LSC Use Only No: 07-16f.	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date: App-10/30/07	Senate Action Date: App. -12/4/07

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person **SANWAR ALI**	Email Address **SANWAR**
Proposing Department/Unit **COMPUTER SCIENCE**	Phone **7-7994**

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

_____New Course _____Course Prefix Change _____Course Deletion

__X__Course Revision __X__Course Number and/or Title Change __X__Catalog Description Change

***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**
COSC 345 Data Communications	**COSC 345 Computer Networks**

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Department Curriculum Committee Chair(s)		5 Dec 06
Department Chair(s)		12/7/06
College Curriculum Committee Chair		05/17/07
College Dean		9/24/07
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
UWUCC Co-Chairs	Gail S Sechrist	10/30/07

* where applicable

Received
SEP 25 2007
Liberal Studies

Part-II Description of the Curriculum Change

1. New Syllabus of Record

I. Catalog Description

COSC 345 Computer Networks 3c-0l-3cr

Prerequisite: COSC 110, and MATH 121 or 125, and MATH 214, 216, or 217, or equivalents.

Data communications, computer network architectures, functions of various network layers, communication protocols, internetworking, emerging high-speed networks.

II. Course Outcomes:

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

- Analyze the basics of data communications and network architecture.
- Analyze functions of each layer of a computer network.
- Evaluate essential features of specific protocols in the common protocol suite.
- Analyze the methodology and the rationale behind addressing, routing and congestion control.
- Evaluate the various multiplexing and switching methods used in networks.
- Evaluate wireless LANs, high-speed digital access, such DSL and cable modem, cellular phone and satellite networks

III. Detailed Course Outline:

1. Introduction to Computer Networks — 1.0 week
   - A. Application of Computer Networks
   - B. Network Hardware
   - C. Network Software
   - D. OSI Model
   - E. Internet Model

2. Physical Layer: — 2.5 weeks
   - A. Transmission Media- Guided and Unguided
   - B. Wireless Transmission
   - C. Communication Satellites
   - D. High-speed Digital Access- DSL, Cable Modem
   - E. Multiplexing- FDM, WDM, TDM
   - F. Mobile Telephone Network

3. Data Link Layer: — 2.5 weeks
   - A. Data Link Layer Design Issue- Framing, Error and Flow Control
   - B. Error Detection and Correction
   - C. Elementary Data Link Protocols
   - D. Sliding Window Protocols
   - E. Example Data Link Protocols- HDLC

TEST-I — ***one class period***

4. Medium Access Control (MAC) Sublayer — 2.5 weeks
   - A. Multiple Access Protocols
   - B. LANs- topologies and protocols
   - B. Ethernet
   - C. Wireless LANs- topologies and protocols
   - D. Broadband Wireless
   - E. Data Link Layer Switching- Hubs, bridges, switches, routers, and gateways

5.	Network Layer: A. Network Layer Design Issues B. Routing Algorithms C. Congestion Control Algorithm D. Quality of Service (QoS) E. Internetworking F. Network Layer in the Internet G. Development in Internet Protocols	2.5 weeks
6.	Transport Layer: A. Elements of Transport Protocols B. Internet Transport Protocols- TCP and UDP C. Performance Issues	1.5 weeks
	TEST-II	***one class period***
7.	Application Layer: A. Fundamentals of the Session and Presentation Layers B. Domain Name System (DNS) C. Email D. File Transfer Protocol F. WWW and Multimedia	1.5 week
Total =		14 weeks
FINAL EXAM		***During Final Exam Week***

IV. Evaluation Methods:

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

Two Class Tests	30%
Final Exam (Comprehensive)	25%
Projects	15%
Assignments	15%
Quizzes	15%

V. Example Grading Scale:

The grading scale will be:
90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, and < 60% = F.

VI. Undergraduate Course Attendance policy:

The attendance policy will conform to the University undergraduate course attendance policy.

VII. Required Textbook, Supplemental Books and Readings:

Tanenbaum, Andrew S. *Computer Networks* (4/e), Prentice Hall, 2003, ISBN #0-13-066102-3

VIII. Special Resources Requirements:

None

IX. Bibliography:

Beasley, Jeffrey S. *Networking*, Prentice Hall, 2004, ISBN #0-13-098659-3

Black, Uyless D. *Computer Networks: Protocols, Standards and Interface* (2/e), Prentice hall, 1993, ISBN #0-13-175605-2

Carr, Houston H. and Snyder, Charles A. *Data Communications and Network Security*, McGraw Hill, 2007, ISBN #978-0-07-297604-5

Comer, Douglas E. *Computer Networks and Internets with Internet Applications* (4/e), Prentice Hall, 2004, ISBN #0-13-143351-2

Forouzan, Behrouz A. *Data Communications and Networking* (4/e), McGraw Hill, 2007, ISBN #978-0-07-296775-3

Kurose, James F. and Ross, Keith W. *Computer Networking* (3/e), Addison Wesley, 2005, ISBN #0-321-22735-2

Leon-Garcia, Alberto and Widjaja, Indra *Communication Networks* (2/e), McGraw Hill, 2004, ISBN #0-07-246352-X

Miller, Dave *Data Communications and Networks*, McGraw Hill, 2006, ISBN #0-07-296404-9

Olifer, Natalia and Olifer Victor *Computer Networks: Principles, Technologies and Protocols for Network Design*, John Wiley, 2006, ISBN #0-470-86982-8

Rowe, Stanford H. *Computer Networking*, Prentice Hall, 2005, ISBN #0-13-048737-6

Stallings, William *Computer Networking with Internet Protocol*, Prentice Hall, 2004, ISBN #0-13-141098-9

Tomasi, Wayne *Introduction to Data Communications and Networking*, Prentice Hall, 2005, ISBN #0-13-013828-2

2. Summary of the proposed revisions

The existing syllabus of record for the course "**Data Communications**" was written more than 12 years ago. The course materials were divided between data communications theory and network topologies and local area networks. In the revised syllabus of "**Computer Networks**" with the title changed, we have included recently emerged technologies in computer networks and details of various layers of OSI models, such as physical layer, data link layer, network layer, transport layer, application layer, etc. The few key elements of data communications are integrated into the expanded network topics. The emphasis has shifted to allow greater coverage of networks.

3. Justification/rationale for the revision

Computer science is a rapidly changing field. During recent years many new technologies have emerged that are introduced in computer networking. Industries have applied these new technologies in computer networking and made a significant improvement in computer communication. To keep our course curriculum up-to-date, it is necessary to revise the old syllabus of COSC 345 Data Communications, which was developed yeas ago (date unknown).

This course is named as Communications and Networking at Penn State University, Data Communication and Computer Networks at University of Pittsburgh, Introduction to Computer Networking at Ohio State University, Computer Networks at the University of Texas at Arlington, and Introduction to Computer Networks at the University of North Texas. Since data communications is one of the components of computer networking, the department decided to rename the course COSC 345 Data Communications to **COSC 345 Computer Networks.**

Change of Prerequisite: Students gain sufficient programming ability to do course projects in COSC 110. COSC 220, which uses COBOL language, is not a required criteria for ABET. Therefore, COSC 220 is removed from the prerequisite list.

MATH 123 is replaced by a new course, MATH 125 by the Department of Mathematics. The credit hours of MATH 125 are 3 only. These changes were approved by the Senate. MATH 125 can be substituted by MATH 121.

4. The old syllabus of record

CO 345 Data Communications 3 Credits

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

Text: Data Communications, 2nd Ed., Kenneth Sherman, or Data Communications and Teleprocessing Systems, 2nd Ed., Trevor Housley

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

Course Topics:

1. Introduction

   A. Basic Communication Concepts
      Historical Perspectives
      Communications Technology
      Applications of Data Networks

   B. Types of Communications Networks

      Circuit Switching, Message Switching, Packet Switching

2. Data Transmission Concepts

   A. Transmission Devices

      Hardwire vs. Software
      Signal Generation Devices, Signal Converters
      Multiplexing, Multidropping, Concentration
      Simplex, Half-Duplex, Full-Duplex
      Asynchronous vs. Synchronous Transmission

   B. Transmission Impairments

      Analog vs. Digital Data Transmission
      Signal Strength, Attenuation, Distortion
      Noise, Channel Capacity (Nyquist, Shannon)

   C. Data Encoding Techniques

      Modulation (Amplitude, Frequency, Phase; Pulse Code)

3. Common Carrier Services

   A. Switched vs. Dedicated Services
   B. Specialized and Value Added Networks

4. Error Detection and Correction Techniques

Parity Checks, Cyclic Redundancy Checks, Forward Error Correction

5. Network Protocols

   A. Half-Duplex Protocols

      Automatic Repeat-Request Schemes
      Polling Schemes

   B. Full-Duplex Protocols

      Point-to-point vs. Multipoint Schemes
      Introduction to HDLC/SDLC; X.25

6. Layered Network Architecture

      The OSI Model: Functions of the Layers

7. Local Area Networks

   A. Technology, Topology, Medium Access Control
   B. PBX Networks
   C. LAN Standardization

8. Network Performance Analysis

   A. Queuing and Statistical Calculations
   B. Routing and Effects of Poor Routing
   C. Network Reliability Issues
   D. Network Security Issues
   E. Network Resource Assignment Issues

Requirements: Term Paper and/or Programming Project
Three Hours of Examinations plus the Final Examination

Part-III Letters of Support or Acknowledgement

Supporting letters from departments of (i) Criminology and (ii) Management of Information Systems are attached herewith because occasionally students from these departments enroll COSC 345 course.

Indiana University of Pennsylvania

Department of Management Information Systems
The Eberly College of Business and Information Technology
664 Pratt Drive, Room 203
Indiana, Pennsylvania 15705-1036

724-357-2929
Fax: 724-357-4831
Internet: *http://www.eberly.iup.edu/im/*

November 8, 2006

Dr. Sanwar Ali
Professor of Computer Science
IUP
332A Stright Hall
210 South 10th Street
Indiana, PA 15705

Dear Dr. Ali:

I have reviewed your revised course syllabus of COSC 345, with title and contents change. I know that several of our MIS students have taken this course, as an elective, over the past three years and I believe that our students will continue to take this course in the future. I am sending you an official supporting letter so that you may proceed to take these changes to the college.

Sincerely,

James A. Rodger
Professor MIS/DS

Indiana University of Pennsylvania

Department of Criminology
McElhaney Hall, Room G-1
441 North Walk
Indiana, Pennsylvania 15705-1018

724-357-2720
Fax: 724-357-4018
Internet: *http://www.hhs.iup.edu/cr*

November 13, 2006

Sanwar Ali
Computer Science Department
Indiana University of Pennsylvania
Stright Hall Room 319
Indiana, PA 15701

Dear Sanwar,

I would like to offer my full support for your curriculum proposal for "Computer Networking" (COSC 345). I have carefully reviewed the proposed syllabus of record and find that this course would be of great value to our undergraduate students. Students who choose to take the Information Assurance Minor will be most interested in this type of course. I want to thank you for keeping our students in mind when you were developing this course. I think students would gain significant knowledge from such a course. Please let me know if I can be of any assistance as you move this proposal through the curriculum process.

Sincerely,

Dennis Giever, Ph.D.
Professor and Chair