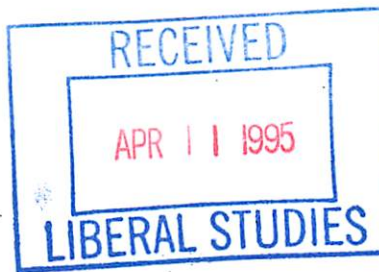


LSC Use Only
Number: _____
Submission Date: _____
Action-Date: _____



95-17
94-96
UWUCC USE Only
Number: _____
Submission Date: App 10/24/95
Action-Date: Senate App 12/5/95

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person James L. Wolfe Phone x6104

Department Computer Science

II. PROPOSAL TYPE (Check All Appropriate Lines)

COURSE Data Communications
Suggested 20 character title

New Course* _____
Course Number and Full Title

Course Revision CO 345 Data Communications
Course Number and Full Title

Liberal Studies Approval+ _____
for new or existing course Course Number and Full Title

Course Deletion _____
Course Number and Full Title

Number and/or Title Change _____
Old Number and/or Full Old Title

New Number and/or Full New Title

Course or Catalog Description Change _____
Course Number and Full Title

PROGRAM: Major Minor Track

New Program* _____
Program Name

Program Revision* _____
Program Name

Program Deletion* _____
Program Name

Title Change _____
Old Program Name

New Program Name

III. Approvals (signatures and date)

[Signature]
Department Curriculum Committee

[Signature]
Department Chair

[Signature]
College Curriculum Committee

[Signature]
College Dean

+ Director of Liberal Studies (where applicable)

*Provost (where applicable)

Part II. Description of the Curriculum Change

1. Catalog Description and New Syllabus

CO 345 Data Communications 3c-01-3sh
Prerequisites: CO 110 or CO 220, MA 214, MA 216, or MA 217,
MA 121 or MA 123, or equivalents
Communications of digital data between computers and to and
from terminals and other peripherals; computer networks; small
design projects or term paper.

New Syllabus - see attachment A

2. Summary of proposed revision.

The prerequisites make CO 220 optional (an alternative to CO 110) and add a calculus course (MA 121 or MA 123). Also, the use of design projects is deemphasized.

3. Rationale for the revision.

The change of requirement for CO 220 reflects the department's opinion that one programming course provides sufficient background to handle CO 345.

The addition of a calculus prerequisite is to make it possible to introduce material based on an understanding of derivatives. Reference to derivatives makes it possible to explain certain material in a far simpler manner than if the same material is explained without the use of derivatives.

The deemphasis of design projects is a reflection of contents of recent textbooks. Formerly, it was possible for a student to have his/her entire grade for the course based on a large programming design project. However, some recent textbooks provide the complete programs for many of the large reasonable design projects. So, it is no longer practical to allow students the alternative of basing their entire grade on a project which can simply be copied from a book.

4. Old syllabus.

See attachment B

5. Letters of Support.

See attachment C.



I. Catalog Description

CO 345 Data Communications 3c-01-3sh

Prerequisites: CO 110 or CO 220, and MA 214, 216, or 217, and MA 121 or 123, or equivalents.

Communication of digital data between computers and to and from terminals and other peripherals; computer networks; small design projects or term paper.

II. Course Objectives

Upon successful completion of this course, the student will be able to:

- A. Describe the basics of both analog and digital communication concepts.
- B. Explain the architecture of a data communications network organized around the OSI (Open Systems Interconnection) seven-layer model.
- C. Describe the services provided in each layer of a data communications network.
- D. Acquire the background knowledge necessary to participate in ongoing developments in telecommunications.
- E. Perceive the necessity for complexity management, standardization for connectivity, and resource sharing.
- F. Explain the methodology and the rationale behind addressing and routing.
- G. Resolve the various multiplexing and switching methods used in data communications networks.
- H. Describe the common protocols used in data communications networks and resolve their relative efficiencies.
- I. Use the currently available data communications services (ex. The Internet and its associated software).

III. Detailed Course Outline

- A. Introduction to Communication Networks. (1 hour)**
 - 1. Evolution of communication networks
 - 2. Network goals
 - 3. Uses of communication networks.

- B. Network Design Principles (3 hours)**
 - 1. Network services and architecture
 - 2. Switching and multiplexing
 - 3. Data transmission in networks
 - 4. Network architectures
 - 5. The OSI model
 - 6. Public networks

- C. The Physical Layer (5 hours)**
 - 1. Signal propagation
 - 2. Optical transmission
 - 3. Modulation schemes
 - 4. Error control techniques

- D. Data Link Layer Protocols (5 hours)**
 - 1. Overview of protocols
 - 2. The Alternating Bit protocol
 - 3. The Selective Repeat protocol
 - 4. The Go Back N protocol
 - 5. Protocol performance determination

- E. Local Area Networks (6 hours)**
 - 1. The medium access sublayer
 - 2. The ALOHA protocols
 - 3. The IEEE 802 standards
 - 4. Ethernet
 - 5. Token Bus networks
 - 6. Token Ring networks
 - 7. Fiber Optic networks
 - 8. Satellite and radio networks
 - 9. The logical link control sublayer

- F. The Network Layer (5 hours)**
 - 1. Naming and addressing
 - 2. Routing and routing algorithms
 - 3. Congestion control algorithms

Attachment A

- G. The Transport Layer (3 hours)
 - 1. Transport service primitives
 - 2. Transport protocols
 - 3. Connection management
- H. The Session Layer (3 hours)
 - 1. Dialog management
 - 2. Synchronization
 - 3. Exception reporting
 - 4. Remote procedure calls
- I. The Presentation Layer (5 hours)
 - 1. Abstract Syntax Notation 1 (ANS.1)
 - 2. Data compression techniques
 - 3. Cryptography
- J. The Application Layer (3 hours)
 - 1. Technical and Office Protocols, Manufacturing Automation Protocol
 - 2. File Transfer Protocol, Electronic mail, TELNET, etc.
 - 3. Virtual terminals, Job transfer and manipulation, Message-handling system
 - 4. Directory services, Remote logins
 - 5. Network File system
 - 6. NetBIOS

IV. Evaluation Methods

- 50% Examinations. Two exams during the semester and one final exam. Examinations will consist of short-answer, calculation, and analysis questions.
- 40% Projects/Term paper. Selected projects (directly related to the objectives of the course) including work on computers (mainframe and/or microcomputers) worth varying points. Alternatively, a term paper related to the objectives of the course may replace these.
- 10% Quizzes. Quizzes (which need not be announced before hand) based on the material discussed so far in the course.

Suggested Grading Scale:

<u>% of Max Points</u>	<u>Grade</u>
91 through 100	A
81 through 90	B
71 through 80	C
61 through 70	D
below 61	F

Attachment A

V. Required Textbook(s), Supplementary Books and Readings

Walrand, Jean, *Communications Networks: A First Course*, Asken Associates Inc., Boston, MA 1991.

VI. Special Resource Requirements

No special resources required.

VII. Bibliography

Black, U., *Data Networks: Concepts, Theory, and Practice*, Prentice-Hall, Inc., Englewood Cliffs, NJ 1989.

Fitzgerald, J., *Business Data Communications: Basic concepts, Security, and Design*, (Fourth Edition), John Wiley and Sons, Inc., New York, NY 1993.

Held, G., *Data Communications Networking Devices*, (Second Edition), John Wiley and Sons, New York, NY 1990.

Moshos, G.J., *Data Communications: Principles and Problems*, West Publishing Co., St. Paul, MN 1989.

Stallings, W., *Data and Computer Communications*, (Fourth Edition), Macmillan Publishing Company, New York, NY 1994.

Tanenbaum, A.S., *Computer Networks*, (Second Edition), Prentice-Hall, Inc., Englewood Cliffs, NJ 1989.

CS345 Data Communications - 3 credits

Prerequisites: CO 110, CO 220, and MA 214, 216, 217,
or equivalents

Text: Data Communications, Dixon R. Doll.

Catalog Description: Communication of digital data between computers, and to and from terminals and other peripherals; computer networks; common carrier services and facilities.

Course Topics:

1. Introduction
 - A. Types of Network Organizations
Centralized vs. Distributed
Generalized Communication vs. Teleprocessing
 - B. Regulatory Environment
2. Terminology and Components
 - A. Multipoint, point-to-point, dedicated, switched.
 - B. Signal Converter, multiplexer, concentrator.
 - C. Simplex, duplex, two-wire, four-wire.
 - D. Asynchronous, synchronous, baud rate.
3. Common Carrier Services
 - A. Switched: DDD, WATS, CSA.
 - B. Dedicated: Voice grade, wide band. DDS.
 - C. Specialized and Value added
Satellite, MCI, Datran
4. Telecommunications Transmission Facilities
 - A. Analog vs. Digital
Pulse Code Modulation and T-Carriers
Frequency hierarchy and multiplexing
 - B. Channel Capacity
Local loops and loading coils
Nyquist, Shannon, decibel, noise
 - C. Distortion
Attenuation, Delay, Phase, Impulse Conditioning
 - D. Control Signals
Echo Suppression, Remote error checking
5. Signal Conversion Devices
 - A. Modulation Techniques
Amplitude, Frequency, Phase
 - B. Modems
Asynchronous, Synchronous
Half duplex, Full duplex, Reverse Channel

6. Data Communication Terminals
 - A. Slow Speed Interactive Terminals
 - B. Transaction Terminal
 - C. Batch Processing Terminals
 - D. Work Stations - Distributed Processing
 - E. Transmission Code
 - F. Signal Converter Interface
7. Controlling Transmission Errors
 - A. Error Detection Codes
 - Parity checking one and two dimensional
 - Cyclic Codes
 - Constant Ratio
 - B. Error Correction
 - Automatic Retransmission (ARG)
 - Stop-and-wait
 - Continuous
 - Go-Back-N
 - Selective Retransmission
 - Forward Error Correction
8. Multiplexing and Concentration Techniques
 - A. Multiplexers
 - Frequency-Division
 - Synchronous Time-Division
 - Statistical Time - Division
 - B. Concentrators
 - Line and Circuit Switching
 - Message and Packet Switching
9. Line Control Procedures
 - A. Line Control - Contention and Polling
 - Binary Synchronous Communications (BSC)
 - Synchronous Data Link Control (SDLC)
 - B. Path and Network Control
 - System Network Architecture (SNA)
 - DECNET
 - Packet Switching
 - C. Network Security

Requirement: Term Paper or Programming Project.
Three Hours of Examinations Plus the Final Examination.

To: James Wolfe, Chairman
Computer Science Curriculum Committee

From: Gerald Buriok, Chairman *gmb*
Mathematics Department

Date: September 27, 1995

Subject: CO 345 Data Communications

The Mathematics Department supports the proposed change in prerequisites for CO 345 to include MA 121 or MA 123 or equivalents. This should have little or no impact on enrollments in these mathematics courses since Computer Science majors take calculus in their freshman year.

16 October 1995

To: Darlene Richardson
Jodell Kuzneski

From: Jim Wolfe, *JW*
Chair Department Curriculum Committee
Computer Science Department

Subject: Course Revision for CO 345

revised proposal

On September 27, I received the following e-mail message from Mrs. Kuzneski which contained a number of questions about the proposed revision of CO 345. I have attached most of that letter below with a response to each question. I have also attached a revised CO 345 proposal that includes all of the changes cited. I hope that these revisions are satisfactory. If not, please let me know and I will try to respond to any other questions you may have.

From: GROVE::KUZNESKI "JODELL KUZNESKI" 27-SEP-1995
To: JLWOLFE
CC: GLBUTER, DRCHRDSN, ME
Subj: Course proposal for CO 345

As chair of the Senate Undergraduate Curriculum Committee, I am forwarding to you the following questions that the committee has re: the course revision proposal for CO 345. Although one member of our committee has already contacted you with a few questions, the following items need further clarification before the committee will act on the proposal.

Questions/comments:

1. Evaluation criteria: "two mid-term exams" is confusing, please clarify.

This phrase has been replaced with, "Two exams during the semester."

2. Please include a grading scale that will be used to determine how the letter grades of A, B, C, D and F will be defined.

A suggested grading scale has been added under evaluation methods.

3. You suggested to Ron Wade, the committee member who contacted you, that it would be OK to just scratch your reference to the evaluation criteria of "100% project" yet if that is done, there is an inconsistency with the course description.

As I indicated during the phone conversations with Ron Wade and Mrs. Kuzneski, it is no longer practical to have a project that counts 100% of the grade. However, it is still reasonable to have small design projects. The course description has been changed to refer to "small design projects" and the evaluation methods have been adjusted to indicate how these projects count relative to other components of the course.

4. There is reference to the attached syllabus as being the most recent version which is "currently being re-written". Is the attachment the current syllabus or is there another version being written that we need to see?

The syllabus attached to the revised course revision proposal, dated October 1994, is the new proposed syllabus. This syllabus is now in syllabus-of-record format; it is the one that was referred to as being rewritten. At the time the original proposal went to the college committee, this proposed syllabus was not in syllabus-of-record format. I should have eliminated the "rewritten" statement when the proposal was passed on to your committee; by then the proper syllabus was already attached.

5. There is a statement that a syllabus of record is not available. If there is no record in the department office, you may want to consider locating the syllabus of record from the Senate archives housed in special collections in the library.

After much digging, a previous syllabus (c. 1980) was found and is attached. The only syllabus I could find in the Senate archives was the one from original course proposal in 1976. Incidentally, although a cursory glance might tend to make one think the 1980 syllabus and the current (1994) syllabus are quite different, they are not. The 1994 syllabus reflects the current terminology and is organized around the framework of the OSI seven-layer network model which was only being developed in 1980.

During the phone conversation with Mrs. Kuzneski, she asked for a statement from the Mathematics Department regarding the impact of requiring calculus for CO 345.

A letter of support for the proposal and a comment about the impact of the calculus requirement is attached under "Letters of Support."