networks (LAN), wide area networks (WAN) and wireless versions of both types. They also learn to connect hardware devices and set up Internet access. These skills can apply to a variety of careers. According to the skills learned in networking classes are valuable to network engineers, programmers and consultants. Classes may be geared toward Unix or Windows systems and may lead toward certification in the field. Topics studied in a computer networking class delve into skills areas such as:

- Performance analysis and measurement
- Examining protocol mechanisms
- Network control, sequencing and simulation
- Advanced network architecture
- Network security
- Maintain files on a network server
- Monitor system performance
- Assist others with network problems
- Maintain machines attached to the network
- Modify software based on user need

Why Networking!

Technology has changed the way we live and work. With rapidly changing networking technology, one must stay updated and keep evolving as per the needs of the job. Employers seek candidates who can build networks, secure devices and manage the network efficiently.

Whether you are planning a career or considering the change, here are 5 reasons to study networking technology.

1. Excellent Opportunities

Networking technology professionals are required in all industries. The highest employment is in computer systems design, telecommunications, financial institution and public administration. The widespread use of complex computer technology has been a driving factor for this occupation.

According to U.S. Bureau of Labor Statistics, the employment of network systems administrators is projected to grow 4% from 2019 to 2029, and network architects will see the growth of 5% from 2019 to 2029, which is faster than average. The demand for networking technology professionals is bound to increase in every country as organizations invest in mobile devices, cloud computing and big data.

2. Higher Earning Potential

Apart from sustainability in networking technology jobs, it also offers a higher salary. According to Job Bank Canada, computer network specialist in the Toronto area earns an average wage of C\$44.23/hr with a higher hourly rate of \$61.54/hr.

Recent graduates with industry-relevant certifications can confidently enter the workforce. The average for network administrators in Canada is C\$32/hr.

3. Don't have to be a Math Genius

Networking is all about basic logic. If you have an interest in technology and understand basic math, you have the skills to launch a career in networking technology.

The beauty of the IT industry is that you don't need a bachelor's degree to get started. A diploma or an associate degree and relevant industry certifications in networking technology are enough to get started. However, to rise the career ladder, it is suggested to enhance your education level.

4. Global Standards

Computer networking is a fast-growing field, and standards are global. Your skills and certifications are recognized worldwide. Companies such as CISCO, Microsoft and CompTIA offer networking certifications which are accepted by multinational organizations.

5. Cloud Computing

The advances in cloud-based infrastructure mean physical hard drives will become obsolete. It allows businesses to be more productive, reduce costs and improved time with business development.

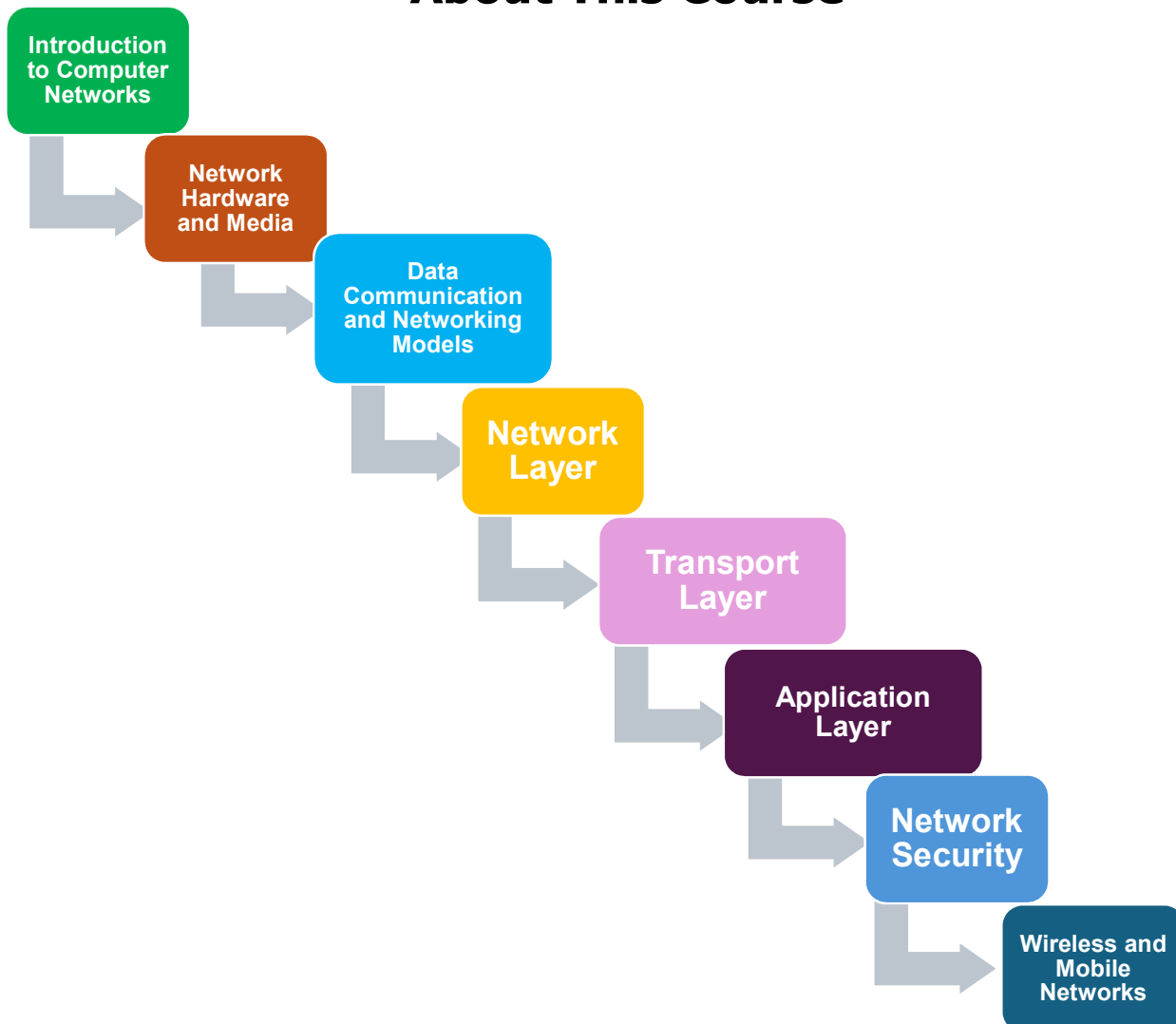
According to Forbes, the user spending on cloud services will be more than \$180 billion, and computer networking specialists will be a huge part of this project. Networking technology specialists will have to update their skills to match the advance technologies.

Next Step Toward Learning

Networking technology has seen tremendous growth in recent years and that trend is likely to continue. Examine a few of the possible future trends, including the widespread expansion of 5G, increased automation through AI advances, and the value of SD-WAN. You can go for the below mentioned certification for your future growth.

1. Certified Network Associate
2. CompTIA Security+
3. CompTIA Network+
4. AWS Certified Advanced Networking - Specialty
5. VMWare Certified Technical Associate - Network Virtualisation (VCTA-NV)

About This Course



Introduction to Computer Networks

- Definition, goals, and characteristics of computer networks
- Need for computer networks (resource sharing, communication, internet access, client-server computing, remote access)
- Network topologies (bus, ring, star, mesh, hybrid, tree)
- Types of networks (LAN, WAN, MAN, PAN, CAN, SAN, EPN)
- Network models (OSI vs TCP/IP architecture and layers)
- Network protocols and standards (IEEE, IETF, ISO)
- Network performance metrics (throughput, latency, jitter, packet loss)

Network Hardware and Media

- Network interface controllers (functions, types, and specifications)
- Routers (functions, types, routing tables, and configurations)
- Switches (functions, types, forwarding methods, VLANs)
- Wireless access points (functions, standards, and configurations)
- Types of Transmission media (twisted-pair cables, coaxial cables, fiber optics, wireless media)
- Network cables and connectors (RJ-45, BNC, F-connectors, SC/LC/ST fiber connectors)
- Repeaters, hubs, and bridges
- Network interface cards (NICs) and their configurations
- Power over Ethernet (PoE)

Data Communication and Networking Models

- Data encoding (NRZ, NRZI, Manchester, 4B/5B, 8B/10B)
- Analog and digital signals (modulation techniques like ASK, FSK, PSK, QAM)
- Multiplexing techniques (FDM, TDM, WDM, CDMA)
- OSI model and its layers (functions and protocols)
- TCP/IP model and its layers (functions and protocols)
- Comparison of OSI and TCP/IP models
- Error detection and correction techniques (parity, checksum, CRC)
- Flow control mechanisms (stop-and-wait, sliding window, selective repeat)

Network Layer

- IP addressing (IPv4 vs IPv6 addressing schemes, classful and classless addressing)
- Subnetting and VLSM (subnet masks, calculating subnets and hosts)
- Routing protocols (RIP, OSPF, BGP, EIGRP, and their operations)
- NAT (types and configurations)
- ICMP (message types and functions)
- IPv4 and IPv6 header formats
- IP fragmentation and reassembly
- IP mobility and mobile IP
- Virtual private networks (VPNs)

Transport Layer

- TCP (connection establishment, reliable data transfer, flow control, and error control)
- UDP (connectionless communication)
- UDP applications (DNS, SNMP, RTP)
- Port numbers and socket programming (client-server model)
- Reliable data transfer mechanisms (sequence numbers, acknowledgments, timers)
- Flow control mechanisms (sliding window, congestion control)
- TCP congestion control algorithms (Reno, Vegas, CUBIC)
- TCP timer management
- TCP/IP socket programming

Application Layer

- TTP and WWW (web browsing, HTTP methods, and messages)
- DNS (hierarchical domain structure, DNS resolution process, DNS record types)
- SMTP, POP3 vs IMAP (Email protocols and their operations)
- FTP (file transfer modes and commands)
- DHCP (IP address allocation and lease management)
- Remote access protocols (SSH, Telnet, RDP)
- Peer-to-peer networks and applications
- Multimedia protocols (RTP, RTSP, SIP)
- Web caching and content distribution networks (CDNs)

Network Security

- Firewalls (packet filtering, stateful inspection, and configurations)
- Cryptography and encryption (symmetric and asymmetric encryption, digital signatures, key management)
- Cyber security threats and attacks (malware, DoS and DDoS, SQL injection, social engineering, salami attack, phishing, etc.)
- Authentication and access control (passwords, biometrics, multi-factor authentication, Kerberos)
- Wireless security (WEP, WPA, WPA2, and their vulnerabilities)
- Secure network protocols (SSL/TLS, IPsec, SSH)
- Network security devices (firewalls, IPS/IDS, honeypots)
- Penetration testing and ethical hacking
- Network security policies and best practices

Wireless and Mobile Networks

- Wireless LAN standards (IEEE 802.11a/b/g/n/ac/ax)
- Cellular networks (GSM, CDMA, LTE, and their architectures)
- Mobile IP and mobility management (handoff procedures, mobile IP protocols)
- Wireless network security (authentication, encryption, and access control in WLANs)
- Wireless network planning and site surveys
- Wireless network performance and optimization
- Bluetooth and personal area networks (PANs)
- Microwave and satellite communications
- Mobile ad-hoc networks (MANETs)

Certificate in Introduction to Computer Networks

Fees 6000/- Duration 6 Months Only

Schedule of Course(Weekdays 1 Hour Per Day (4 days a week, Monday to Thursday)

or

Weekend 2 Hours per day(Saturday and Sunday)

*80% Attendance are compulsory to achieve certificate.

Marking scheme for Final Certificate		
Sr. No	Activity	Marks
1.	Attendance	20
2.	Class Behaviour	20
3.	Term End Exam MCQ Based Max 40 Question of 0.5 Marks each	20
4.	Final Practical	20
5.	Presentation	20
Total Marks= 100		