



CenturyLink™



Graduate Certificate in Communications Systems

Louisiana Tech University is pleased to partner with CenturyLink to offer a Graduate Certificate in Communications Systems, developed exclusively for CenturyLink employees.

This academic telecommunications program consists of 15 semester credit hours (5 courses) and is designed for those with general responsibilities and interests in telecommunications engineering, information technology or information systems.

This program is currently offered in the evenings at CenturyLink headquarters in Monroe, LA in order to serve full-time employees. The class presentations are captured and posted for students' use after the class or in case their work schedule requires them to miss class. The class capture technology also enables the class to be taken by students in other locations.

Students who complete the Graduate Certificate in Communications Systems may consider applying to the MBA program offered by the College of Business at Louisiana Tech, or to the M.S. in Engineering and Technology and Management or the M.S. in Engineering offered by the College of Engineering and Science at Louisiana Tech (depending on the student's undergraduate background and career goals).

For Fall Quarter 2011 (beginning September 8)

Two courses will be offered in the Fall Quarter:

- ***CIS 544 - Network Design and Implementation*** - Dr. Tom Roberts
This is the final course in the sequence for those who began the program in the Fall 2010. However, the courses are not required to be offered in sequence.
- ***ELEN 525 - Telecommunication Theory and Applications*** - Dr. Scott Shepard
First course in the sequence.

For additional information, please contact:

Ms. Carol Hendrix - carol.hendrix@centurylink.com

Dr. Scott Shepard - sshepard@latech.edu

Dr. Les Guice - guice@latech.edu

Additional information can be found online at <http://centurylink.latech.edu>

ELEN 525 – Telecommunication Theory and Applications

Tuesdays – 5:15pm to 7:05pm

CenturyLink HQ (and online)

Dr. Scott Shepard

Reasons for joining us:

“I’m so busy already ... how can I possibly manage the time to take a class and why?”

This course can be taken entirely online (most students just spend a few hours, from home and/or on the weekends, to watch the lectures etc.) During the Tuesday class sessions, there is an opportunity for live lecture interactions, but these are also recorded and posted online, along with other archived lectures.

This is the first course in a series towards a Graduate Certificate in Communication Systems (which can also be leveraged into an MS degree). These courses empower CTL employees by broadening their knowledge base, enabling them to perform better in their current position as well as increase the range of opportunities for their professional development. The courses are also designed to meet the interdisciplinary needs of students with backgrounds in business, computer science and engineering. Dr. Shepard has a PhD from MIT, worked at Bell Labs, has experience teaching high-tech telecom issues (via minimal math) to a broad range of backgrounds and received a perfect 4.0/4.0 evaluation from CTL students in the previous teaching of this class.

This is an excellent chance to quickly further your career and have a lot of fun!

Course Overview:

Emphasis is on the physical and data link layers of the OSI telecommunications model. Also known as the fiber and packet layers, these topics deal with the physical aspects and lower level protocols of telecommunication networks including modulation formats, network efficiencies and throughput, fiber and copper cabling, media access control protocols, multiplexing and fundamental aspects of hauling data, voice and video traffic over LANs, MANs and WANs with examples drawn from POTS, DSL, Ethernets, the Internet, Fiber-To-The-Home and hybrid fiber/coax networks.

Prerequisites: None

Course topics include:

General characteristics of traffic and networks

Normalized propagation delay, throughput and efficiency of high speed computer data networks

Delay and accuracy requirements of networks for hauling computer data, voice and video traffic

Network architectures and MAC (media access control) protocols

Examples include 802.3 and Gigabit Ethernet; 802.5 Token Ring; FDDI; Frame Relay; and ATM

The Internet, VoIP, IPTV, CATV, ADSL, POTS, LTE and 4G wireless networks, SONET

Physical layer constraints and requirements

Thermal noise, shot noise, dispersion, multipath fading, nonlinearities and their mitigation

Fiber and copper attenuation, reflection, standards, SNR, bit-error-rate, inter-symbol-interference

Multiplexing and modulation

Time division multiplexing, frequency division multiplexing, statistical multiplexing, DWDM

Data rates, frequency bandwidths and modem architectures in AM, FM, PSK, and QAM systems

Wireless standards and technologies

Multipath and flat fading compensation via adaptive equalizers, space diversity and regenerators

WiFi, WiMAX, Advanced LTE, cellular networks, 4G systems, OFDMA, software defined radio

Optical fiber and hybrid fiber/coax standards and technologies

Fiber to the curb (FTTC), FTTH, Raman fiber amplifiers, EDFAs, photonic crystal fiber, FBGs, dispersion compensating fiber, solitons, DWDM, ROADM, limits and emerging technologies



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CIS 544 – Network Design and Implementation

Wednesdays – 5:15pm to 8:15
CenturyLink HQ (and online)
Dr. Tom Roberts

Reasons for joining us:

“I’m so busy already ... how can I possibly manage the time to take a class and why?”

This course can be taken entirely online (most students just spend a few hours, from home, and/or on the weekends, to watch the lectures etc.) During the Wednesday class sessions, the course will provide an opportunity for live lecture interactions, but these are recorded and posted online.

The course is a part of a set of courses that Graduate Certificate in Communication Systems (which can also be leveraged into an MBA or MS degree). The program empowers CTL employees by broadening their knowledge base, enabling them to perform better in their current position as well as increase the range of opportunities for their professional development. The courses are designed to meet the interdisciplinary needs of students with backgrounds in business, computer science and engineering. Dr. Roberts has a PhD from Auburn University and has been teaching Telecommunications in Business for over 20 years.

This is an excellent chance to quickly further your career and have a lot of fun!

Course Overview:

The course focuses upon the Telecommunications Industry from history, current regulation, business models, and OSI Model Layers 3-7. The goal of the course is to provide a basic understanding of the telecommunications industry from a business and regulatory perspective, its operations, and the handling of the network, transport, presentation, and application layers of the OSI telecommunications model.

Prerequisites: None

Course topics include:

Telecommunications History

A history of the telecommunications industry from Western Union to today!!!

Telecommunications Regulation

The impact of telecommunications regulatory operations from International, Federal (FCC), to state regulatory bodies; Tariffs; Transnational Data Flow, and the impact of the political process on the telecommunication industry.

The Competing Forces in the Telecommunications Industry

The technologies (Cellular, 4G, Landline, CATV, Satellite, etc.), the competitors, the customers, and business strategies.

The Network Layer

Routing, IPv4, IPv6, DNS, and Quality of Service (QOS).

The Transport Layer, Presentation Layer, and Application Layer

Transport Protocols, data formats, compression, encryption, and network applications.

Network Security

Cryptography Methods, Symmetric Key, Public Key (PKI), Digital Signatures, SSL, Privacy, IPsec, Firewalls, VPNs, and Wireless Security.



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