SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: INTRODUCTION TO TELECOMMUNICATIONS

Code No.: CSN200 *Semester:* 3

Program: COMPUTER ENGINEERING TECHNICIAN
COMPUTER PROGRAMMER
COMPUTER NETWORK TECHNICIAN
COMPUTER SYSTEM SUPPORT TECHNICIAN

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Date: June , 1998 *Previous Outline Dated:* August 1997

Approved: Dean [signature] Date June 28/98

Total Credits: 4

Prerequisites: CSO100 or equivalent

Length of Course: 4 Hours/Week Total Credit Hours: 64

Introduction to Telecommunications — CSN200
COURSE NAME — *CODE NO.*

I. COURSE DESCRIPTION:

This course introduces students to modern telecommunications and data communications including standards, techniques, applications and devices involved in transmitting information over a distance. The course emphasis is on the fundamentals of data transmission, telecommunications equipment and concepts with lab activities supporting the theory.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

A. Learning outcomes:

1. Compare various telecommunications media and services, devices, standards and applications, enabling appropriate choices from among alternative technologies.

2. Use data communications terminology appropriately, enabling the effective use of journals, reference manuals and planning documents.

3. Describe the components, techniques and services comprising the public telecommunications system.

4. Use the Internet for effective information retrieval and display, research and communication in support of a technologist's role.

5. Utilize and configure communications hardware and software, modems and test equipment effectively.

B. Learning Outcomes and Elements of the Performance:

Upon successful completion of this course the student will demonstrate the ability to:

1. Compare various telecommunications media and services, devices, standards and applications, enabling appropriate choices from among alternative technologies.

Elements of the Performance:

- Describe the present and emerging uses of networks.
- Describe the important data communications standards organisations.
- Describe the EIA-232 serial interface standard, its interchange circuits, electrical and functional characteristics.
- Identify the characteristics of other relevant physical layer interface standards.
- Describe various communications media, cabling standards and their characteristics including : twisted-wire pairs, coaxial cable, microwave radio, satellite links and fibre-optic cable.
- Compare various data link protocols.

This learning outcome will constitute approximately 35% of the course.

2. Use data communications terminology appropriately, enabling the effective use of journals, reference manuals and planning documents.

Elements of the Performance:

- Describe the history and basic components of data communications systems.
- Describe basic data communications concepts including: serial vs. parallel communication, half duplex vs. full duplex communication, asynchronous vs. synchronous communication, point-to-point vs. multidrop.
- Utilise data communications reference manuals, catalogs and journals to identify the implementation of data communications theory in actual products and services.
- Use equipment and software manuals to find solutions to problems.
- Utilise the ISO OSI 7-layer model of computer networks to categorize communications activities by function.

This learning outcome will constitute approximately 15% of the course.

3. **Describe the components, techniques and services comprising the public telecommunications system.**

Elements of the Performance:

- Describe the important North American Common Carriers and the major services they provide.
- Describe the telecommunications system, the nature of telephone lines, circuits and switches.
- Describe digital communications, its advantages, A/D conversion, the sampling theorem, digital coding schemes and Pulse Code Modulation (PCM).
- Compare various wide area networking alternatives including switched and dedicated circuits, packet switched services, frame relay and ATM.
- Describe the use of various multiplexing techniques used to enable the efficient use of telecommunications equipment.
- Describe the nature of noise and transmission impairments, their measurement using decibels, and various remedies.

This learning outcome will constitute approximately 15% of the course.

4. **Use the Internet for effective information retrieval, research and communication in support of a technologist's role.**

Elements of the Performance:

- Describe the nature of the Internet and the various services it can provide.
- Use the services of the Internet for specified information retrieval tasks.
- Describe briefly the role of the TCP/IP protocols and their use in routing and transporting Internet packets.
- Utilise the World Wide Web and HTML to access and display information.

This learning outcome will constitute approximately 15% of the course.

5. **Utilise and configure communications hardware and software, modems and test equipment effectively.**

Elements of the Performance:

- Describe the nature of asynchronous transmission and its implementation in a PC serial port using a UART.
- Describe modulation techniques used in modems and the specific characteristics of various V-series modems.
- Set up and use modems and communication software effectively to enable communication over a distance.
- Describe error detection and correction techniques and the standards associated with them.
- Describe techniques and standards used for data compression and encryption.
- Use various PC file transfer protocols such as Kermit, Xmodem and ZModem to transfer files and compare their efficiency.
- Describe various flow control, error control and sequencing techniques used in file transfer and data link protocols.

This learning outcome will constitute approximately 20% of the course.

III. TOPICS TO BE COVERED:

1. Fundamental Data Communications Concepts and Terminology.

2. Network Applications including the use of the Internet.

3. The Telecommunications System.

4. Data Communication Hardware and Software.

IV. REQUIRED STUDENT RESOURCES/TEXTS:

TEXT BOOK:

"Business Data Communications and Networking" (6th Edition)
by Jerry Fitzgerald and Alan Dennis
(John Wiley and Sons, 1998)

V. EVALUATION PROCESS/GRADING SYSTEM:

3 WRITTEN TESTS	60%
LAB PROJECTS/QUIZZES and ASSIGNMENTS	35%
LAB ATTENDANCE	5%

(The percentages shown above may vary slightly if circumstances warrant.)

GRADING SYSTEM

A+	90	-	100%
A	80	-	89%
B	70	-	79%
C	55	-	69%
R	Repeat Less than 55%		
X	Incomplete		

NOTE: *It is required to pass both the theory and the lab part of this course. It is not possible to pass the course if a student has a failing average in the three written tests but is passing the lab portion, (or vice versa).*

UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 55%, there is the possibility of upgrading to a pass when a student meets all of the following criteria:

1. The student's attendance has been satisfactory.
2. An overall average of at least 45% has been achieved.
3. The student has not had a failing grade in all of the theory tests taken.
4. The student has made reasonable efforts to participate in class and complete assignments.

The nature of the upgrading requirements will be determined by the instructor and may involve one or more of the following: completion of existing labs and assignments, completion of additional assignments, re-testing on individual parts of the course or a comprehensive test on the entire course.

LABS:

Lab activities represent a very important component of this course. Because of this, **attendance is mandatory** and the satisfactory completion of all lab activities is required. *It is the student's responsibility to discuss absences from regularly scheduled labs with the instructor so that alternate arrangements (where possible) can be made to complete the lab requirements.*

LAB REPORTS
Required lab report requirements will be detailed for each lab individually.

ATTENDANCE:
Absenteeism will affect a student's ability to succeed in this course. Absences due to medical or other unavoidable circumstances should be discussed with the instructor.

VI. SPECIAL NOTES:

- **Special Needs**
  Students with special needs (e.g. physical limitations, visual or hearing impairments, or learning disabilities) are encouraged to discuss any required accommodations confidentially with the instructor and/or contact the Special Needs Office, (Room 1204, Ext. 493, 717, 491) so that support services can be arranged.

- **Retention of Course Outlines**
  It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.

- **Course Modifications**
  Your instructor reserves the right to make reasonable modifications to the course as deemed necessary to meet the needs of students or take advantage of new or different learning opportunities.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced standing in the course should consult the instructor. This course is not eligible for challenge at the present time.