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LIBERAL STUDIES

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Senate App 2/29/00

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person William Oblitey Phone 7-2524

Department Computer Science

II. PROPOSAL TYPE (Check All Appropriate Lines)

X **COURSE** Test & Control LANs
Suggested 20 character title

X New Course* CO/IM 354 Testing and Controlling LANs
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)

Department Curriculum Committee

Department Chair

College Curriculum Committee

College Dean

+Director of Liberal Studies (where applicable)

*Provost (where applicable)

CO 354 & IM 354 - Testing and Controlling LANs

I. Catalog Description

CO 354 & IM 354 Testing and Controlling LANs 3c-01-3sh

Prerequisites: CO 352 or IM 352 or equivalent

This course explores local area network (LAN) topologies and their associated protocols. The course introduces ways of interconnecting, securing, and maintaining LANs. It provides students with hands-on experience in the interconnection of multiple LANs. It also presents a hands-on approach to design, testing and administration of interconnected LANs.

II. Course Objectives

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

A. Match various LAN topologies with their associated protocols.

B. Interconnect separate LANs.

C. Distinguish between the different LAN interconnection devices and their operation.

D. Distinguish between various IEEE (institute of Electrical and Electronic Engineers) 802 Standard LAN packets.

E. Discern common LAN problems and develop solutions for them.

F. Manage, optimize, and monitor the performance of LANs.

III. Detailed Course Outline

1. LAN Transport Systems, Protocols and Topologies. (6 hours)
An overview of the common topologies and protocols of LANs and an in-depth look at LAN architectures in light of the various IEEE 802 standards. A look at LANs as an alternative to a mainframe.

2. LAN Testing and Support (3 hours)
Examination of the common problems that result with the connection of various LAN

components. Resolving conflicts of NICs (Network Interface Cards) and IRQs (Interrupt Requests) and I/O (Input and Output) addresses. Ways of solving cabling problems. A look at some of the methods for testing devices used with LANs, for example multimedia systems.

3. LAN Interconnection Concepts and Devices (9 hours)
A study of the various ways of connecting LANs to each other. A detailed look at the connectivity devices for connecting LANs to each other and those for connecting LANs to MANs (Metropolitan-Area Networks) and WANs (Wide-Area Networks). A hands-on interconnection of independent LANs in the laboratory.

4. Remote Access to LANs (6 hours)
Study of methods of accessing local area networks from remote locations and identification of the security options available with remote access servers. A look at wireless LAN Standards. Examining remote-boot PROMs (Programmable Read Only Memories).

5. LAN Performance Monitoring (6 hours)
A look at the basic LAN performance measures: throughput and message delay. Study of permissions and rights on LANs. The process of auditing network accounts. Methods of monitoring and tracking network performance. Methods of protecting sensitive information on LANs through control of access points..

6. Fault-Tolerance Techniques for LANs (3 hours)
The process of locating and correcting network problems. Effects of Redundancy. Disk mirroring, disk duplexing, RAID technology (Redundant Array of Inexpensive Disks), Disk and tape backup strategies, Virus protection, Power management. Other methods of preventing data loss.

7. Troubleshooting and Maintaining LANs (6 hours)
A look at protocol analyzers, cable testers and other performance monitoring devices. A study of common network problems and identification of common network problems associated with specific layers of the OSI (Open System Interconnection) reference model.

8. In-class Examinations (3 hours)

IV. Evaluation Methods

20% Homework assignments and Research paper. These will be based on material discussed in class and on aspects of the project.

40% Examinations. Two in-class exams and a final exam all of which count equally

toward the 40%. Examinations consist of short-answer, analysis, and what-if questions.

40% Project. Selected projects covering LAN maintenance, troubleshooting, interconnection, etc.

Grading Scale: The standard grading scale will be used.
90%+=A; 80-89%=B; 70-79%=C; 60-69%=D; below 60%=F.

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

Goldman, James E., *Local Area Networking: A Client/Server Approach, John Wiley & Sons, Inc.*, New York, NY 1997.

Several handouts will be given to provide students with guidance with the projects. The professor has other related material that will be placed on reserve for students' use during the progress of the course.

VI. Special Resource Requirements

The Eberly networking laboratory is adequately equipped for this course.

VII. Bibliography

Baca, H.R., Zagar, C.M., and Zinky, M.A., *Local Area Networks with Novell*, Wadsworth Publishing Company, Belmont, CA 1995.

Black, U., *OSI: A Model for Computer Communications Standards*, Prentice-Hall, Inc., Englewood Cliffs, NJ 1991.

Black, U., *Computer Networks: Protocols, Standards and Interfaces*, (Second Edition), Prentice-Hall, Inc., Englewood Cliffs, NJ 1993.

Cohen, A.M., *A Guide to Networking*, (Second Edition), Boyd & Fraser Publishing Company, Danvers, MA 1995.

Derfler, F.J., Jr., *PC Magazine Guide to Connectivity*, Ziff-Davis Press, Emeryville, CA 1991.

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

Harbaugh, L.G., *Novell's Problem-Solving Guide for NetWare Systems*, SYBEX, Inc. Alameda, CA 1993.

Held, G., *Data Communications Networking Devices*, (Second Edition), John Wiley and Sons, New York, NY 1989.

Lawrence, B., *Using Novell NetWare*, (Second Edition), Que Corporation, Indianapolis,. IN 1992.

Madden, J., and Stuple, S. J., (Editors), *Networking Essentials*, (Second Edition), Microsoft Press, Redmond, WA 1998.

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

Ramos, E., Schroeder, A., and Simpson, L., *Data Communications and Networking Fundamentals Using Novell NetWare*, Macmillan Publishing Company, New York, NY 1994.

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

Stallings, W., *Local and Metropolitan Area Networks*, (Fourth Edition), Macmillan Publishing Company, New York, NY 1994.

Steenstrup, M., *Routing in Communications Networks*, Prentice-Hall, Inc., Englewood Cliffs, NJ 1995.

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

Walrand, J., *Communication Networks:A First Course*, (Second Edition), WCB/McGraw-Hill Inc. Boston, MA 1998.

White, C.M., *Data Communications and Computer Networks: An OSI Framework*, Boyd & Fraser Publishing Company, Danvers, MA 1995.

Course Analysis

Section A: Details of the Course

A1 LANs have grown to become quite popular and many of our majors have obtained jobs as LAN managers. Some of our experiential study students also go to companies to function as LAN managers. The departments, at the moment, do not have courses which explicitly teach the ideas of LANs as proposed in this course. Both departments' Corporate Advisory Boards have suggested the need for extensive exposure of LANs to the students. This course will fit into the programs of the departments by meeting this need. The course is designed with Computer Science, MIS, and Technology Support (Office Systems) majors in mind, but any student with the necessary background will be accepted.

A2 The course does not require changes in the contents of any of our existing courses. It will serve as a controlled elective for Computer Science, MIS and Technology Support majors.

A3. The course has not been previously offered at IUP.

A4 The course is not intended to be listed as dual level.

A5 The course may not be taken for variable credit.

A6. Quite a number of universities and colleges offer this course in various forms and modifications. For example, the School of Library and Information Science of the University of Pittsburgh and Kent State University offer versions of this course.

A7 The Association for Computing Machinery (ACM), the Association for Information Systems (AIS) and the Association for Information Technology Professionals (AITP) all recommend this course.

Section B: Interdisciplinary Implications

B1 The course is designed to be taught by one instructor.

B2 This course is jointly proposed by the Computer Science and the MIS Departments and will be cross listed. The course does not overlap with any other courses at this University.

B3 Students from the School of Continuing Education, if they want to take this course and meet the prerequisites, will be welcome.

Section C: Implementation

C1 Faculty resources are currently adequate.

C2 Resources needed for this course are available although they can be improved.

a. Space: Classroom space is adequate. The Eberly networking laboratory is adequately equipped for this course.

b. Equipment: The Eberly networking laboratory is adequately equipped for this course.

c. Laboratory Supplies and other Consumable Goods: Both departments have licensed copies of network operating systems and some applications software for projects. However, periodic updates will be required to keep up with the technology.

d. Library Materials: There is an adequate source of reading material in Stapleton Library that can support this course.

e. Travel Funds: No travel funds are needed.

C3 No resource for this course is funded by a grant.

C4 The course is expected to be offered every other semester. If demand increases, the frequency of offering will be increased accordingly.

C5. It is anticipated that one or two sections of the course will be offered per academic year. Again, based on demand, this can be increased.

C6 Twenty-five students will be accommodated in a section of the course.

C7 No professional society recommends enrollment limits or parameters for this course or for courses resembling this course. However, past experience with hands-on courses that are taught in computer labs has shown that twenty-five students per section can be accommodated.

IUP

Indiana, Pennsylvania 1570

Date: December 16, 1998

Subject: Letter of Support for Computer Science Curriculum Proposals

To: Dr. William Oblitey, Chair, Computer Science Department
Mr. James Wolfe, Computer Science Department

From: Kenneth L. Shildt, Chair, MIS and Decision Sciences Department KLS
Elizabeth M. Pierce, MIS and Decision Sciences Department EMP

The MIS and Decision Sciences Department supports the course proposals for CO/IM 352 Local Area Networks Design and Installation as it is being proposed as a course for Computer Science, Office Systems, and MIS majors. This course, along with CO/IM 354 Local Area Networks Administration, will enable students majoring in the area of Information Technology to gain knowledge, which will undoubtedly enhance their professional career preparation.

The dual-listing of these courses demonstrates a spirit of cooperation in the planning and implementation of curriculum which should result in more efficient utilization of the University's resources as well as more flexibility in the scheduling of courses by the majors.

The ability to share the special purpose networking lab located in the Eberly College of Business has the full approval of the MIS Faculty and Dean Robert Camp. A scheduling model will be developed by the Departments to insure that each version of the proposed courses will be given equitable delivery.

The MIS and Decision Sciences Department also supports the course proposal for CO 304 Interactive Internet Programming in JAVA. This course will enable both MIS and Computer Science majors who have had the prerequisite CO110 to learn how to write applications for the Internet. Such skills are currently in high demand in the job market and the offering of this course will benefit both our students and the organizations that recruit our students.

In addition to the new courses listed above, the Computer Science Department listing of a revised set of courses which may be utilized as controlled electives by its majors is strongly supported by the MIS and Decision Sciences Department. The interaction of Computer Science and MIS majors in classes will provide for a continuing dialogue between the Departments and result in a stronger set of courses for both majors to schedule.

Subject: Computer Science Curriculum Support
Date: Wed, 16 Dec 1998 15:34:43 -0500
From: "Mr. Kenneth Shildt" <kshildt@grove.iup.edu>
Organization: Indiana University of Pennsylvania
To: JLWOLFE@grove.iup.edu, OBLITEY@grove.iup.edu, MOORE@grove.iup.edu

Jim:

The letter of support for the Computer Science Department Curriculum Proposals can be viewed on the attached word document entitled "Support Letter?" It reflects the review by our Curriculum Committee and me. It appears that the Office Systems Department is ready to support the proposal for IM 354 as modified after yesterday's meeting.

Both Departments support a change in the title. "Testing and Controlling LAN's" appears to be an acceptable name. Let me know if this transmits successfully.

Ken Shildt

COMPSCI.SUP.doc	**Name:** COMPSCI.SUP.doc **Type:** Winword File (application/msword) **Encoding:** base64

Kenneth Shildt <kshildt@iup.edu>

TO: William Oblitey, Chair
Computer Science Department

Ken Shildt, Chair
Management Information Systems Department

FROM: Wayne Moore, Chair
Office Systems and Business Education Department

DATE: December 16, 1998

SUBJECT: CO/IM 354 NEW COURSE PROPOSAL

The Office Systems and Business Education department faculty have reviewed the course proposal for CO/IM 354—Testing and Controlling LAN's. The department supports this course proposal.

The content of the course is relevant to all technology majors at IUP. Students in our program will benefit by this course.

The cooperative effort that led to the development of this course strengthens the university's technology programs.

C: Robert Camp, Dean, Eberly College of Business