

# TELECOMMUNICATIONS (TLEN)

## Courses

### TLEN 5000 (3) Fundamentals of CyberSecurity for Leaders and Innovators

Designed for students without a computer science background, this course introduces core concepts in cybersecurity including, confidentiality, authentication, risk management, and adversarial thinking. The concepts will be applied to both traditional information technology (IT) systems and cyber physical systems (CPS). At the conclusion of the course, students should have a solid foundation in cybersecurity and hands-on experience.

**Requisites:** Not open to Computer Science (CSCI) majors.

**Grading Basis:** Letter Grade

### TLEN 5106 (3) International Deployment of Broadband Networks

Evaluates the business potential for deploying fixed or mobile broadcast networks in an international context. Guides students to develop financial statements to evaluate the investment potential of the venture. Covers: strategy, market potential, sales channels, costs, regulatory and financial issues all in an international context. Project teams mimic the matrix structure of working teams in business context and present to an investor their recommendations.

**Requisites:** Restricted to students with 87-180 credits (Senior) or graduate students in the College of Engineering or Leeds School of Business only.

### TLEN 5150 (1) Managing Effectively in a Changing Telecommunications Environment

Provides students with an opportunity to join international managers and policy makers from around the world in an intensive seminar focused on the challenges of managing in a telecommunications environment in an era of technological change. Guest lecturers provide an effective overview of the cutting-edge issues managers face in telecom and technology companies around the world.

**Equivalent - Duplicate Degree Credit Not Granted:** ATLS 5150

### TLEN 5190 (3) Standardization and Standards Wars

Examines current issues and strategy in the standardization of telecommunications and information technologies. Covers topics on the importance of standards, government and private sector perspectives, and impact of information age technologies on standards development. Introduces students to relevance of antitrust and intellectual property law to the topic.

### TLEN 5245 (3) Introduction to Intellectual Property Law

Provides an overview of our nation's intellectual property laws, including patent, copyright, trademark, trade secret and also discusses other assorted matters related to intellectual property, including licensing, competition policy issues and remedies.

**Equivalent - Duplicate Degree Credit Not Granted:** LAWS 6301

**Requisites:** Restricted to CYBR/TLEN graduate students.

### TLEN 5265 (3) Copyright

Examines state and federal laws relating to the protection of works of authorship ranging from traditional works to computer programs. Studies the 1976 Copyright Act as well as relevant earlier acts. Gives attention to state laws, such as interference with contractual relations, the right of publicity, moral right, protection of ideas and misappropriation of trade values, that supplement federal copyright.

**Requisites:** Restricted to CYBR/TLEN graduate students.

### TLEN 5300 (1-3) Telecommunications Theory and Applications

Examines the mathematical and physical theory of telecommunications. Deals with the fundamental concepts related to a wide range of topics including physical units, numbering systems, trigonometric functions, logarithms, indices, decibels, complex numbers, calculus, elementary probability, and power circuit analysis.

**Repeatable:** Repeatable for up to 3.00 total credit hours. Allows multiple enrollment in term.

### TLEN 5350 (3) Commercial Spaceflight Operations and Communications

Aimed at a high level fundamental understanding of broadcasting, communication and navigation satellite systems. Topics include orbital mechanics, orbit selection, spacecraft subsystems, spacecraft and earth station configurations, propagation issues, link budgets, modulation and multiplexing techniques, multiple access schemes (FDMA, TDMA, CDMA), error control coding, satellite network architecture, and economic, regulatory and business issues in Geo, Meo, and Leo systems.

**Requisites:** Requires corequisite of TLEN 5330. Restricted to graduate students in TLEN or BUSN.

### TLEN 5430 (3) Data Communications 2

Provides a detailed technical study of Internet and Internet-related protocols following a top-down approach through the protocol stack. Bit-level analysis of a large number of Internet and Internet-related protocols, including the study of classic protocol suite principles. Covers real time and near real-time data streaming, IP mobility, IPV6, and an introduction to Internet security.

**Requisites:** Requires prerequisite course of TLEN 5330 or CSCI 4273 or CSCI 5273 (minimum grade D-). Restricted to TLEN or CSCI or BUSN grad students, or TLEN BS/MS students (C-AMENTLEN; C-CSCITLEN; C-CSENTLEN; C-ECENTLEN).

### TLEN 5438 (3) Internet Lab

Have you ever wondered how the Internet actually works? This course teaches students simple, hands-on understanding of the technical components and challenges of providing Internet Services to everyday users. This is the ideal course for technical or non-technical students who have a passion for the Internet or need to have a more detailed understanding of the Internet within their career.

**Grading Basis:** Letter Grade

### TLEN 5530 (3) Applied Network Security

Examines the critical aspects of network security. A technical discussion of threats, vulnerabilities, detection, and prevention is presented. Issues addressed are cryptography, firewalls, network protocols, intrusion detection, security architecture, security policy, forensic investigation, privacy, and the law.

**Requisites:** Restricted to CSCI juniors and seniors, or TLEN or CSEN graduate students, or TLEN BS/MS students (C-AMENTLEN; C-CSCITLEN; C-CSENTLEN; C-ECENTLEN).

### TLEN 5540 (3) Network Security Laboratory

Applies what students have learned in computer and network security foundations in a simulated network environment. Topics to be covered include: system hardening, firewalls, intrusion detection, vulnerability assessment, and investigation.

**Requisites:** Restricted to CSCI juniors and seniors, or TLEN or CSEN graduate students, or TLEN BS/MS students (C-AMENTLEN; C-CSCITLEN; C-CSENTLEN; C-ECENTLEN).

**Recommended:** Prerequisite TLEN 5530 and operating system experience.

**TLEN 5550 (3) Computer and Network Security**

Studies methods to protect information, and the ability to process and move information, from theft, misuse, tampering, destruction and unauthorized access. Introduces foundational topics of computer and network security, including security models, cryptography and authentication protocols.

**Equivalent - Duplicate Degree Credit Not Granted:** CSCI 6268

**Requisites:** Restricted to Engineering Graduate Students and TLEN BS/MS students (C-AMENTLEN; C-CSCITLEN; C-CSENTLEN; C-ECENTLEN).

**Recommended:** Prerequisites CSCI 5273 and significant experience in coding (C or C++) and some experience in networks and familiarity with TCP/IP, UDP and ICMP.

**TLEN 5700 (2) Research Methods**

Develop basic concepts and methods for pursuing quantitative and qualitative research. Students will develop a research proposal that will be completed in TLEN 5710 or as a Master's Thesis. Writing skills test required.

**Requisites:** Restricted to CYBR or BUSN graduate Students

**TLEN 5710 (1-3) Capstone**

Complete Capstone research project initiated in TLEN 5700.

**Repeatable:** Repeatable for up to 3.00 total credit hours.

**Requisites:** Requires prerequisite course of TLEN 5700. Restricted to TLEN or BUSN graduate students only.

**TLEN 5841 (3) Secure Web Application Development**

Learn to develop and protect secure applications for web and mobile. Students will develop in a production cloud environment mirroring industry trends. Techniques to resist attackers and increase situational awareness will be covered. The class culminates with an end of semester project applying secure coding techniques to build a secure web application from start to finish.

**Requisites:** Restricted to CSCI juniors and seniors, or TLEN or CSEN graduate students, or TLEN BS/MS students (C-AMENTLEN; C-CSCITLEN; C-CSENTLEN; C-ECENTLEN).

**Grading Basis:** Letter Grade

**TLEN 6438 (3) Internet Lab 2**

Builds on TLEN 5438 Internet Lab, and teaches students simple, hands-on understanding of the technical components and challenges of providing Internet Services to everyday users. This is the ideal course for students with a basic foundation of technology who have a passion for the Internet or need to have a more detailed understanding of network security and wireless networks within their career.

**Requisites:** Requires prerequisite TLEN 5438 (minimum grade B-).

**Grading Basis:** Letter Grade

**TLEN 7000 (1-6) Current Topics in Telecommunications**

Studies research topics of current interest in telecommunication and networking.

**Repeatable:** Repeatable for up to 8.00 total credit hours.

**Requisites:** Restricted to CYBR/TLEN graduate students.

**TLEN 7001 (3) Interdisciplinary Telecom Analysis**

Examines a set of problems, research methodologies and analytical techniques that are common to the research, problem solving and analysis of information and communications technology development and deployment issues. Looks critically at the strengths, limitations and underlying assumptions of key research and analysis approaches that relate business, economic and policy objectives to current and future telecommunications development and deployment efforts.

**Requisites:** Restricted to CYBR/TLEN graduate students.

**Grading Basis:** Letter Grade