SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: DIGITAL AND DATA COMMUNICATIONS

Code No.: ELN 305 - 6

Program: ELECTRONIC TECHNOLOGY

Semester: SIX

Date: AUGUST, 1985

Author: PETER SZILAGYI

New: ___X___   Revision: _____

APPROVED: _____   _____
Chairperson   Date

Communications Systems III   ELN 305-6
(Digital, Analog And Data Communication)

TOPIC DESCRIPTION	Hours

Block I : Spectral Analysis

1.1	Fourier Series And Signal Spectra	7
1.2	Fourier Integral and Continuous Spectra	4
	Test #1	1

Total Block I		12

Block II : Voice And Data Communication Over Analog Systems

2.1	Introduction	
2.2	Selected Telephone Network Concepts	8
2.3	Transmission Of Data Over An Analog System	11
	Test #2	1

Total Block II		20

Block III : Pusle And Digital Modulation

3.1	Analog Pulse Modulation	7
3.2	Digital Modulation	7
3.3	Effect Of Noise And Distortion On Digital Transmission	2
	Test #3	1

Total Block III		17

Block IV : Information Theory

4.1	Information Content And Capacity	2
4.2	Pulse Transmission Over Bandlimited Systems	6
4.3	Coding	6
	Test $4	1

Total Block IV		15

2.2 Continued
- touch tone decoders
- characteristic impedance and propagation constant of a telephone line
- frequency division multiplexing
- frequency division of standard CCITT GROUPS
- formation and detection of CCITT groups
- types of trunk circuits
- switching facilities
- four wire terminating set
- network stability
- noise, distortion, crosstalk
- group delay
- delay equalizer
- dynamic compandors

2.3 Transmission Of Data Over An Analog System
- skin effect, proximity effect and radiation
- line detector and decision threshold
- bandwidth limiting of a pulse train
- 20 MA loop
- USART
- line drivers . balanced and unbalanced lines
- baud rate and bit rate
- modems . data link employing modems
- frequency utilization of half duplex and full duplex modems
- modem modulation techniques
- ASK
- FSK
- PSK, BPSK, DPSK
- four phase
- QUAM
- phasorial and mathematical analysis of modems
- (E1A) RS-232-C specifications
- T 103A data set
- modem chips

Block III : Pulse And Digital Modulation

3.1 Analog Pulse Modulation
- time sampling techniques
- the Sampling Theorem
- natural sampling
- frequency spectrum of natural sampled waveform
- line spectrum of the switching function
- aliasing
- flat top (sample and hold) sampling
- frequency spectrum of sample and hold signal
- filter characteristics
- time division multiplexing
- IC analog multiplexer
- pulse amplitude, pulse duration and pulse position modulation
- generation, transmission, recover and conversion of PAM, PDM (PWM) and PPM

BIQUINARY, GRAY
- error detection and correction
- hamming distance
- cyclic codes
- hamming codes
- line codes : RZ, NRZ, AMI, HDB3
- channel throughput and efficiency