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Returned 3/18/97

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. **CONTACT**

Contact Person Dr. Richard A. Halapin Phone 357-5777

Department MIS and Decision Sciences

II. **PROPOSAL TYPE (Check All Appropriate Lines)**

X **COURSE** Network Admin
Suggested 20 character title

X New Course* IM 352 Computer Network Installation and Administration
Course Number and Full Title

____ Course Revision _____
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)

Louise B. Burky
Department Curriculum Committee

Kenneth L. Shuldt
Department Chair

[signature]
College Curriculum Committee

[signature]
College Dean

+Director of Liberal Studies (where applicable)

*Provost (where applicable)

SYLLABUS OF RECORD

I. Catalog Description

IM 352, Network Installation and Administration — 3 credits, 3 lecture hours, 3 lab hours (3c-3l-3sh)

Prerequisites: IM 350 or OS 313, Jr. Standing

Beginning with a discussion of networking theory the course teaches the student basic network skills and the fundamentals of network security and network utilities. The class emphasizes hands-on instruction which combines lecture and lab activities.

Administration tasks covered in the course include installing network servers, performing basic workstation skills, configuring network resources, managing networks involving multiple servers, creating an effective security system, setting up network printing and creating workstation automation.

Students who complete this course will be able to assemble a network and accomplish the fundamental network management skills in several network environments. A typical student could become a first-time administrator who assumes responsibility for the daily operational management of an installed network. Prerequisites are a good understanding of DOS and directory structures, and familiarity with networking technology.

II. Course Objectives

This course is designed to provide MIS and other qualified students with the necessary knowledge and skills to perform competently in the role of network administrator or system manager.

Students completing this course will be able to accomplish basic and fundamental network management tasks. They will gain first hand experience with management tasks performed routinely as network administrators. On course completion students will be able to do the following:

-- Perform basic workstation skills, connect the workstation, log in to the network, access and use command line utilities, menu utilities, help systems, on-line documentation, create login scripts, and menu systems.

-- Set up a network servers and file systems by managing volumes, directory structures, directories, and master file access.

-- Perform basic server skills such as executing console commands, loading programs's, remotely accessing the server console, and establishing server security.

-- Set up network printing by configuring and bringing up a print p9p5 server, print queue, and printer; perform basic printing tasks and create workstation automation.

-- Create an effective security system by establishing and managing user accounts, and log in restrictions, directory and file trustee rights, file attributes, server access control, and workstation security.

-- Implement the network auditing function to enhance the security and integrity of network transactions.

III. Course Outline

A. Network Theory and Design (30 percent)

1. Network Media and Topology

2. Connectivity and Network Services

B. Network Installation (20 percent)

1. Connecting the Network Hardware

2. Installing the Server

3. Installing DOS and Windows Clients

C. Network Architecture (20 percent)

1. Planning and Accessing Network File Systems
2. Managing Network File Systems
3. Backing Up and Restoring Network Data

D. Network Security and Services (30 percent)

1. Implementing Login and File System Security
2. Creating Login Scripts and User Menus
3. Implementing and Managing Network Print Services
4. Implementing and Managing Electronic Mail
5. Installing Application Services and Hardware

IV. Evaluation Methods

The final grade for the course will be determined as follows:

40% Tests. Two tests (mid-term and final) consisting of multiple choice and true-false questions. 100 points each.

50% Performance test. Each student will be expected to install servers, workstations, and ancillary hardware on two networks of significant and prominent business use, e.g., Novell NetWare and Windows NT.

10% Research Paper. Each student will prepare a 4-8 page paper and presentation comparing the features of the above installed networks to two other networks of significant and prominent business use, e.g., Banyan Vines and Unix.

V. Required textbooks, supplemental books and readings

Textbook: Cohen, Alan M., A Guide to Networking, Boyd & Fraser Publishing Co., Danvers, MA, Ed. 2, 1995

Textbook: Rains, Alvin L. and Michael J. Palmer, Local Area Networking with Novell Software, Boyd & Fraser Publishing Co., Danvers, MA, 1994

Textbook: Stamper, David A., Local Area Networks, The Benjamin/Cummings Publishing Co., Redwood City, CA, 1994

VI. Special resource requirements

Hardware. Hardware support for IM 352, Network Installation and Administration will be provided in the form of a dedicated microcomputer laboratory. Equipment requirements are intended to provide hands-on training in all aspects of managing computer networks. Training will include network hardware assembly and disassembly including major components such as file servers, work stations, laser printers, scanners, network facsimile machines, CD-ROM drives, and LAN gateways.

Software. Software support will include a complete suite of operating system, network management, and application software designed for network use. MIS majors must be able to support network users and manage hardware maintenance technicians to be effective in the business world of tomorrow. Their training should include all aspects of network management which requires hands-on training in network management and user application software. In depth capabilities in network design, construction, and management will be an over-riding goal.

VII. Bibliography

Black, Uyless D., Data Communications and Distributed Networks, Prentice-Hall, Englewood Cliffs, NJ, 1987

Black, Uyless D., Data Networks, Prentice-Hall, Englewood Cliffs, NJ, 1989

Comer, Douglas E., Internetworking with TCP/IP, Prentice-Hall, Englewood Cliffs, NJ, 1988

Ellis, Robert L., Designing Data Networks, Prentice-Hall, Englewood Cliffs, NJ, 1986

Martin, James, Telecommunications and the Computer, Prentice-Hall, Englewood Cliffs, NJ, 1990

Quarterman, John S. and Smoot Carl-Mitchell, The Internet Connection, Addison-Wesley Publishing Co., Reading, MA, 1994

Rowe, Stanford H., Business Telecommunications, Science Research Associates, Chicago, 1988

Smoot Carl-Mitchell and John S. Quarterman, Practical Internetworking with TCP/IP and Unix, Addison-Wesley Publishing Co., Reading, MA, 1993

Spragins, John D., Telecommunications: Protocols and Design, Addison-Wesley Publishing Co., Reading, MA, 1991

Stallings, William, Business Data Communications, Macmillan Publishing Co, New York, NY, Ed. 3, 1990

Stallings, William, Data and Computer Communications, Macmillan Publishing Co, New York, NY, Ed. 3, 1988

Stallings, William, Local Networks, Macmillan Publishing Co, New York, NY, Ed. 3, 1990

COURSE ANALYSIS QUESTIONNAIRE

A. Details of the Course

A1 This course will be an elective for students in the B.S. in the Management Information Systems program. It is not required by any major nor intended for inclusion in the Liberal Studies program.

A2 This course does not require changes in any other courses or programs in the department.

A3 This course has never been offered at IUP.

A4 This course is not intended to be dual level.

A5 This course is not to be taken for variable credit.

A6 This course responds to rapidly changing business needs for network knowledgeable MIS program graduates and is typically not offered in other Colleges of Business.

A7 This elective course is not required to meet any College of Business or other accreditation standards.

B. Interdisciplinary Implications

B1 This course will not be team taught.

B2 This course does not overlap with any other courses at the University.

B3 No special reservations will be implemented.

C. Implementation

C1 No new faculty are needed to teach this course. One section of this course can be accommodated in the Spring semester teaching schedule every year. Any course load adjustments can be accomplished through rescheduling of IM 101, Computer Literacy teaching load.

C2 Other Resources

a. Current space allocations are adequate to offer this course.

b. The department will use the computer facilities of the College of Business for this course.

c. The department budget is sufficient to purchase supplies for this course.

d. Library holdings are adequate and mainframe resources will be neither utilized or nor required.

e. A small amount ($100) of travel funds may be needed to rent vans to transport students to observe modern corporation network installations.

C3 No grant funds are associated with this course.

C4 This course will be offered once every year in the Spring.

C5 One section of the course will be offered at a time.

C6 A maximum of twenty students will be accommodated in this course. The nature of the lab activities restricts enrollment to this number.

C7 Enrollments are not mandated or recommended by any society.

D. Miscellaneous

No additional information is necessary.

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21 November 1996

To: Ken Shildt, Chair
MIS and Decision Sciences Department

From: Jim Wolfe, Chair Curriculum Committee, and
Bill Oblitey, Department Chair,
Computer Science Department

Subject: Course Proposals for IM 352 and IM 354

As you may be aware, the Curriculum Committee of the Computer Science Department reviewed the proposals for these two courses once before. Rich Halapin sent us draft copies of the proposals near the beginning of 1996. In March, the committee sent him a letter expressing our concerns about these two courses. A copy of that letter is attached.

A line by line comparison between the draft proposals and the proposals you sent attached to your letter of November 6, shows very little change has been made since we saw the drafts. The only change that we can detect that addresses any of the issues we raised in our letter of 19 March is that the course outline now shows time percentages associated with each topic. There are also changes in the course objectives for IM 354 (a paragraph with many unexplained abbreviations has been added and two previous objectives related to routers, bridges, and gateways were removed - even though the course outline still includes this material).

Because so little has changed, we feel that nearly all of the concerns we expressed in the letter of 19 March remain concerns today. Further, we are distressed that the problems we pointed out, the suggested solutions we gave, and the cooperation we offered in relation to a proposed CO 245 (Local Area Network Analysis and Design) all seem to have been ignored. Following is a summary list of our continuing concerns.

1. Neither IM 352 nor IM 354 (but especially IM 352) includes sufficient network theory and concepts to give the students taking these courses an understanding of WHY they should take various management actions. Without concepts, these courses take on a cookbook nature; and the student's "knowledge" of networks is incomplete.

2. Neither course requires a prerequisite course, such as CO 345, that does provide the needed concepts and theory.

3. The statement under B2, "This course does not overlap with any other courses at the University." appears to be patently false (especially for IM 354) when one looks at the syllabus of record for CO 345. At least ten topics that appear in the IM 354 course outline (accounting for approximately 30% of the course) are essentially identical to topics in CO 345. See the attached, annotated syllabus of record for CO 345.

4. The hardware needs for these courses are substantial. The facilities of the College of Business are also substantial; however, we would expect greater clarification under C2 considering that the resources needed would seem to require exclusive use.

5. Given that these courses entail three hours of lecture and three hours of lab per week, the course load for faculty and the credit value for students seems to be addressed incompletely in C1 and A1.

We find the first three of these concerns sufficient cause to not support the establishment of the two courses in the proposed forms. We are not saying that there should be no course on Local Area Networks. As indicated above, we have been working on one ourselves. We simply think that network courses should be more substantial and should fit in with and take advantage of a course already in existence.

19 March 1996

To: Dr. Richard Halapin

From: Jim Wolfe,
Chair, Computer Science Curriculum Committee

Subject: IM 352 and IM 354 Proposals

The Computer Science Curriculum Committee has several reservations regarding your IM 352 and IM 354 course proposals. We explain these reservations in the following sections.

Comments about IM 352

The course description and the course outline indicate that some networking theory will be covered; however, no hours or course percentages are shown for the various topics in the outline. Thus, we could not determine how much time would be devoted to network theory and design. We feel that for a student to appreciate what s/he is doing when installing, configuring, and managing a LAN, the student must have sufficient conceptual understanding of networks and communications theory. Without conceptual understanding, the student simply goes through the motions. But, the more network theory that you add to IM 352, the more it overlaps with an existing course - CO 345, Data Communications. You would seem to be in a "Catch-22" situation here - if you teach the theory, you overlap with CO 345; and if you don't teach the theory, the students will have an incomplete understanding of network implementation. Perhaps, you should consider CO 345 as a prerequisite.

Second, we are concerned about the laboratory environment and resource needs for this course. The performance test under IV. Evaluation Methods suggests that each student would do an installation of two types of network software. With twenty students in the course, at least twenty machines would be required, unless students work in shifts throughout the term - a situation that would be hard to match lectures to. Further, the machines used for installation would NOT be available for ANY other use. Each partially installed system could not be used for other lab work. Thus, this course will tie up considerable resources for long periods of time.

Comments about IM 354

Several of this course's objectives seem to be covered in the material for IM 352, including objectives 1., 2., and part of 5. This duplication also appears in the course outline - topic A is a repeat from IM 352; topics B and C should need to be covered in IM 352 in order to for the students to understand and complete an installation.

There is a serious overlap in the IM 354 course outline with the

material in CO 345. Again, it is not possible to determine the time overlap because times were not associated with the topics; however, OSI is really a key topic of CO 345 and the topics Repeaters and Bridges, Routers and Gateways, and MAN/WAN Links are all covered in CO 345.

We have the same laboratory environment and resource concerns for IM 354 as for IM 352; however, there is an additional complicating factor. For IM 352, the machines start bare and the network is to be installed during the term. But for IM 354, the machines already have a network installed and optimization is to be done throughout the term. This means that between semesters, all machines used in IM 354 must have network software correctly installed **before** the course can begin; and if any student's optimization actions destroy aspects of the initial installation, there must be a means of reinstalling the network software quickly and efficiently. This task may present a substantial course management problem.

Comments about both IM 352 and IM 354

The load of 3 lectures hours and 3 lab hours to get 3 credits may present an unappealing prospect to students. If you believe that this much contact time is needed, perhaps you should consider making these 4-credit courses?

Will the teaching load for each course be the equivalent of a 6-hour load or a 3-hour load for faculty? We doubt that APSCUF would allow the course to represent a 3-hour load. If the load is 6 hours, you should acknowledge the potential elimination of **two** IM 101 sections in the Course Analysis Questionnaire section C1.

Also, we believe that in the Course Analysis Questionnaire you should acknowledge the relationship of IM 352 and IM 354 to CO 345 under section B2. Further, we believe that you should either acknowledge the resource impact more fully under section C2 or indicate how you intend to make the impact less than we suggest.

For Your Consideration

Enclosed is a copy of Bill Oblitey's proposal for CO 245, LAN Analysis and Design. The Computer Science Curriculum Committee has been considering Bill's proposal for almost a year. We have even asked that he get comments on his proposal back in September. He did get comments from Office Systems and from Communications Media; we didn't know that you were working on a similar course at the time. The committee has yet to iron out all the problems we see in CO 245, including a couple that we are noting about your proposals as well. If you examine the CO 245 proposal, you should see a great deal of similarity to your IM 352 and IM 354 proposals. Perhaps we should be working together more closely on LAN related courses; we seem to be headed in similar directions. The Curriculum Committee is not opposed to a joint course proposal, once all the bugs are worked out.

CO 345 - Syllabus of Record

October 1994

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

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:

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

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.

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RECEIVED
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Indiana, Pennsylvania 15705

Date: February 3, 1997

Subject: Course Proposals for IM352 and IM354

To: UWCC

From: Dr. Richard A. Halapin
MIS and Decision Sciences Department

The Computer Science Department Curriculum Committee Chair (CSDCCC), Jim Wolfe, has expressed several opinions regarding the above course proposals from the Management Information Systems and Decision Sciences Department. A very insightful one is that the course will require considerable resources for long periods of time. It should be noted by the UWCC that the Eberly College of Business (ECOB) considers the understanding of business networks of such great business importance that all necessary resources have been fully committed to support the courses. Approximately $200,000 has been expended for hardware and software to outfit the Network Intensive Management Information Systems (NIMIS) lab. NIMIS is a dedicated business networks lab, totally restricted to teaching the above courses. The NIMIS lab contains in excess of 24 pentium computers, and sufficient network cards, hubs, bridges and cabling to build 4 to 6 independent networks using several protocols and wiring schemes. These resources are sufficient to allow one, and only one, section of students to build business networks and implement business network services on peer-to-peer and several client/server networks, including Novell Netware and Microsoft Windows NT. And, as correctly observed by the CSDCCC, it is absolutely necessary that the NIMIS lab resources NOT be available for ANY other use, as is the case.

The ECOB commitment in creating the NIMIS lab provides a unique business networks resource not duplicated elsewhere on campus. Consequently, it is patently true that the courses can not significantly duplicate the type of instruction available in other campus courses. The courses fully reflect MIS Department efforts to maximize student hands-on computer activities as is done in IM101 Microbased Computer Literacy, IM201 Internet and Multimedia, IM372 Advanced Microcomputers and many other MIS business courses. Fortunately for our students, and as pointed out by CSDCCC, the business hardware facilities of ECOB are indeed substantial and furthermore, totally dedicated to the benefit of our business students.

In considering prerequisites for the course, a number of possibilities, beyond those chosen, where considered. They included IM480 Distributed Business Information Systems, taught in the MIS Department, and OS400 Telecommunications, taught in the Office Systems and Business Education Department. These courses include various aspects of networks although the focus is on the classroom setting and theory. In particular, IM480 stresses WANs and older aspects of mainframe business network theory encompassed in systems such as Bisync, SDLC, DDCMP, and the OSI model of the 1970s and early 80s. Although such courses would have provided interesting historical background, it was felt that modern hardware and operating system aspects covered in the prerequisite courses ultimately identified, offered more favorable preparation for the network courses. Furthermore, piling on an additional upper level prerequisite course would make it very difficult or impossible for our business students to complete those prerequisites in time to take the upper level business networks courses.

The IM480 course has been around for a very long time, receiving UWCC approval in the late 1970s. The CO345 course duplicates much or all of what is covered in IM480. In fact, MIS majors are encouraged to take CO345 when they want background on wide area networks and IM480 is not offered timely to their graduation. Knowledge of the historic 7-layer OSI model that the students receive in either IM480 or CO345 is certainly not to be discouraged. However, as only the bottom 2 of the 7 levels are relevant to most LAN implementations, that material (physical and data link layer) can be readily delivered during hands-on sessions. The students will work with network cards, connectors, and cabling that make up physical layer in a way that theory can never touch. The remaining relevant layer (data link) will be studied and understood as the students install and configure the LAN software that implements data link theory. In retrospect, the proposed courses would be excellent preparation for business students who could further study the historical foundations of wide area networks in the non-hands-on environment of either IM480 or CO345.

The UWCC should be assured of the following:

- Careful consideration of needs of our business students and preparing them for success in the business world has gone into the development of MIS course proposals. Difficult choices are not made lightly.

- Considerable ECOB resources have been marshaled and dedicated to our students for this effort. The insight of CSDCCC in recognizing the magnitude of that necessary commitment is to be applauded.

- The proposal preparation included thoughtful consideration of prerequisite alternatives. Student knowledge of modern hardware and operating systems was deemed to be preferable to historical knowledge of wide area and upper-layer network concepts only marginally related to LANs.

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#2 26-FEB-1997 11:48:33.26 NEWMAIL

From: GROVE::KUZNESKI "JODELL KUZNESKI"
To: HALAPIN, KSHILDT
CC: JLWOLFE, OBLITEY, JSECK, BOBCAMP, @UWUCC
Subj: proposals for IM 352 and IM 354

Dr. Halapin:

I received the copy of your memo to the UWUCC dated 2-3-97. At the UWUCC meeting yesterday, I verified with the sub-committee that originally screened the IM proposals that they had indeed considered the comments in your memo before recommending to me that the proposals be returned to you for further deliberation. The screening committe and I stand by the decision to return these proposals to you.

I would like to add a personal apology for incorrectly spelling your last name and Dr. Shildt's last name in the memo I sent to you.

MAIL>