

GSA Contract GS-02F-0053X

Training Catalog

- ✓ **Instructor-Led Courses**
- ✓ **DVD-Video Courses**
- ✓ **Online Courses**
- ✓ **Certification Packages**
- ✓ **Printed Books**

TeraCom Training Institute

best of breed: telecommunications training - since 1992

AUTHORIZED FEDERAL SUPPLY SCHEDULE PRICE LIST

MISSION ORIENTED BUSINESS INTEGRATED SERVICES (MOBIS TRAINING)

Contract Number: GS-02F-0053X Modification Number HR142QXC

Contract Period: Dec 20, 2010 to Dec 19, 2020.

Business size: Small business

Special Items Numbers (SIN):

874-4 Instructor-Led Training, Web-Based Training Courses PSC: U012 NAICS: 611430

874-9 DVD-Video Courses and Books PSC: 6910 NAICS: 423490

Welcome to Teracom Training Institute!

At Teracom, we concentrate on telecommunications training for non-engineering professionals: telecom, datacom and networking, VoIP, IP, MPLS and wireless. This way, we can bring you the *best!*

Our specialty is explaining telecom fundamentals and technologies to professionals who need a comprehensive overview and update, and to newcomers to the field who need to get up to speed.

This is the ideal way to put a solid base of knowledge in place. Put an end to buzzword-related frustration, improve your accuracy and efficiency, and enhance your career skill set.

Understand telecom and network fundamentals, jargon, technologies, organizations and services, and most importantly, the underlying ideas, and how it all fits together. Get solid, structured, vendor-independent knowledge you can build on. Plus, detailed course books for future reference.

Buy with confidence! We've been in business for over 20 years, and scored 97% in quality rating by customers. Thousands of people in organizations ranging from the NSA to the SF Giants have benefited from Teracom training and consistently rate our courses "excellent" on evaluations.

Get this essential training **your** way:

- Instructor-Led Training: the gold standard in training, where you learn with a professional instructor, can ask questions and interact with the class. Attend a scheduled public seminar, or have us come to you for a private onsite course. Course books with full notes are included. Unlimited access to online courses and certifications are also included as a bonus.
- DVD-Video Courses are the next best thing – like private lessons from the Director of the Institute, with on-camera instructor, animated graphics and bullets. Our top instructor Eric Coll uses his vast experience, wicked sense of humor and acclaimed ability to explain key concepts, technologies and how it all fits together to get you up to speed. Includes printed course books. Unlimited access to online courses and certifications are also included as a bonus.
- Online Courses are content-rich self-paced training based on our proven instructor-led and video courses with the instructor's voice, bullets, graphics, text, illustrations and pictures of equipment, covering the knowledge set required for today's telecommunications.
- Certification Packages are online courses plus Telecommunications Certification Organization (TCO) certification, with Certificate and Letter of Reference, for individuals and teams. Guaranteed to Pass with the Unlimited Plan!
- Printed books are a valuable supplement to instructor-led training and DVD-video courses, and greatly enhance online courses and certification packages. These professional-quality textbooks can also be used in classroom, for self-study, and are ideal as a day-to-day reference.

The following pages list available courses, high-level descriptions and pricing in accordance with our GSA Contract number GS-02F-0053X.

Please visit teracomtraining.com for brochures with detailed outlines, free samples and ordering, and information on other training products:

- eBooks: Teracom books are available in the iBooks, Google Play and Kindle stores.
- Courseware: license Teracom SCORM-compliant online courses for upload to your LMS, or license Teracom's instructor-led course materials for classroom use.

Many thanks,

Eric Coll, M.Eng., Director

Online access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order are available through GSA Advantage!, a menu-driven database system. GSA Advantage! is reached on the Internet at <https://www.gsaadvantage.gov>

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Instructor-Led Training



Instructor-led training is the gold standard, the best training you can get.

You can ask questions and interact with other people without distractions. Our instructors are professionals specializing in getting you up to speed.

Teracom's training is geared for professionals needing a comprehensive overview and update. It is ideal for those new to the business, and those starting a new project who need to get up to speed.

Our goal is to explain the jargon, buzzwords, standard practices and technologies, the telecommunications business, and most importantly, the underlying ideas, and how it all fits together. You will get a solid foundation of

knowledge to build on – knowledge you can't get by reading trade magazines or talking to vendors.

Teracom's course materials and instructors are best-of-breed. Teracom instructors are professionals with broad and deep knowledge of telecommunications, with Engineering degrees and many years' experience in the field and teaching seminars. Both are consistently ranked "excellent" on evaluations!

Instructor-led training includes:

- A multi-day course with professional instructor in a classroom setting
- The ability to ask questions, discuss your situation and network with other students
- High-quality bound course book with full text notes and graphics, sure to be a valuable reference for years to come
- Course certificate and CPE credits

plus the free bonuses:

- CTNS Certification Package – Unlimited Plan (six online courses + certification)
- CTA Certification Exam – Unlimited Plan

Thousands of people have benefited from Teracom instructor-led training!

Join us at a scheduled public seminar, or hold a private onsite course:

Public Seminars

Scheduled instructor-led courses are held in conference facilities in major cities on a regular basis. Locations include Santa Clara in the heart of Silicon Valley; Vancouver BC (70 miles south of Whistler), Denver (highly popular recently), New Orleans, Chicago, Atlanta, New York, Washington DC and more.

[View the current schedule](#)

Private Onsite Courses

We'll come to teach your team.

- Your personnel will be up to a common speed with a solid knowledge base.
- The seminar will be a strong team-building exercise.
- Customization to meet your requirements is available.
- Significant reductions in training costs are often achieved.
- Each student receives a detailed course book that will be a valuable reference for years to come.
- The training is viewed as a resounding success.

[Find out about onsite training](#)

List of Available Instructor-Led Courses

101 Telecom, Datacom and Networking for Non-Engineering Professionals

Our famous instructor-led core training – an intensive three-day course getting you up to speed on all major topics in telecom, datacom and networking, from fundamentals and jargon to the latest technologies – fully up to date. Best-of-breed training, consistently rated “excellent” across the board on student evaluations. Valuable logically organized 350-page course book with full text notes.

102 Telecom for Non-Engineers

Our famous instructor-led Course 101 core training in a two-day format, available for private onsite classes. Course 102 is the standard set of topics for two days – but any combination of material from Course 101 can be taught to best meet your needs.

103 The New Generation All-IP Telecom Network

The essential two-day overview and update on technologies and practices for the new generation of telecommunications with all services on the same network. Get up to speed on the concepts, jargon, buzzwords and technologies. Understand how voice, video and Internet traffic are all carried together using MPLS on IP, Ethernet, fiber and last-mile copper. High-quality course book a valuable reference.

110 IP, VoIP and MPLS for the Non-Engineering Professional

Three-day course covering virtually all aspects of IP networks, equipment and services. Learn about IP networks from the ground up: fiber, optical Ethernet and Layer 2 switches, IP and Layer 3 routers, MPLS, Class of Service and traffic management, how voice is packetized, VoIP, softswitches, SIP, SIP trunking, The Cloud, routing basics, firewalls, NAT, DHCP, encryption, security and more.

120 Understanding Wireless

The Wireless course! A two-day intensive course to get you up to speed, fill in the gaps and put in place a solid understanding of today's wireless technologies. Learn cellular radio from fundamentals to GSM, CDMA and LTE, all about WiFi and the 802.11 standards, Bluetooth and more.

130 Understanding Voice over IP

The VoIP course! Vendor-independent VoIP training course explaining fundamentals, buzzwords, jargon, technologies and standard solutions for VoIP. Start with basics of digitized voice and IP, understand softswitches, SIP trunking, gateways and carriers, IP Centrex, PBX & Hosted PBX, applications and case studies, with vendor overview and a bonus chapter on project management.

BOOT CAMP

A full week of the best you can get: instructor-led training on telecom and networking from A to Z, where you can ask questions and interact with other students. Get up to speed on the PSTN, the telecom business, The Cloud, cellular and WiFi, Ethernet LANs, basics of IP addresses, routers and networks, MPLS and Class of Service, DSL, Cable and fiber, Internet and ISPs, VoIP fundamentals, SIP and SIP trunking, VoIP applications and implementation cases, rounded out with a chapter on project management. Carpe diem!

Instructor-Led Course Pricing – GSA Contract GS-02F-0053X

Public Seminars (Contractor-Facility Courses)

ITEM / PART #	DESCRIPTION	DAYS	GSA PRICE PER SEAT
PS-101	TELECOM, DATACOM AND NETWORKING FOR NON-ENGINEERING PROFESSIONALS	3	1335.19
PS-103	THE NEW-GENERATION ALL-IP NETWORK	2	952.34
PS-130	UNDERSTANDING VOICE OVER IP	2	952.34
PS-BOOTCAMP	5-DAY BOOT CAMP: COURSE 101 + 130	5	1909.46

AVAILABLE DISCOUNTS: 2-DAY AND 3-DAY SEMINARS

Volume discounts on top of “GSA Price Per Seat” in table above:

10% discount for two or three seats at same session

20% discount for four seats at same session

25% discount for five or more seats at same session

AVAILABLE DISCOUNTS: 5-DAY BOOT CAMP

Volume discounts on top of “GSA Price Per Seat” in table above:

5% discount for four seats at same session

25% discount for five or more seats at same session

SUMMARY OF PER-SEAT GSA PRICING WITH VOLUME DISCOUNTS:

# SEATS	1	2	3	4	5+
COURSE DURATION					
2 DAY	952.34	857.11	857.11	761.87	714.25
3 DAY	1,335.19	1,201.67	1,201.67	1,068.15	1,001.39
5 DAY	1,909.46	1,909.46	1,909.46	1,813.99	1,432.10

Prices include IFF.

SUPPORT MATERIALS INCLUDED

Printed course book

CONCESSIONS (BONUSES INCLUDED)

4210 CTNS Online Courses & Certification Package Unlimited Plan included

L3921 CTA Certification Exam Unlimited Plan included

T101 Telecom 101 Printed Textbook 50% discount

[Register for a public seminar](#)

Private Onsite Courses (Customer-Facility Courses)

ITEM / PART #	DESCRIPTION	DAYS	BASE PRICE UP TO 20 (CONUS)	BASE PRICE UP TO 20 (AK, HI)	BASE PRICE UP TO 20 (OTHER)	ADDITIONAL STUDENT #21 AND ABOVE
OS102	TELECOM FOR NON-ENGINEERS	2	8216.44	8838.57	9604.27	430.71
OS103	THE NEW-GENERATION ALL-IP NETWORK	2	8216.44	8838.57	9604.27	430.71
OS120	UNDERSTANDING WIRELESS	2	8216.44	8838.57	9604.27	430.71
OS130	UNDERSTANDING VOICE OVER IP	2	8216.44	8838.57	9604.27	430.71
OS101	TELECOM, DATACOM AND NETWORKING FOR NON-ENGINEERING PROFESSIONALS	3	11779.82	12401.95	13167.65	622.13
OS110	IP, VOIP AND MPLS FOR THE NON-ENGINEERING PROFESSIONAL	3	11779.82	12401.95	13167.65	622.13
OS-BOOTCAMP	BOOT CAMP	5	17500.55	18122.68	19175.52	813.56

Instructor travel and living expenses are additional at GSA rates. Additional student rate is for each student #21 and above, if any, at any particular session. Prices include IFF.

SUPPORT MATERIALS INCLUDED

Printed course book

CONCESSIONS (BONUSES INCLUDED)

4210 CTNS Online Courses & Certification Package Unlimited Plan included

L3921 CTA Certification Exam Unlimited Plan included

T101 Telecom 101 Printed Textbook 50% discount

[Get more information on private onsite courses](#)

AVAILABLE DISCOUNTS

Discount for two presentations of the same course in the same location back-to-back:

ITEM / PART #	DESCRIPTION	DAYS	BASE PRICE UP TO 20 (CONUS)	BASE PRICE UP TO 20 (AK, HI)	BASE PRICE UP TO 20 (OTHER)	ADDITIONAL STUDENT #21 AND ABOVE
OS102-2	TELECOM FOR NON-ENGINEERS	4	13277.00	13899.13	14856.25	430.71
OS103-2	THE NEW-GENERATION ALL-IP NETWORK	4	13277.00	13899.13	14856.25	430.71
OS120-2	UNDERSTANDING WIRELESS	4	13277.00	13899.13	14856.25	430.71
OS130-2	UNDERSTANDING VOICE OVER IP	4	13277.00	13899.13	14856.25	430.71
OS101-2	TELECOM, DATACOM AND NETWORKING FOR NON-ENGINEERING PROFESSIONALS	6	19004.91	19722.73	20679.88	622.13
OS110-2	IP, VOIP AND MPLS FOR THE NON-ENGINEERING PROFESSIONAL	6	19004.91	19722.73	20679.88	622.13
OS-BOOTCAMP-2	BOOT CAMP	10	28160.29	29069.56	30026.69	813.56

[Get more information on private onsite courses](#)

Instructor-Led Course Descriptions

101 Telecom, Datacom and Networking for Non-Engineering Professionals

Telecom, Datacom and Networking for Non-Engineering Professionals is Teracom's famous core training – an intensive three-day course getting you up to speed on all major topics in telecom, datacom and networking, from fundamentals and jargon to the latest technologies – fully up to date. Best-of-breed training, consistently rated “excellent” across the board on student evaluations.

Tuned and refined over more than twenty years – and constantly updated – the content of this course is the core knowledge set required in the telecommunications business today.

You'll get up to speed, demystify jargon and buzzwords, fill the gaps, understand the technologies, and most importantly, the underlying ideas and how it all fits together... knowledge you can't get reading trade magazines online or talking to salespeople. This investment will be repaid many times over, eliminating frustration at buzzword-filled meetings, increasing your efficiency and accuracy.

This training – and our superb instructors – consistently receive rave reviews on evaluations. Many attendees tell us that this is knowledge that they've been needing for years.

Part 1: Fundamentals of Telecommunications provides an understanding of the telephone network, traditional telephony, SIP and VoIP, digital communications, the telecom business and players, the Cloud and wireless. We'll demystify buzzwords and jargon, provide a clear structure for understanding the components of telecom networks including loops and trunks, switches, VoIP, SIP trunking, digital voice and video, ILECs and CLECs, the network “cloud”, how services are actually provided, plus wireless: mobile networks, cellular to 4G, WiFi... and how it all fits together.

Part 2: “Data” Communications and Transmission begins with a discussion of how voice and video are treated like data to achieve convergence: one network and one service for everything. Then we'll put in place a solid base of the principles and technologies of data communications, including circuit configurations, packets and frames and Ethernet. Then we'll cover transmission systems: legacy channelized TDM and SONET systems, today's IP and Optical Ethernet systems, fiber optics, finishing with DSL and cable modems on copper for the last mile.

Part 3: Networking starts with the OSI Layers to provide a structure for the discussion, then the principles of overbooking, bandwidth on demand and packet switching, IP and routers, Customer Edge, IP addressing, DHCP, public and private addresses, Network Address Translation and IPv6. In the afternoon, we'll cover carrier packet networks, Service Level Agreements, MPLS and how MPLS is used to implement VPNs, classes of service, service integration and traffic aggregation. The last main chapter covers the Internet, ISPs, Internet VoIP and Internet VPNs. We'll conclude with a top-down review with solutions you can put to immediate use and a peek at the future of telecommunications.

Thousands of people from organizations including AT&T, Verizon, Cisco, Intel and Microsoft, the GSA, CIA, IRS, FAA, and FBI, all branches of US Armed Forces, TELUS, Bell Canada, Qwest, Wells Fargo, Bank of America, TD Bank, Oneida Tableware, the SF Giants and many others who needed to be more effective in understanding and dealing with telecom and networking technology, services and applications have benefited from this course. Join us today!

[Course web page](#)

[Printable brochure with detailed outline](#)

[Public seminar schedule](#)

[Private onsite course information](#)

102 Telecom for Non-Engineers

Our famous instructor-led Course 101 core training in a two-day format, for private onsite classes. Learn telecom and network fundamentals, fill gaps, demystify buzzwords, master jargon, get up to speed on current technologies and standard practices, and most importantly, understand how everything fits together.

- Get the gold standard in training: instructor-led, where you can interact and ask questions
- Your team will be up to a common speed, with a common vocabulary and reference books
- Significant cost savings are often achieved with discounted group pricing and no travel costs
- The course will be a strong team-building exercise. Discuss your environment during the course!

The content, its order, our analogies and explanations have been refined over the course of more than twenty years... and totally updated for 2014-2015.

The Course 102 outline in the link below is the standard set of topics for two days – but any combination of material from Course 101 can be taught. Feel free to start with the Course 101 brochure's detailed outline and select chapters to best meet your needs.

Hundreds of people have rated this training "excellent" across the board on evaluations!

Get started today!

[Course web page](#)

[Printable brochure with detailed outline](#)

[Private onsite course information](#)

103 The New Generation All-IP Telecom Network

The essential two-day overview and update on new-generation telecom technologies and practices

The “next-generation” telecom network happened. “Convergence” has been achieved.

Voice, video and data are carried on the same network, and delivered on the same cable.

With this up-to-date course, get up to speed on the “new” network technologies delivering Digital TV, Internet and Telephone together on IP, Ethernet, fiber and last-mile copper.

Learn the jargon, buzzwords, concepts, and technologies – and how everything fits together.

- Since everything is carried together by treating voice and video like data, begin with the fundamentals of what was called “data communications”: packets and frames, LANs and WANs.
- Review the OSI Layers, the structure that organizes functions into separable groups. Sort out “Layer 2” vs. “Layer 3”. Understand “TCP/IP” and how Ethernet fits in the story.
- Learn the basics of IP and routing, used implement networks: IP addresses, static and dynamic addresses, DHCP, public and private addresses, NAT, TCP, UDP and ports, and IPv6.
- Learn how fiber works, current standard practices, Optical Ethernet connectors, how fiber is used both in the network core and for customer access circuits, Active Optical Networks and Passive Optical Networks (PONs) for fiber to the premise.
- Understand Ethernet, MAC frames, MAC addresses and VLANs, and how it relates to IP.
- Learn about carrier services, service levels, MPLS, and how it is used for traffic management.
- Find out the latest on the last mile in “brownfields”: VDSL on twisted pair, DOCSIS on coax.
- Round out your knowledge with VoIP: how voice is packetized, softswitches, SIP and SIP trunking, gateways, Internet and PSTN connections.

In two days, you will get up to speed, demystify jargon and buzzwords, understand the technologies, players and standard practices... productivity- and career-enhancing training that will be repaid many times over.

[Private onsite course information](#)

110 IP, VoIP and MPLS for the Non-Engineering Professional

IP, VoIP and MPLS for the Non-Engineering Professional is a three-day course covering virtually all aspects of IP networks, equipment and services.

This course will give you the solid, vendor-independent foundation necessary to deal with IP telecom network, VoIP and MPLS projects and applications with confidence.

In three days, you'll build a solid understanding of IP/MPLS networks and the equipment that implements them, the players, competition, Internet vs. MPLS services, interconnect, Voice over IP, packetized voice, VoIP protocols, SIP and SIP trunking, softswitches, gateways, and practical solutions.

Start at the beginning with fundamental concepts. Understand jargon, buzzwords, technologies, equipment, standard practices and how it all fits together. Including and expanding on Course 103, you will learn about:

New-generation IP telecom networks from the ground up:

- Fiber, Optical Ethernet, cable modems, DSL, PONs, fiber to the home
- LANs and VLANs, MAC addresses, MAC frames vs. IP packets
- IP addressing, DHCP, public/private NAT; fundamentals of routing; IPv6

VoIP

- How packetized voice works; codecs and voice quality; the RTP/UDP/IP protocol stack
- What SIP can do, SIP trunking and how calls are connected in the IP world
- Principles and operation of softswitches, gateways, blade servers and other VoIP components
- VoIP solutions: PBX replacement, hosted PBX, IP Centrex

MPLS and Carrier services

- Carrier networks and Service Level Agreements
- MPLS basics. MPLS for traffic management: QoS, VPNs, traffic integration and aggregation
- Internet services, ISPs, transit vs. peering, wholesale and resale; competition

IP Security

- Firewalls; ports and packet filtering; VoIP security
- RSA public key encryption, AES private key encryption, digital signatures
- Internet VPNs and IPsec

Practical mainstream solutions

- Compare and understand the pros and cons of different solutions
- In-class implementation case studies and discussion; readiness assessment, vendor listings

[Course web page](#)

[Printable brochure with detailed outline](#)

[Private onsite course information](#)

120 Understanding Wireless

The Wireless course! A two-day intensive course to get you up to speed, fill in the gaps and put in place a solid understanding of today's wireless technologies. Learn cellular radio from fundamentals to GSM, CDMA and LTE, all about WiFi and the 802.11 standards, Bluetooth and more.

Understand the fundamentals, jargon, buzzwords, technologies and applications:

Radio fundamentals

- Analog vs. digital, spectrum and bands, interference

Mobile communications:

- Cellular radio
- Mobility, registration and handoffs
- First generation analog FDMA
- 2G digital PCS and GSM: CDMA and TDMA
- "Data plan": Internet access
- CDMA: how it works, why it's called spread spectrum, how it compares to TDMA/GSM
- 3G technologies: cdma2000 1X and UMTS/W-CDMA
- 4G LTE

Wireless LANs / 802.11 WiFi

- WiFi concepts, standards and equipment,
- Configuration, deployment, performance and security
- WiFi Internet access replacing cellular voice and data

Bluetooth and satellite internet access

[Course web page](#)

[Printable brochure with detailed outline](#)

[Private onsite course information](#)

130 Understanding Voice over IP

The VoIP course! Course 130 is a vendor-independent VoIP training course explaining fundamentals, buzzwords, jargon, technologies, equipment, standard practices and solutions for VoIP.

Start at the beginning with basics of digitized voice and IP, understand softswitches and SIP, SIP trunking, gateways and connecting to carriers, IP Centrex, PBX & Hosted PBX, applications and case studies, with vendor overview and a bonus chapter on project management..

Taking this VoIP training course, you'll obtain the solid foundation necessary to intelligently discuss, compare and evaluate VoIP technologies, products and implementation choices, demystifying the jargon, understanding the fundamentals and how it all fits together.

VoIP technology

- Components and implementations of VoIP
- IP voice packetization, codecs, softswitches, gateways, protocols

SIP and SIP trunking

- Understand how SIP works and what it can do
- How SIP fits in with soft switches and call managers
- Trace the establishment of an IP phone call step-by-step

Carriers and VoIP services

- Contrast and compare PBX replacement vs. hosted PBX vs. IP Centrex services
- Learn about IP vs. DS0 connection to carriers, SIP trunking, QoS and Service Level Agreements
- Demystify MPLS and VPNs
- Seven critical areas any potential service provider must be evaluated on

Convergence, presence, and converged applications: enhance productivity and lower costs

- Understand convergence and the power of converged networks and converged applications
- Find out about Presence and how it enables sophisticated call handling
- Real-life examples: mixed-media group communications, contact centers, unified messaging, IPTV

How VoIP saves money

- Understand why traditional phone companies are converting to VoIP
- The how and why of cost savings for small, medium and large organizations

Practical solutions: readiness assessment, case studies, vendors

- Readiness assessment: identify and discuss key issues that must be evaluated
- Business and deployment cases: PBX replacement, IP Centrex, multi-location networked cases
- Vendor and product reviews

Project management

- The need for a process. Doing it the "right" way.
- Requirements analysis, RFPs, running trials, selecting a vendor, rollout, maintenance
- Practical templates and checklists you can put to immediate use

[Course web page](#)

[Printable brochure with detailed outline](#)

[Public seminar schedule](#)

[Private onsite course information](#)

BOOT CAMP

BOOT CAMP is a full week of the best training you can get: instructor-led training on telecom and networking from A to Z, where you can ask questions and interact with other students.

BOOT CAMP consists of two courses back-to-back: Course 101 Telecom, Datacom and Networking for Non-Engineering Professionals then Course 130 Voice over IP.

Get up to speed on the PSTN, the telecom business, The Cloud, cellular and WiFi, Ethernet LANs, basics of IP addresses, routers and networks, MPLS and Class of Service, DSL, Cable and fiber, Internet and ISPs, VoIP fundamentals, SIP and SIP trunking, VoIP applications and implementation cases, rounded out with a chapter on project management.

This is the 5-day BOOT CAMP that hundreds of people have attended over the years.

Seize this opportunity to get up to speed and fill in the gaps. You'll have an advantage over the competition with this career-enhancing knowledge of telecom, datacom, networking, IP, MPLS and VoIP. You'll be more effective and less frustrated, understanding the ensemble of communications technologies, the jargon, buzzwords and how it all works together.

This is an easy sell with management. Your increased efficiency, productivity and informed decision-making will repay the cost of the training many times over.

Plus, you benefit from a special discount, and get the free bonus Online Courses and Certifications, making it an unbeatable value.

Attending both courses as the 5-day BOOT CAMP is totally optional. You are welcome to attend one course, or the other, or both, as best meets your needs. But with the low incremental cost and wall-to-wall training, BOOT CAMP is a great opportunity.

[Course web page](#)

[Public seminar schedule](#)

[Private onsite course information](#)

Online Courses



Best-Of-Breed Self-Paced Telecom Training

Get up to speed and build a solid base of knowledge in telecom, datacom, networking, and wireless... with available certification to prove it.

Proven Content – Totally Up-to-Date

Based on Teracom's renowned instructor-led courses developed for organizations including AT&T, Verizon, Bell Canada, Intel, Microsoft, Cisco, Qualcomm, the CIA, NSA, IRS, FAA, US Army, Navy, Marines, Air Force, Bank of America, the SF Giants and hundreds more. Top-notch, top-quality and right up to date with the topics and knowledge you need.

High-Quality Full Multimedia

Interactive lessons, rich with photographs and illustrations make this self-paced learning enjoyable! The text spoken by the instructor is displayed on the right side of the screen while animated diagrams, pictures, bullets and video are displayed on the left. Each lesson in a course has several parts, followed by informal quiz questions to ensure key points are understood.

Course Completion Certificate & CPE Credits

Every course includes a multiple-choice test at the end and course completion certificate including CPE credit hours, suitable for framing. Register for individual courses or packages as best meet your needs.

Certification

We've partnered with the Telecommunications Certification Organization for certifications. Register for a Certification Package to get a set of courses, complete the courses and exams, and get your TCO Certification, with diploma, personalized Letter Of Reference and all of the other benefits of certification, all at a discounted package price.

Unlimited Plan: Guaranteed to Pass

With the "unlimited" option, you can repeat the course and take the exam as many times as needed... meaning you can take and review lessons as needed, now and in the future. Unlimited exam repeats means guaranteed to get your certification if you're willing to learn.

Team Training

Take advantage of these courses for individual learning, or for an entire organization. The scalable myTeracom Learning Management System can register and manage all of your people, and generate management reports showing progress and scores with the click of a button. Or, check out the Courseware section of the Teracom catalog for uploading the courses to your organization's LMS.

30-Day 100% Money-Back Guarantee

We're so confident of the quality of the Online Courses, we back them up with a 100% money-back guarantee. Go ahead! You have nothing to lose.

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List of Available Online Courses

2201 POTS and the PSTN

Loops and Trunks • Circuit-Switching • LECs and IXCs • Analog • Voiceband • DTMF • SS7
8 interactive multipart lessons, multiple-choice exam and certificate.

2206 Wireless Telecommunications

Mobility • Cellular Networks • GSM and TDMA • UMTS and 1X CDMA • LTE • WiFi • Satellite
10 interactive multipart lessons, multiple-choice exam and certificate.

2212 The OSI Layers and Protocol Stacks

Protocols & Standards • Open Systems • OSI Model • Layers • Protocol Stacks • FedEx Analogy
14 interactive multipart lessons, multiple-choice exam and certificate.

2211 Ethernet, LANs and VLANs

MAC Addresses • 802.3 and Ethernet • Broadcast Domains • LAN Cables • Switches • VLANs
8 interactive multipart lessons, multiple-choice exam and certificate.

2213 IP Networks, Routers and Addresses

IP Packets • Packet Networks • Routers • Static, Dynamic, Public, Private Addresses • NAT • IPv6
11 interactive multipart lessons, multiple-choice exam and certificate.

2214 MPLS and Carrier Networks

Carrier Packet Networks • Technologies • MPLS • SLAs • CoS • Integration & Aggregation
15 interactive multipart lessons, multiple-choice exam and certificate.

Online Course Price List - GSA Contract GS-02F-0053X

ITEM / PART #	DESCRIPTION	NUMBER OF SEATS	PRICE	ADDITIONAL SEATS
L2201	POTS AND THE PSTN, UNLIMITED PLAN	1	46.90	46.90
L2201-5	POTS AND THE PSTN, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L2206	WIRELESS TELECOMMUNICATIONS, UNLIMITED PLAN	1	46.90	46.90
L2206-5	WIRELESS TELECOMMUNICATIONS, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L2211	ETHERNET, LANS AND VLANS, UNLIMITED PLAN	1	46.90	46.90
L2211-5	ETHERNET, LANS AND VLANS, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L2212	THE OSI LAYERS AND PROTOCOL STACKS, UNLIMITED PLAN	1	46.90	46.90
L2212-5	THE OSI LAYERS AND PROTOCOL STACKS, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L2213	IP NETWORKS, ROUTERS AND ADDRESSES, UNLIMITED PLAN	1	46.90	46.90
L2213-5	IP NETWORKS, ROUTERS AND ADDRESSES, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L2214	MPLS AND CARRIER NETWORKS, UNLIMITED PLAN	1	46.90	46.90
L2214-5	MPLS AND CARRIER NETWORKS, UNLIMITED PLAN, 5 SEATS	5	142.61	28.52
L4212	TELECOM, DATACOM AND NETWORKING FOR NON-ENGINEERS COURSE PACKAGE (SIX COURSES), UNLIMITED PLAN	1	190.47	190.47
L4212-5	TELECOM, DATACOM AND NETWORKING FOR NON-ENGINEERS COURSE PACKAGE (SIX COURSES), UNLIMITED PLAN, 5 SEATS	5	563.75	112.75

Unlimited Plan allows unlimited repeats of a courses and/or exams at no charge.
Prices include IFF

AVAILABLE DISCOUNTS

55% discount on single-seat price for 10 or more seats

60% discount on single-seat price for 25 or more seats

Please see Certifications and Certification Packages for more course package options.

Online Course Descriptions

2201 POTS and The PSTN

Loops and Trunks • Circuit-Switching • LECs and IXCs • Analog • Voiceband • DTMF • SS7
8 interactive multipart lessons, multiple-choice exam and certificate.

This course is dedicated to the Public Switched Telephone Network (PSTN) and Plain Ordinary Telephone Service (POTS). Understanding the fundamentals of this technology and network architecture is a starting point for understanding everything else related to telecommunications.

You'll gain a solid understanding of the fundamentals of the telephone system: customer premise and Central Office, loops, trunks, remotes, circuit switching and how a telephone call is connected end-to-end. We'll cover LECs and IXCs, sound, analog and the voiceband, twisted pair, DTMF and SS7.

Based on Teracom's famous Course 101, tuned and refined over the course of 20 years of instructor-led training, we'll cut through the jargon to demystify telephony and the telephone system, explaining the jargon and buzzwords, the underlying ideas, and how it all works together... in plain English.

Featuring many photos of actual equipment both inside a Central Office and in the outside plant, this multimedia course is an excellent way to get up to speed on traditional telephony.

Course Outline

1. Introduction

Course introduction and overview.

2. History of Telecommunications

Local phone companies, long distance; US: Bell System, breakup, LECs and IXCs; Canada

3. The Public Switched Telephone Network (PSTN)

Loops and trunks, CO, customer premise, circuit-switching, outside plant, loop length, remotes

4. Analog Circuits and Sound

What analog means, microphones and speakers, copper wires and electricity, sound: trees falling in the forest

5. The Voiceband

Reproducing thoughts vs. reproducing sound, frequency range, filters, limitations

6. Plain Ordinary Telephone Service (POTS)

Twisted pair, analogs on two wires, dial tone, ringing, supervision, lightning protection

7. Signaling: Pulse Dialing and DTMF

Dial-up, make-or-break signaling, touch-tone, DTMF, in-band signaling

8. Signaling System 7 (SS7)

Control system for the PSTN, SCPs and SSPs, examples of sophisticated call routing

9. Multiple-Choice Exam

Prerequisites

None.

Course Objectives: What You Will Learn

The objective of this course is to understand how the physical telephone network is organized, the characteristics of basic telephone service, how calls are established end-to-end, and to demystify common telephony jargon and buzzwords.

In particular, on completion of this course, you will be able to explain:

- Why telecom networks are divided into local access wiring and long-distance transmission
- The founding, breakup and re-emergence of AT&T in the US; TELUS and Bell in Canada
- A basic model for the PSTN and its main components
- Loops, why they are called loops and why there is a maximum loop length
- The outside plant
- Circuit-switching
- Central Office and Customer Premise
- How and why remotes are used; fiber to the neighborhood
- Plain Ordinary Telephone Service
- What analog is, and how it relates to copper wires, electricity, circuits and sound
- How microphones and speakers work
- The human hearing range
- Whether trees falling in the forest if no-one is there to hear them cause a sound
- The voiceband
- Why and how the telephone system can limit frequencies to the voiceband
- Why two wires are used
- Why they are twisted together (twisted pair)
- Tip and ring, -48 volts
- Supervision, dial tone, ringing, lightning protection
- Dial-up
- Touch-tone and DTMF
- Basics of SS7
- Examples of sophisticated call routing using SS7

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2206 Wireless Telecommunications

Mobility • Cellular Networks • GSM and TDMA • UMTS and 1X CDMA • LTE • WiFi • Satellite
10 interactive multipart lessons, multiple-choice exam and certificate.

Wireless Telecommunications is a comprehensive course on wireless, mobile telecommunications plus wireless LANs and satellites.

You'll gain a solid understanding of the key principles of mobile networks: the objectives of coverage, capacity and mobility, what a cellular radio system is and why they are used, mobile network components and principles of operation including registration and handoffs, digital radio, data over cellular and the cellular technologies and generations: 1G analog FDM, 2G GSM and IS-136 TDMA, 3G UMTS and 1X CDMA and 4G LTE OFDM.

Plus, you'll receive an overview of the radio frequencies and standards for wireless LANs and an overview of satellite communications.

We'll cut through the jargon to demystify wireless, explaining the jargon and buzzwords, the underlying ideas, and how it all works together... in plain English.

Course Outline

1. Introduction

Course introduction and overview. Basic radio principles, analog and digital over radio.

2. Mobile Network Components, Jargon and Basic Operation

Handset, base station, airlink, handoffs, connection to wireline systems

3. Cellular Principles and AMPS (1G)

Coverage, capacity and cellular radio systems, mobility, spectrum, FDM spectrum sharing

4. 2G: Digital Radio - Voice Communications

Components and operation of a digital radio: microphone, codec, RF modem, antenna

5. Digital Cellular: Data Communications

Using only the RF modem and antenna of the cellphone as a "tethered" modem for another device

6. Spectrum-Sharing Technologies: FDMA, TDMA, CDMA, OFDM

Sorting out the generations and standards; GSM and IS-136 TDMA vs. CDMA and OFDM

7. 3G Cellular: CDMA

Basic ideas behind CDMA and its operation; 1X vs. UMTS standards

8. 4G Mobile Cellular: LTE

Steve Jobs ends the standards wars; OFDM basic principles of operation

9. 802.11 Wireless LANs - WiFi

Basic principles of operation, 802.11 standards, frequency bands and limitations

10. Communication Satellites

Basic principles of operation, geosynchronous and LEO

11. Multiple-Choice Exam

Prerequisites

None. Course 2201 POTS and the PSTN has some relevance, as the mobile networks connect to the wireline Public Switched Telephone Network. Courses 2211 Ethernet, LANs and VLANs and 2213 IP Networks, Routers and Addresses are relevant to Lesson 9.

Course Objectives: What You Will Learn

The objective of this course is to develop a solid understanding of mobile cellular communications networks and technologies. After taking this course, you will be up to speed on the fundamental principles of cellular radio networks, components and operation, digital radio, spectrum-sharing technologies and the four generations of mobile cellular technology. An additional objective is a basic understanding of WiFi and satellites.

In particular, on completion of this course, you will be able to explain:

- The principal components of a mobile communication system
- Coverage, capacity and mobility
- The reason for and basic layout of a cellular radio system
- Basic operation of a mobile network including registration and handoffs
- How digital cellular is implemented
- How digital cellular can be used for data communications, either as a tethered modem or using the phone as a data terminal
- The principles and operation of the different spectrum-sharing technologies: first-generation FDMA, second-generation GSM and TDMA, third-generation UMTS and 1X CDMA and fourth-generation LTE and its OFDM
- The different radio bands and standards for 802.11 wireless LANs
- The two main types of communication satellites and their advantages and disadvantages.

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2212 The OSI Layers and Protocol Stacks

Protocols & Standards • Open Systems • OSI Model • Layers • Protocol Stacks • FedEx Analogy
14 interactive multipart lessons, multiple-choice exam and certificate.

The OSI Layers and Protocol Stacks begins the discussion of IP-based telecom in the Certified Telecommunications Network Specialist (CTNS) certification package. It is the first course in the Certified IP Telecom Network Specialist (CIPTS) package.

This course establishes a framework for all of the subsequent discussions: the OSI 7-Layer Reference Model, which identifies and divides the functions to be performed into groups called *layers*. This framework is required to sort out the many functions that need to be performed, and to be able to discuss separate issues separately.

You'll learn what a layer is, the purpose of each layer, see examples of protocols used to implement each layer, and learn how a protocol stack really works with the famous "FedEx Analogy" presented as an embedded video by our top instructor, Eric Coll.

We'll cut through the jargon to demystify layers, explaining jargon and buzzwords, and most importantly, the underlying ideas, and how it all works together... in plain English.

Course Outline

1. Introduction

Course introduction and overview.

2. Open Systems

Open systems vs. proprietary systems.

3. Protocols and Standards

The difference between a protocol and a standard.

4. ISO OSI 7-Layer Reference Model

Top-level overview and introduction to Layers

5. The Physical Layer

Fiber, Twisted Pair, Cable and Wireless

6. Data Link Layer

LANs and MAC Addresses

7. Network Layer

IP, MPLS, Packets and Routers

8. Transport Layer

Reliability, Connections, Ports and Sockets

9. Session Layer

SIP, POP and HTTP

10. Presentation Layer

ASCII, MIME, Compression, Encryption, Codecs

11. Application Layer

SMTP, HTML and English

12. Protocol Stacks

The FedEx Analogy

13. Protocol Headers

Babushka Dolls

14. Standards Organizations

15. Multiple-choice Exam

Prerequisites

None. This is the best course to begin learning about IP and MPLS.

Course Objectives: What You Will Learn

This course can be taken by both those who need simply an overview and introduction to the idea of layers and the OSI model, and by those embarking on a certification and/or planning to take further courses.

If you're in the first group, the objective is not to become an instant expert, but rather to become familiar with the structure that is used to be able to discuss separate issues separately, what a layer is, the basic functions of each layer, what a protocol stack is and how it works, and where things you've heard of before like Ethernet, IP and TCP fit into the picture... to demystify the jargon and buzzwords, to eliminate frustration and increase your confidence and effectiveness.

If you're in the second group, and your objective is to put in place a structure for subsequent courses, following is a list of concrete objectives. On completion of this course, you will be able to explain:

- The concept of an open system and its advantages
- What a protocol is and what a standard is
- The OSI Model and its purpose
- What a Layer is
- The seven layers of the OSI model
- The name of each layer
- The functions each layer is responsible for
- Examples of actual protocols for each layer
- What a protocol stack is and how it operates
- Examples of standards organizations that publish protocols

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2211 Ethernet, LANs and VLANs

MAC Addresses • 802.3 and Ethernet • Broadcast Domains • LAN Cables • Switches • VLANs

8 interactive multipart lessons, multiple-choice exam and certificate.

Ethernet LANs are the standard method of implementing Layer 2 of the OSI Model, data links for communications between two machines. Taking this course, you'll gain a solid understanding of LANs: Ethernet and its bus topology, CSMA-CD access control, broadcast domains and MAC addresses; MAC frames, the IEEE 802 standards, evolution of Ethernet from 10BASE-T to Gig-E, hubs and switches, LAN cables, the TIA-568 cable categories, basic cabling design; what "bridging" means, how a LAN switch works, VLANs and finishing with a preview of the next course: using routers to move frames between broadcast domains.

We'll cut through the jargon to demystify Ethernet, MAC addresses, LANs and VLANs, explaining the jargon and buzzwords, the underlying ideas, and how it all works together... in plain English.

Course Outline

1. Introduction

Course introduction and overview

2. Bus Topology

Broadcast domains, MAC addresses, CSMA-CD access control

3. Ethernet and 802.3

IEEE 802 standards, 802.2 and 802.3, MAC frames

4. Evolution of Ethernet

10BASE-2, 10BASE-T → Gigabit Ethernet and Optical Ethernet

5. LAN Cabling and TIA-568 Categories

Category 5, 5e and 6 cables, basic cabling design

6. Bridging

Connecting broadcast domains, bridged services

7. LAN Switches

Layer 2 switches, MAC tables

8. VLANs

Broadcast domains defined in software

9. Multiple-Choice Exam

Prerequisites

None. Course 2212 The OSI Layers and Protocol Stacks is useful to understand where LANs fit into the overall picture and how LANs and VLANs relate to routers and IP.

Course Objectives: What You Will Learn

The objective of taking this course is to become familiar with the standard technology used to implement Layer 2 in IP-based packet networks. After taking this course, you will be up to speed on MAC addresses and MAC frames, broadcast domains, LAN cables and LAN switches, VLANs and Optical Ethernet.

In particular, on completion of this course, you will be able to explain:

- The original bus design for a LAN, called Ethernet
- How the bus created a need for an access control protocol, and the CSMA-CD protocol that was implemented for Ethernet
- How the bus implements a broadcast domain, and the MAC addressing scheme that was implemented to identify stations
- The standardization of Ethernet with the IEEE 802 series of standards, understanding 802.2 and 802.3
- Evolution of Ethernet from 10 Mb/s on coaxial cables to Gigabit Ethernet on copper and fiber, and the codes like 10BASE-T used to refer to the various versions
- LAN cables and the TIA-568 cable categories
- How LANs are connected together: bridges and LAN switches, also called “Layer 2” switches, and
- How VLAN technology is used to separate devices on LANs into different broadcast domains.

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2213 IP Networks, Routers and Addresses

IP Packets • Networks • Routers • Static, Dynamic, Public, Private Addresses • NAT • IPv6

11 interactive multipart lessons, multiple-choice exam and certificate.

IP Networks, Routers and Addresses is a comprehensive course on Layer 3 of the OSI Model, concentrating on IP addresses, routers and packets.

You'll gain a solid understanding of the key principles of packet networks: bandwidth on demand, packet forwarding and packet filtering, how routers work, all of the different types of IP version 4 addresses: static and dynamic, public and private, network address translation plus IP version 6.

Based on Teracom's famous Course 101, tuned and refined over the course of 20 years of instructor-led training, we'll cut through the jargon to clearly explain IP and routers, packets and addresses, the underlying ideas, and how it all works together... in plain English.

Course Outline

1. Introduction

Course introduction and overview

2. Review: Channelized Time-Division Multiplexing (TDM)

Traditional TDM – and why it is inefficient

3. Statistical Time-Division Multiplexing: Bandwidth-on-Demand

Overbooking and opportunistic capacity

4. Private Network: Bandwidth on Demand + Routing

The simplest framework for understanding routers and bandwidth on demand

5. Routers

Routers and routing tables. Packet forwarding and packet filtering. Customer Edge.

6. IPv4 Addresses

Address classes and dotted-decimal notation.

7. DHCP

Dynamic addresses and static addresses – and how both are assigned using DHCP

8. Public and Private IPv4 Addresses

How to obtain public addresses, and why private addresses are used in many cases

9. Network Address Translation

How a NAT glues private IPv4 addressing used in-building to public addressing used on the Internet

10. IPv6 Overview

Introduction to IPv6, what's new, the improvements on IPv4 and the IPv6 packet format.

11. IPv6 Address Allocations and Assignment

Types of IPv6 addresses, registries and allocations to ISPs. How subnets are assigned to end-users.

12. Multiple-Choice Exam

Prerequisites

None. Course 2212 The OSI Layers and Protocol Stacks is useful to understand where IP and packets fit into the overall picture. Course 2211 Ethernet, LANs and VLANs complements this course, as IP packets are usually carried on Ethernet.

Course Objectives: What You Will Learn

The objective of this course is to develop a solid understanding of IP. After taking this course, you will be up to speed on the fundamental principles of packet networks: bandwidth on demand, also known as overbooking or oversubscription, and packet forwarding. You will know the IP packet format and how IP addresses are allocated, assigned and displayed. You will know the difference between static and dynamic addresses, public and private addresses and how Network Address Translation works. An additional objective is to become familiar with the basics of IPv6.

In particular, on completion of this course, you will be able to explain:

- The concept of statistical multiplexing, also known as oversubscription, overbooking and bandwidth on demand, why and how it can be implemented and its benefits.
- What a private network is
- What a router is and how it implements the network by connecting data links
- How routers move packets between broadcast domains, including VLANs
- How routers also act as a point of control for traffic, called packet filtering
- The basic structure and contents of a routing table
- The Customer Edge
- IPv4 address blocks: Class A, Class B and Class C, and dotted-decimal notation
- Static addresses and dynamic addresses, and how and why DHCP is used to assign both
- Public addresses and private addresses, how, why and where each is used
- Network Address Translation for interfacing domains where public addresses are used with those where private addresses are used
- The improvements and changes between IPv4 and IPv6, and
- The types of IPv6 addresses, how IPv6 addresses are allocated to ISPs then assigned to users, and how each residence gets 18 billion billion IPv6 addresses.

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2214 MPLS and Carrier Networks

Carrier Packet Networks • Technologies • MPLS • SLAs • CoS • Integration & Aggregation

15 interactive multipart lessons, multiple-choice exam and certificate.

MPLS and Carrier Networks is a comprehensive training course designed to build a solid understanding of carrier packet networks and services, the terminology, technologies, configuration, operation and most importantly, the underlying ideas ... in plain English.

We'll cut through the buzzwords and marketing to demystify carrier packet networks and services, explaining Service Level Agreements, traffic profiles, virtual circuits, QoS, Class of Service, Differentiated Services, integration, convergence and aggregation, MPLS and other network technologies, and how they relate to TCP/IP without bogging down on details.

You will gain career- and productivity-enhancing knowledge of the structure, components and operation of carrier packet networks and services, how they are implemented, packaged and marketed by carriers and how they are used by government, business... and other carriers.

Course Outline

1. Introduction
Packet Switching and Bandwidth on Demand concepts. Course overview.
2. Carrier Packet Network Basics
Customer Edge, Provider Edge, Access and Core
3. Service Level Agreements
Traffic Profile and Class of Service
4. Virtual Circuits
Traffic Classes, Virtual Circuits and Virtual Circuit IDs
5. X.25
Packet Network Protocol Stack & OSI Layers
6. Frame Relay
Frame Relay vs. Packet Switching, IP, TCP, FRADs
7. TCP/IP over Frame Relay
Tracing a file download end-end through the equipment and protocols
8. QoS Requirement for Voice over IP
How packetized voice works and what is needed
9. ATM
Brief overview: ATM objectives, cells, Service Classes
10. MPLS
MPLS components, jargon, basic operation
11. TCP/IP over MPLS
Tracing a file download end-end, MPLS for VPN or VPLS
12. Differentiated Classes of Service using MPLS
QoS, traffic classification, Diff-Serv: multiple CoS
13. Integration and Convergence using MPLS
Carrying all traffic on a single network technology
14. Managing Aggregates of Traffic with MPLS Label Stacking
Carrying virtual circuits on virtual circuits – access and core
15. MPLS Services vs. Internet Service
Similarities and differences, pros and cons. The Future.
16. Multiple-choice Exam

Prerequisites

Courses 2212 OSI Layers, 2211 LANs and 2213 IP are recommended. Those courses along with this one are included in both the Certified Telecommunications Network Specialist (CTNS) and the Certified IP Telecom Network Specialist (CIPTS) certification packages.

Course Objectives

This course can be taken by both those who need simply an overview and introduction to carrier packet networks and MPLS, and by those who need to build a solid base on all the listed topics.

If you're in the first group, the objective is not to become an instant expert, but rather to become familiar with the structure, components and operation of carrier packet networks and services, how they are packaged, marketed and used, and to demystify the jargon and buzzwords, to eliminate frustration and increase your confidence and effectiveness.

If you're in the second group, following is a list of concrete objectives.

On completion of this course, you will be able to:

- Explain the components and basic structure of a carrier packet network including core, provider edge, access and customer edge,
- List three ways packet services are better than dedicated lines for wide-area networking,
- Define a Service Level Agreement, Class of Service and traffic profile,
- Define a traffic class and explain what a virtual circuit is, and what they are used for,
- Differentiate between a reliable and unreliable Class of Service and what must be done to accommodate the latter, and briefly explain connection-oriented and connectionless communication modes,
- Explain the fundamentals of Frame Relay: how Frame Relay got its name, how IP is carried over Frame Relay, why TCP is also required, and the traffic profiles supported,
- Identify the steps involved in communicating voice in packets, and what transmission characteristics are critical to call quality,
- Briefly describe the characteristics of ATM and the classes of service it was supposed to implement to support telephone calls,
- Show how MPLS is essentially the same thing as X.25, Frame Relay and ATM but with different jargon – and identify that jargon, including defining the meaning and purpose of a label, and identifying where the label is placed in the headers,
- Trace the flow of a message transported by TCP in IP packets over an MPLS network,
- Identify the benefit of MPLS compared to Frame Relay from the user's point of view,
- Explain what Differentiated Services are, and how MPLS labels can be used to implement Diff-Serv, and an alternative,
- Explain how and why MPLS can be used to achieve service integration,
- Show how MPLS can be used to aggregate traffic,
- Explain what exactly someone means when they say "MPLS service" and explain why "IP service with a service level agreement" would be a more accurate term, and
- Identify two differences between MPLS service and Internet service, and the pros and cons of each.

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Certifications



Teracom is a Gold Training Partner of the [Telecommunications Certification Organization](#), authorized to administer exams for TCO certifications on the myTeracom Learning Management System and award TCO certifications.

TCO certification is proof of your knowledge of telecom, datacom and networking fundamentals, jargon, buzzwords, technologies and solutions. It's backed up with a certificate and a letter of introduction.

Teracom Certification Packages are sets of online courses chosen to give you a solid, comprehensive, up-to-date knowledge base in telecommunications and networking, plus the corresponding Telecommunications Certification Organization (TCO) certification.

You will understand the jargon and buzzwords, technologies, protocols, standards, and most importantly, the underlying ideas and how it all works together - in plain English.

This training is ideal for non-engineers needing to get up to speed, fill in the gaps and master both the fundamentals and the big picture.

When you successfully complete the courses in a certification package, you are awarded the prestigious TCO certification.

Certification is proof of knowledge skills... a valuable asset to you and your employer.

Discounted Package Price

By registering for a certification package, not only will you get a set of courses that have been carefully chosen to provide the training needed for today's environment, you will also benefit from a substantial discount compared to purchasing individual courses and purchasing the certification separately.

Learning Management System

The myTeracom Learning Management System guides you every step of the way, from ordering your certification package to taking the lessons and writing the end-of-course exams. Study at your own pace – and take as long as you want to do the lessons.

Guaranteed to Pass

With the Unlimited Plan, you can repeat courses and course exams at no additional charge – which means guaranteed to pass if you're willing to learn.

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Benefits of Certification

Benefits of Certification for Individuals

One benefit of TCO certification is differentiating yourself from the rest of the crowd when applying for a job or angling for a promotion.

The knowledge you gain taking Teracom's Online Courses, and confirmed with the TCO Certification is foundational knowledge in telecommunications, IP, networking and wireless: fundamental concepts, mainstream technologies and how it all fits together.

This type of knowledge and preparation makes you an ideal candidate to hire or promote to a task, as you will be able to build on your proven knowledge to quickly get up to speed and work on a particular project - then have the versatility to work on subsequent projects.

TCO certification will help demonstrate to an employer that you have this necessary foundational knowledge... a desirable thought to have in your potential manager's mind.

Benefits of Certification to Employers

Teracom certification packages are an extremely cost-effective way of implementing consistent, comprehensive telecommunications and networking technology fundamentals training, ensuring that existing resources and new hires are up to the same speed, with a common vocabulary, framework and knowledge base.

Based on Teracom's proven instructor-led training courses crafted and refined over twenty years providing training for organizations including AT&T, Verizon, Bell Canada, Intel, Microsoft, Cisco, Qualcomm, the CIA, NSA, IRS, FAA, US Army, Navy, Marines and Air Force and hundreds of others, Teracom online courses are top-notch, top-quality and right up to date with the topics you need.

Course exams provide concrete measurement of competency in key knowledge areas. Management can view the progress and results of all team members and export it to spreadsheet or PDF.

Team progress reports identify skills deficiencies and strengths, and can also provide tangible proof of Return On Investment and team readiness for year-end reports to upper management.

The scalable, web-based myTeracom Learning Management System is included at no extra charge, facilitating the training of both individuals and groups.

Courses and exams may also be licensed as courseware deployed on an organization's LMS and available to all employees.

List of Available Certifications

Certified Telecommunications Network Specialist (CTNS)

(recommended choice)

CTNS will give you a well-rounded, solid, structured understanding of telecommunications, including traditional telephony, wireless and IP telecommunications, plus a certification to prove it.

This package includes these six courses plus your CTNS certification, certificate, letter of reference and all of the other great benefits of TCO Certification:

- 2201 POTS and the PSTN
- 2206 Wireless Telecommunications
- 2212 The OSI Layers and Protocol Stacks
- 2211 Ethernet, LANs and VLANs
- 2213 IP Networks, Routers and Addresses
- 2214 MPLS and Carrier Networks

Certified IP Telecom Network Specialist (CIPTS)

CIPTS is the same as CTNS, but leaves off the PSTN and Wireless and concentrates on all of the aspects of the IP telecommunications network. This package includes four courses plus your CIPTS certification, certificate, letter of reference and all of the other benefits of TCO Certification:

- 2212 The OSI Layers and Protocol Stacks
- 2211 Ethernet, LANs and VLANs
- 2213 IP Networks, Routers and Addresses
- 2214 MPLS and Carrier Networks

Certified Telecommunications Analyst (CTA)

The prestigious TCO Certified Telecommunications Analyst (CTA) Certification is proof of your comprehensive knowledge of telecom, datacom and networking, itemized on a personalized Letter of Introduction / Letter of Reference included with your TCO Certification.

The CTA Certification is exam-only, without online courses. It is the “final exam” and certification for the following training:

- Instructor-led Course 101 Telecom, Datacom and Networking for Non-Engineering Professionals,
- DVD-Video package V530 Full Library
- Textbook Telecom 101

One certification is included per Course 101 student. Five certifications are included as a free bonus with DVD package V530 Full Library. The certification exam may be purchased by students with the Telecom 101 textbook, or anyone who already has the required knowledge.

Certifications Price List - GSA Contract GS-02F-0053X

ITEM / PART #	DESCRIPTION	NUMBER OF SEATS	PRICE	ADDITIONAL SEATS
L4210	CERTIFIED TELECOMMUNICATIONS NETWORK SPECIALIST (CTNS) CERTIFICATION PACKAGE UNLIMITED PLAN	1	209.61	209.61
L4210-5	CERTIFIED TELECOMMUNICATIONS NETWORK SPECIALIST (CTNS) CERTIFICATION PACKAGE UNLIMITED PLAN, 5 SEATS	5	602.03	120.41
L4211	CERTIFIED IP TELECOM NETWORK SPECIALIST (CIPTS) CERTIFICATION PACKAGE UNLIMITED PLAN	1	152.18	152.18
L4211-5	CERTIFIED IP TELECOM NETWORK SPECIALIST (CIPTS) CERTIFICATION PACKAGE UNLIMITED PLAN, 5 SEATS	5	468.03	93.61
L3921	CERTIFIED TELECOMMUNICATIONS ANALYST (CTA) CERTIFICATION EXAMS UNLIMITED PLAN	1	85.18	85.18
L3921-5	CERTIFIED TELECOMMUNICATIONS ANALYST (CTA) CERTIFICATION EXAMS UNLIMITED PLAN, 5 SEATS	5	257.47	51.49

NOTES

Unlimited Plan allows unlimited repeats of a courses and/or exams at no charge.
IFF is included in prices.

AVAILABLE DISCOUNTS

55% discount on single-seat price for 10 or more seats
60% discount on single-seat price for 25 or more seats

Please see Online Courses for more course package options.

Certification Descriptions

CTNS Certification Package

(recommended choice)

The CTNS certification package and its six courses will give you a solid foundation of structured knowledge spanning telecom, datacom and networking from traditional telephony through cellular to IP and MPLS networking, understanding the fundamentals, technologies, jargon and buzzwords, and most importantly, the underlying ideas and how it all fits together... plus TCO Certification to prove it!

You will benefit from decades of knowledge, insight and experience gained working for and with the biggest names in the business, distilled into clear lessons, logically organized to build one concept on another.

The result is a major career-enhancing and productivity-enhancing upgrade to your knowledge skills that you can't get on the job, reading magazines or talking to vendors... solid understanding that lasts a lifetime.

The courses and their lessons can be done at your own pace. There are no time limits for completing a lesson and moving to the next one. Selecting the Unlimited Plan allows you to repeat the courses and/or exams for no additional cost... which means guaranteed to pass if you're willing to learn.

This package includes all six courses and with the certification package, your CTNS Certification, letter of reference and all of the other great benefits of TCO Certification:

- 2201 POTS and The PSTN
- 2206 Wireless Telecommunications
- 2212 The OSI Layers and Protocol Stacks
- 2211 Ethernet, LANs and VLANs
- 2213 IP Networks, Routers and Addresses
- 2214 MPLS and Carrier Networks

Each course has a course exam, consisting of ten multiple-choice questions chosen at random from a pool and shuffled in order. Passing the course exams proves your knowledge of these topics and results in your certification as a Certified Telecommunications Network Specialist, with Certificate and Letter of Introduction.

The "Unlimited Plan" allows you to repeat courses and/or exams at no additional charge – which means guaranteed to pass if you're willing to learn.

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CIPTS Certification Package

The CIPTS Certification Package includes the four Online Courses related to “IP” Telecommunications. Taking this set of courses, you will build a solid foundation of structured knowledge, understanding the fundamentals, technologies, jargon and buzzwords, and most importantly, the underlying ideas and how everything fits together.

Students taking this course will be enriched with valuable knowledge skills that are both career-enhancing for the student and productivity-enhancing for the employer... with certification from the Telecommunications Certification Organization to prove it.

The courses and their lessons can be done at your own pace. There are no time limits for completing a lesson and moving to the next one.

Selecting the Unlimited Plan allows you to repeat the courses and/or exams for no additional cost... which means guaranteed to pass if you’re willing to learn.

On the other hand, if you like this discounted package of courses, but don’t need the certification – or don’t feel like writing exams – no problem! Take the package, benefit from the training and the discount and simply skip the exams.

This package includes the following four courses and your CIPTS certification, certificate, letter of reference and all of the other great benefits of TCO Certification:

- 2212 The OSI Layers and Protocol Stacks
- 2211 Ethernet, LANs and VLANs
- 2213 IP Networks, Routers and Addresses
- 2214 MPLS and Carrier Networks

The four courses in the CIPTS package are on the “IP” telecommunications network and its three main enabling technologies: Ethernet, IP and MPLS, and beginning with the OSI model and its layers to establish a framework.

This is in effect the same as the CTNS certification package, but skipping the traditional telephony and the wireless telecommunications courses and going directly to the IP telecom courses.

This package is ideal for those who only need to get up to speed on the new areas in telecommunications, and/or up to speed on “the network”, when the network in question is IP-based.

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CTA Certification

The prestigious TCO Certified Telecommunications Analyst (CTA) Certification is proof of your comprehensive knowledge of telecom, datacom and networking, itemized on a personalized Letter of Introduction / Letter of Reference included with your TCO Certification.

The CTA Certification is exam-only, without online courses. It is the “final exam” and certification for the following training:

- Instructor-led Course 101 Telecom, Datacom and Networking for Non-Engineering Professionals,
- DVD-Video package V530 Full Library
- Textbook Telecom 101

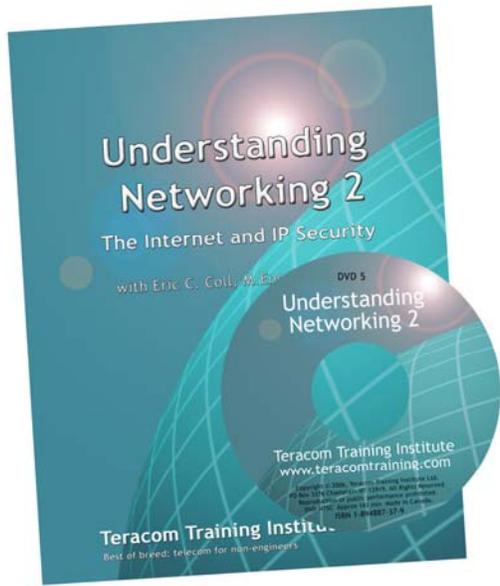
One certification is included per Course 101 student. Five certifications are included as a free bonus with DVD package V530 Full Library. The certification exam may be purchased by students with the Telecom 101 textbook, or anyone who already has the required knowledge.

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DVD-Video Courses



Teracom's self-paced DVD-video courses: ideal for learning about telecom, datacom, networking, IP, MPLS, VoIP and wireless at your own pace, with printed course books.

These high-quality video courses will give you the understanding of key telecom concepts, jargon, buzzwords and technologies that is our trademark

Keeping You Engaged and Learning!

Over 50% of communication is body language – a definite advantage of video over computer courses.

Speaking directly to you via the camera, along with overlaid graphics, our engaging and often humorous on-screen instructor will keep your attention while you learn.

Teracom DVDs are as close as you can get to a private course from the Director of the Institute without actually being there!

Printed Course Books: Retain What you Learn

Every course comes complete with a high-quality comprehensive course book with copies of all graphics plus full text notes.

A printed course book makes all the difference, helping you learn during the course – and sure to be a valuable reference for years to come.

Course Completion and CPE Certificate

Each course has an online knowledge evaluation test. Upon successful completion of the test, you get a certificate suitable for framing, including a statement of the number of CPE credits earned.

Bonus Online Courses & Certifications

With the Full Library package, you also get unlimited access to all Teracom Online Courses and TCO CTNS and CTA Certifications for five people as a free bonus.

The DVD Advantage

Cinema-quality video, animated bullets, plenty of crisp graphics – DVDs are convenient and easy to pass around in your department. DVDs also mean guaranteed to play in your laptop, ideal to watch with headphones on plane flights. Navigation menus allow you to jump directly to topics, so you can watch one segment at a time - or watch start to finish like instructor-led training.

Team Training

DVDs also play in DVD players - connect to your LCD projector and you've got a very high value-added scenario for your organization. We'll bundle books and certificates for everyone at a reasonable price.

Hundreds of organizations have purchased Teracom video training courses!

Order today to make this invaluable addition to your telecommunications training library.

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List of Available DVD-Video Courses

V1 Fundamentals of Telecom 1

Length 142 minutes. DVD-R NTSC format. 55-page 8.5" x 11" softcover bound course book.
The PSTN • Telephony • Telecom Equipment • The Telecom Industry

V2 Fundamentals of Telecom 2

Length 124 minutes. DVD-R NTSC format. 63-page 8.5" x 11" softcover bound course book.
Voice Digitization • DS0-DS3 • Digital Transmission and TDM • T1 • T3 • ISDN • SONET • Fiber • DWDM

V3 Fundamentals of Datacom and Networking

Length 106 minutes. DVD-R NTSC format. 65-page 8.5" x 11" softcover bound course book.
WANs and LANs • MAC Frames vs. IP Packets • The Network "Cloud"

V4 Understanding Networking 1

Length 127 minutes. DVD-R NTSC format. 58-page 8.5" x 11" softcover bound course book.
OSI Layers • Protocol Stacks • The FedEx Analogy
IP Addressing, DHCP, NAT • Bandwidth on Demand Services • Frame Relay • ATM • MPLS

V5 Understanding Networking 2

Length 151 minutes. DVD-R NTSC format. 64-page 8.5" x 11" softcover bound course book.
The Internet • ISPs • The Web • IP Security • Viruses • Firewalls • Encryption • IPsec • VPNs

V6 Wireless

Length 185 minutes. (More than 3 hours long!) DVD NTSC format. 74-page 8.5" x 11" softcover bound course book.
Radio Fundamentals • Spectrum • Mobility • Cellular Principles • Digital Voice • Mobile Internet
Technologies: TDMA, CDMA, OFDM • Generations: 2G GSM, 3G 1X, UMTS and HSPA, 4G LTE
Fixed wireless: Bluetooth, WiFi, WiFi security & encryption, WiMAX, satellite and more

V8 Understanding Voice over IP 1

Length 134 min. DVD-R NTSC format. 60-page 8.5" x 11" softcover bound course book.
Components • Standards • Architectures

V9 Understanding Voice over IP 2

Length approx 119 min. DVD-R NTSC format. 48-page 8.5" x 11" softcover bound course book.
Voice Packetization • Voice Quality • Codecs, Jitter, Packet Loss • Diff-Serv • Network QoS with MPLS

V10 Understanding Voice over IP 3

Length approx 116 min. DVD-R NTSC format. 54-page 8.5" x 11" softcover bound course book.
SIP and IP Call Flow • Carrier Interconnect • Megaco

DVD-Video Course Price List – GSA Contract GS-02F-0053X

RECOMMENDED PACKAGES: FREE DOMESTIC GROUND SHIPPING

ITEM / PART #	DESCRIPTION	UNIT PRICE
V110	CORE TRAINING PACKAGE 1 V1, V2, V3, V4 AND V5	752.75
V140	CORE TRAINING PACKAGE 2 V1, V2, V3, V4, V5 AND V6	852.09
V310	VOIP PACKAGE V8, V9 AND V10	595.18
V530	FULL LIBRARY V1, V2, V3, V4, V5, V6, V8, V9 AND V10	1447.27

INDIVIDUAL COURSES À LA CARTE

V111	ANY ONE DVD V1, V2, V3, V4, V5, V6, V8, V9 OR V10	211.48
V112	ANY TWO DVDs V1, V2, V3, V4, V5, V6, V8, V9 OR V10	403.27
V113	ANY THREE DVDs V1, V2, V3, V4, V5, V6, V8, V9 OR V10	595.18

ADDITIONAL COURSE BOOKS PURCHASED WITH DVDs

One course book is included with each DVD. Order additional course books for additional students using the same DVD. Students who have a course book can take the course test and receive a course completion certificate.

W111	COURSE BOOK FOR V111 (1 BOOK)	22.92
W112	COURSE BOOKS FOR V112 (2 BOOKS)	43.93
W113	COURSE BOOKS FOR V113 (3 BOOKS)	54.56
W110	COURSE BOOKS FOR V110 (5 BOOKS)	82.31
W140	COURSE BOOKS FOR V140 (6 BOOKS)	92.84
W310	COURSE BOOKS FOR V310 (3 BOOKS)	54.56
W530	COURSE BOOK FOR V530 (9 BOOKS)	150.27

Prices include IFF.

NOTE: Products W111 – W530 are offered for purchase only at the same time as purchase of the corresponding DVD-Video Courses. Please see the Printed Books section for pricing of DVD-Video course books purchased on their own.

SHIPPING AND HANDLING

	US48 AND CANADA10			ANYWHERE ELSE
	GROUND	2-DAY	1-DAY	AIRMAIL
ANY PACKAGE OF 3 OR MORE COURSES	FREE	15.00	35.00	100.00
ITEM V112	FREE	30.00	40.00	80.00
ITEM V111	FREE	25.00	35.00	30.00
ITEMS W111-W999, EACH	FREE	25.00	35.00	30.00

Ground shipping FOB destination CONUS is free.

AVAILABLE DISCOUNTS

PRODUCT V110, V140, V530 ONLY: 50% discount on second and more on the same order.

CONCESSIONS (BONUSES INCLUDED)

T101 Telecom 101 Printed Textbook 50% discount

CONCESSIONS (BONUSES INCLUDED) – PRODUCT V110, V140, V530 ONLY

L4210 CTNS Online Courses & Certification Package Unlimited Plan for 5 people

L3921 CTA Certification Exam Unlimited Plan for 5 people

DVD-Video Course Descriptions

V1 Fundamentals of Telecommunications

The PSTN • Telephony • Telecom Equipment • The Telecom Industry
Length 142 minutes. DVD-R NTSC format. 55-page 8.5" x 11" softcover bound workbook.

It all starts with the Public Switched Telephone Network (PSTN) and Plain Ordinary Telephone Service (POTS). We'll begin with the basics of telephony: loops, trunks, circuits, analog, the voiceband... fundamentals that are key to understanding of newer technologies and services.

To complete the picture, we take a practical journey through different types of equipment. We'll review switches, PBXs, Centrex, multiplexers and routers, as well as ancillary equipment like ACDs, voice mail and interactive voice response (IVR) systems.

With this framework in place, we'll review the telecommunications industry and understand the main players and competitors, how Local Exchange Carriers connect to Inter-Exchange Carriers and how CLECs fit into the picture.

The topics in this video course - how the telephone system and industry work, provide the essential foundation on which everything else, including VoIP, data circuits and networking are built.

Part 1 Fundamentals of Telephony

- 1.03 The Public Switched Telephone Network (PSTN)
- 1.05 Analog Circuits
- 1.07 What is Sound?
- 1.09 The Voiceband
- 1.11 Plain Ordinary Telephone Service (POTS)
- 1.13 DTMF Address Signaling
- 1.15 Signaling System 7 (SS7)

Part 2 Telecom Equipment

- 2.03 Telephone Switches
- 2.05 PBX vs. Centrex
- 2.07 Voice VPNs
- 2.09 Call Centers

Part 3 The Telecommunications Industry

- 3.03 US Domestic Telcos
- 3.05 AT&T and Verizon
- 3.07 Canadian Telephone Companies
- 3.09 PSTN Switching Centers Before Competition
- 3.11 Accessing The Interexchange Carriers
- 3.13 Competitive Local Exchange Carriers (CLECs)

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V2 Fundamentals of Telecommunications 2

Voice Digitization • DS0-DS3 • Transmission • TDM • T1 • T3 • ISDN • SONET • Fiber • DWDM
Length 124 minutes. DVD-R NTSC format. 63-page 8.5" x 11" softcover bound workbook.

In this video course, we drill into the technology a bit, to understand the concepts, standards and technologies for actually transmitting voice calls from one place to another. We'll give you a real understanding of what "digital" actually means, and how it is implemented. We'll explain what a "DS0" is, and take a practical tour of digital circuits, including T1, T3, SONET and ISDN. At a high level, we'll see how voice, data and video can be integrated. Then, we'll take a closer look at how this is all actually done, with Time Division Multiplexing (TDM) and digital carrier systems that are the technologies at the heart of telecommunications networks. Without getting bogged down on technical details, we'll provide you with a basic understanding of how transmission systems work, including T1 over copper wires and SONET over fiber.

Most of the transmission systems we have in place were designed for digital voice communications using these techniques... but they are also used for data and networking. This video course provides you with the concrete knowledge of the telecommunication circuits necessary to a full understanding of data circuits and network services.

Part 1 Digital Communications

- 1.03 Why Digital?
- 1.05 Analog and Digital: What Do We Really Mean?
- 1.07 Continuous Signals, Discrete Signals
- 1.09 Voice Digitization (Analog → Digital Conversion)
- 1.11 Voice Reconstruction (Digital → Analog Conversion)
- 1.13 Voice Digitization Summary
- 1.15 The Digital Hierarchy: Industry Standard Line Speeds
- 1.17 Popular Technologies: Digital Carrier Systems
- 1.19 ISDN BRI and PRI
- 1.21 Digital Circuit Voice Applications
- 1.23 Digital Circuit Data Applications
- 1.25 Digital Video
- 1.27 Integration: Voice, Video, Data

Part 2 Transmission Systems

- 2.03 Time Division Multiplexing
- 2.05 T1 Carrier System
- 2.07 T1 Basics: Multiplexers
- 2.09 Framing and Channels
- 2.11 Pulses and Repeaters
- 2.13 How T1 is Provided
- 2.15 Fibers and Cables
- 2.17 SONET and DWDM: Core Networks
- 2.19 International Digital Hierarchies

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V3 Fundamentals of Datacom and Networking

WANs and LANs • MAC Frames vs. IP Packets • The Network "Cloud"

Length 106 minutes. DVD-R NTSC format. 65-page 8.5" x 11" softcover bound workbook.

In this course, we'll begin by establishing a model for a data communications circuit, then provide examples and context for each of the components of the model, and review different circuit configurations including LANs and WANs.

In the second part, we'll look at how data is formatted for transmission, beginning with the older concepts of "synchronous" and "asynchronous", then cover the newer ideas of frames and packets, how frames and packets are related, and the addresses on frames and packets, and the structure of IPv4 packets. We'll complete this course with an understanding of the "Network Cloud", why people use clouds to draw networks, and what is really going on inside that cloud.

This set of topics, particularly the understanding of packets and frames, the addresses on each, and how they are related; and the idea of three kinds of network services – and three kinds of edge equipment – is the foundation for all further study of LANs, WANs, IP and just about any other kind of communications, including Voice over IP.

Part 1 Introduction to Data Communications and Networking

- 1.03 Data Circuit Model
- 1.05 Data Terminal Equipment (DTE)
- 1.07 Analog and Digital Data Circuits
- 1.09 Data Circuit Terminating Equipment (DCE)
- 1.11 Configuration Example: Point-to-Point
- 1.13 Multidrop Circuits
- 1.15 LANs
- 1.17 Wide Area Networks

Part 2 How Data is Formatted for Transmission

- 2.03 Data Communications Basics: Bits and Bytes
- 2.05 ASCII Code Set
- 2.07 "Asynchronous"
- 2.09 Frames
- 2.11 Details for Reference: Cyclic Redundancy Check
- 2.13 Packets
- 2.15 Packets vs. Frames
- 2.17 IP Packets

Part 3 The Network "Cloud": How Data Circuits are Actually Provisioned

- 3.03 Anatomy of a Digital Circuit
- 3.05 Common Carriers' Transmission Networks
- 3.07 Network Equipment: How and Where Each is Used

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V4 Understanding Networking 1

OSI Layers • Protocol Stacks • The FedEx Analogy • IP Addressing, DHCP, NAT • Bandwidth on Demand Services • Frame Relay • ATM • MPLS

Length 127 minutes. DVD-R NTSC format. 58-page 8.5" x 11" softcover bound workbook.

This course builds on the basic packet, frame and IP networking concepts of Course V3, Fundamentals of Datacom and Networking, to put in place a solid understanding of protocol stacks, the OSI model and layers and IP addressing including address classes, static vs. dynamic public vs. private and network address translation.

In Part 3, we move to the next higher level of knowledge, understanding packet networks and bandwidth on demand services from telecommunication service providers. After understanding the core concepts, including virtual circuits, we use the grand-daddy of packet services, X.25 to explain jargon: connection-oriented vs. connectionless and reliable vs. unreliable packet networks. Then we progress through technologies: Frame Relay, ATM and finish with MPLS. We'll trace the flow of TCP and IP packets from server to client across Frame Relay, then see how the same TCP/IP works over MPLS. IP over MPLS will end up replacing all other services including ISDN, T1s, Frame Relay, native ATM.

Part 1 Protocol Stacks and the OSI 7-Layer Reference Model

- 1.03 Protocols and Standards
- 1.05 ISO OSI Reference Model
- 1.07 OSI 7-Layer Model
- 1.09 Protocol Stacks
- 1.11 Protocol Stack in Operation

Part 2 IP

- 2.03 IP Address Classes
- 2.05 Dynamic IP Addresses
- 2.07 IP Addresses for Private Networks
- 2.09 Network Address Translation

Part 3 WANs - Bandwidth On Demand: Packet Network Services

- 3.03 Statistical TDM
- 3.05 Bandwidth On Demand Service Concepts
- 3.07 Virtual Circuit Technologies
- 3.09 X.25 and Jargon
- 3.11 Frame Relay
- 3.13 TCP/IP over Frame Relay
- 3.15 Frame Relay Performance: CIR and BIR
- 3.17 ATM: Capacity Management
- 3.19 MPLS
- 3.21 TCP/IP Over MPLS

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V5 Understanding Networking 2

The Internet • ISPs • The Web • IP Security • Viruses • Firewalls • Encryption • IPsec • VPNs
Length 151 minutes. DVD-R NTSC format. 64-page 8.5" x 11" softcover bound workbook.

In this course, we cover the Internet and IP Security. We'll start at the beginning of the story, understanding where the Internet came from and its fundamental principles of operation. Then we'll look at some details and improvements such as the Domain Name System, MIME, HTML and HTTP... which form "the Web". We'll review how you can connect to the Web from a residence and from an enterprise or organization.

In the second part, we'll make a reasonably comprehensive overview of security in the IP world. We'll begin with a discussion of risk areas, vulnerabilities and measures. Then we'll examine several areas: computer security and malicious software like viruses and Trojan Horses and the measures to protect against these risks; network security and firewalls, public key and private key encryption, authentication, IPsec and VPNs.

This video provides you with a real understanding of what the Internet is, how it functions and current issues, plus practical knowledge of computer security, network security and firewalls, encryption, IPsec and VPNs.

Part 1 Understanding The Internet

- 1.03 Internet History
- 1.05 Internet Basics
- 1.07 TCP and UDP
- 1.09 Internet Service Provides
- 1.11 Commonly Used Internet Protocols
- 1.13 Domain Name System
- 1.15 MIME and Base-64 Encoding
- 1.17 World Wide Web
- 1.19 HTML, HTTP and HTTPS
- 1.21 Accessing the Internet: Home Connections
- 1.23 Accessing the Internet: Organization Connections

Part 2 IP Security

- 2.03 Risk, Measures and Policy
- 2.05 Viruses
- 2.07 Trojan Horses, Denial of Service Attacks, Spyware and Exploits
- 2.09 Network Segmentation and Perimeters
- 2.11 Packet Filtering
- 2.13 Firewall Proxies
- 2.15 Stateful Packet Inspection
- 2.17 Encryption
- 2.19 Authentication
- 2.21 IPsec
- 2.23 Customer-Premise-Based VPN
- 2.25 Carrier VPNs

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V6 Wireless

Radio Fundamentals • Mobile Networks • Cellular Principles • Digital Voice • Data • Mobile Internet • TDMA • CDMA • OFDM • 2G GSM • 3G 1X • UMTS • HSPA • 4G LTE • Bluetooth • WiFi • Security
Length 185 minutes. DVD-R NTSC format. 74-page 8.5" x 11" softcover bound course book.

Teracom's *V6 Wireless* is a complete course covering fundamentals, mobile and fixed wireless. Part 1 begins the course with radio fundamentals, spectrum, analog and digital radio. Part 2 covers mobile communications from A-Z: cellular principles, digital voice, data over cellular, mobile Internet access, the technologies and the generations. Part 3 rounds out your knowledge with fixed wireless: Bluetooth, 802.11 wireless LANs, WiFi, security, WiMAX, microwave and satellite.

Over 3 hours long with 28 lessons, this video course provides you with a real understanding of how radio works, how a cellular network operates, the cellular technologies and generations, plus WiFi and much more. Get this upgrade to your knowledge today!

Part 1 Fundamentals

- 1.03 Wireless
- 1.05 Wireless Spectrum and Radio Bands
- 1.07 Analog Radio
- 1.09 Digital Radio: Modems
- 1.11 Propagation, Penetration and Fading

Part 2 Mobile Communications

- 2.03 Mobile Network Components and Operation
- 2.05 Cellular
- 2.07 1G: Analog Frequency-Division Multiple Access
- 2.09 Second Generation: Digital Cellular
- 2.11 Digital Cellular: Voice Communications
- 2.13 Internet Access via Cellular: "Data" Communications
- 2.15 2G: TDMA (IS-136) Time-Division Multiple Access
- 2.17 2G: TDMA (GSM) Time-Division Multiple Access
- 2.19 2G: CDMA Code-Division Multiple Access
- 2.21 Spread Spectrum
- 2.23 CDMA Operation and Patents
- 2.25 3G: CDMA 1X and UMTS
- 2.27 4G: LTE
- 2.29 4G: OFDM
- 2.31 Dynamic Assignment of Subcarriers
- 2.33 Spectrum-Sharing Roundup: FDMA, TDMA, CDMA, OFDM

Part 3 Fixed Wireless

- 3.03 Infrared
- 3.05 Bluetooth
- 3.07 WiFi: Wireless LANs
- 3.09 WiFi Security and WPA2
- 3.11 802.16 WiMAX
- 3.13 Point-to-Point Microwave
- 3.15 Satellite

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V8 Understanding Voice over IP 1

Components • Standards • Architectures

134 min. DVD-R NTSC format. 60-page 8.5" x 11" softcover bound workbook.

Teracom's *Understanding VoIP* is a comprehensive set of multimedia video courses on DVD designed for those needing to get up to speed on and understand Voice over IP technologies, buzzwords, jargon and mainstream solutions, and importantly, the ideas and fundamental concepts underlying VoIP, independent of any particular vendor's viewpoint.

We'll get started with a big-picture view of VoIP, identifying and explaining key components, jargon and buzzwords, standards and protocols. Then we'll review the many flavors of VoIP, comparing and contrasting implementation and architecture choices. Starting with Internet telephony and progressing through Managed IP Telephony, PBX replacement, Hosted PBXs, IP Centrex and Asterisk, you'll gain the knowledge you need to confidently differentiate VoIP architectures and discuss pros and cons of different implementation options.

Chapter 1 VoIP Systems, Components, Standards, Jargon and Buzzwords

- 1.03 The Big Picture
- 1.05 Terminals
- 1.07 Voice in IP Packets
- 1.09 Soft Switches / SIP Servers / Call Managers
- 1.11 Media Servers
- 1.13 Gateways
- 1.15 LANs and WANs
- 1.17 Key VoIP Standards
- 1.19 Where All of This is Headed: Broadband IP Dial Tone

Chapter 2 VoIP Architectures and Implementation Choices

- 2.03 Computer-Computer VoIP over the Internet
- 2.05 Skype and IM
- 2.07 Computer to Phone e.g. SkypeOut (DS0 Interconnect to LEC)
- 2.09 Phone to Phone over the Internet e.g. Vonage
- 2.11 Managed IP Telephone Service (MIPT)
- 2.13 IXCs and IP-based Backbones
- 2.15 VoIP for Businesses and Organizations
- 2.17 VoIP-Enabled PBX and Migration Options
- 2.19 PBX Replacement
- 2.21 Hosted PBXs
- 2.23 IP Centrex
- 2.25 Asterisk and Open-Source IP-PBX Software
- 2.27 SO/HO IP Phone Features and Uses

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V9 Understanding Voice over IP 2

Voice Packetization • Voice Quality • Codecs, Jitter, Packet Loss • Diff-Serv • QoS with MPLS
Approx. 119 min. DVD-R NTSC format. 48-page 8.5" x 11" softcover bound workbook.

Teracom's *Understanding VoIP* is a comprehensive set of multimedia video courses on DVD designed for those needing to get up to speed on and understand Voice over IP technologies, buzzwords, jargon and mainstream solutions, and importantly, the ideas and fundamental concepts underlying VoIP, independent of any particular vendor's viewpoint.

The next course in this series explains how voice is packetized, the factors affecting quality and methods for voice quality in the VoIP system and on the IP network. We'll cover voice digitization and the RTP protocol, then give you a thorough understanding of codecs and compression including G.711 and G.729, as well as delay, jitter and packet loss, why they are important and how they are corrected. In the second part, you'll understand MPLS, Differentiated Services (Diff-Serv), traffic conditioning, Service Level Agreements and Quality of Service (QoS) on IP networks.

Chapter 1 Voice Packetization, Codecs and Voice Quality

- 1.03 Voice Packetization
- 1.05 Measuring Voice Quality
- 1.07 Factors Affecting Voice Quality
- 1.09 Codecs: Voice Coding and Compression
- 1.11 Delay
- 1.13 Jitter
- 1.15 RTP
- 1.17 Protocol Stack: RTP, UDP, IP, MAC
- 1.19 Packet Loss
- 1.21 Tips for Maximizing Voice Quality

Chapter 2 QoS: Quality of Service in the IP World

- 2.03 Virtual Circuit Technologies
- 2.05 MPLS
- 2.07 Differentiated Services (Diff-Serv)
- 2.09 Meters, Markers, Shapers and Droppers
- 2.11 Interworking Diff-Serv and MPLS
- 2.13 802.1P
- 2.15 Implementing QoS: Queuing Techniques

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V10 Understanding Voice over IP 3

SIP and IP Call Flow • Carrier Interconnect • Megaco

Approx. 116 min. DVD-R NTSC format. 54-page 8.5" x 11" softcover bound workbook.

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The third course explains SIP and how connections are made. You'll understand the SIP trapezoid, how it works, demystify jargon like proxy server and location server, understand how SIP fits in with softswitches and call managers, and trace the establishment of an IP phone call step by step. In the second part, we'll cover connecting to carriers using traditional DS0 PBX trunks and PRIs, how Megaco fits in to the story, plus IP interconnect, coexistence with legacy systems, integrated messaging and more.

Chapter 1 SIP and Call Flow in the IP World

- 1.03 What SIP Is and What It Can Do
- 1.05 Relationship to Other Protocols
- 1.07 SIP URIs: "Telephone Numbers"
- 1.09 Register: Update Your Location
- 1.11 INVITE: "Dialing"
- 1.13 Location Service: Finding the Far End
- 1.15 The SIP Trapezoid
- 1.17 SIP Message Example
- 1.19 How SIP Relates to Softswitches and Call Managers
- 1.21 SDP: Session Description Protocol
- 1.23 SIP Glossary

Chapter 2 Carrier Interconnect

- 2.03 Internet - PSTN Interconnect via DS0 (Vonage / SkypeOut)
- 2.05 Internet - PSTN Interconnect via IP
- 2.07 Session Border Controllers
- 2.09 Carrier - Business Interconnect Using DS0 and SIP
- 2.11 Interconnect using MEGACO
- 2.13 Carrier - Business Interconnect Using IP and SIP
- 2.15 Co-Existence with a Legacy PBX
- 2.17 Integrating Integrated Messaging

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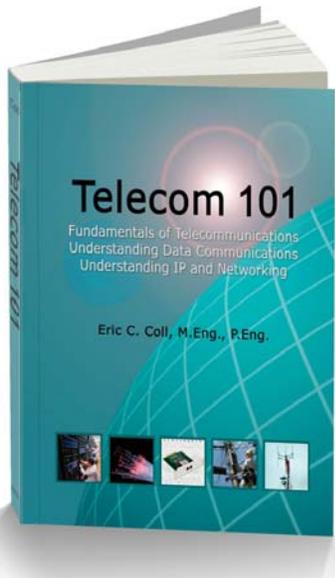
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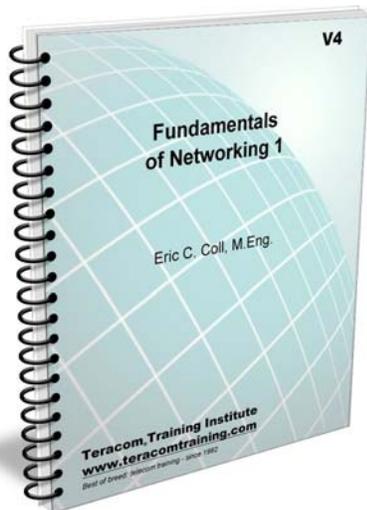
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