(22) Glassboro State College Senate Curriculum Committee (C)

Approval Form

Proposal Title: Data Communications and Networking Networks

Sponsor(s) Don Stone, Gary Itzkowitz, H. Kholghi Dept.: Math/Computer Sci. Ext. 6044

Check one: ☒ Course ☐ Specialization ☐ Concentration ☐ Minor ☐ Achievement Certificate

☐ Certification Program ☐ Major Program ☐ Minor Change _____ (please name: deletion or credit/title/catalog change)

☒ Undergraduate ☐ Graduate 3 Credit Hours

Step 1 (Department)

☒ Approved 10/19/87 Date

☐ Not Approved

Ronald J. Gorton Dept. CC Chairperson

☐ Reviewed 11-24-87 Date

Dept. Chairperson

Step 2 (Receipt)

☐ SCC# 87-88-24

Proposal Received 11/18/87 Date

Brenda A. Bolay SCC Chairperson

Step 3 (School CC)

Reviewed 2/9/88

☒ Approved

☐ Not Approved

Comments:

School Curr. Comm. Chairperson

Step 4 (Academic Dean)

☑ Recommend

☐ Not Recommend

☐ Conditionally Recommend (see comments)

Reviewed 2-10-88 Date

Comments:

Signature, Dean of School

Step 5 (SCC)

Open Hearing 3/8/88 Date ☐ Approved by Senate Curriculum Committee 3/24/88 Date

☐ Returned to sponsor(s) for the following reasons:

Minor changes - OK 3/24

Title of Data Communications and Networks

clarify Hours #'s in 1,f

Changes in Cat. Description also

Step 6 (Senate)

Presented to Senate 3/25/88 Date ☒ Approved ☐ Not Approved

Notification to Vice-President for Academic Affairs 3/28/88 Date

Brenda A. Bolay Signature, SCC Chairperson

Step 6 (Senate)

Received 4/7/08
Date

Approved ☐ YES ☐ No

If no, reasons are as follows:

Student credit hours 3

Faculty load hours 3

Equalized credit hours 3

Official copy and approval sheet filed 5/12/08
Date

Signature, Vice-President for Academic Affairs

Registrar

Approved course description received _____
Date

Hegis Taxonomy and Course Number assigned _____

Signature, Registrar

Date

Notification forwarded:

- ☐ Senate Curriculum Committee Chairperson
- ☐ Department Chairperson(s)
- ☐ Academic Dean(s)
- ☐ Registrar
- ☐ Sponsor(s)

Glassboro State College
Department of Mathematics and Computer Science

Course Proposal

Data Communications and Networks

1. Details:
   a. Course title: Data Communications and Networks
   b. Sponsors: Don Stone, Gary Itzkowitz and Hossein Kholghi, Department of Mathematics and Computer Science
   c. Credit hours: 3
   d. Course level: Undergraduate
   e. Curricular effect: This course is designed to be available as a restricted elective for Computer Science majors.
   f. Prerequisites: 0704.370 (Digital Design and Lab), 0704.380 (Computer Architecture) and either 1702.360 (Probability and Statistics I) or 1703.260 (Statistics I).
   g. Suggested time and scale of implementation: to be offered once a year, starting in 1988-89.
   h. Adequacy of the present staff, resources and library facilities: the present staff, resources (including computer hardware and software) and library facilities are more than adequate for the proposed course.

2. Rationale: The proposed course will provide Computer Science students with experience in the important and related areas of data communications and computer networks. These areas are currently experiencing a great deal of growth. The New Jersey Department of Higher Education, for example, has recently instituted a Networking Sub-Grant Program to "promote and develop the use, understanding and knowledge of telecommunications and networking technologies and applications among student, faculty, administrators and researchers in all academic disciplies." More and more Computer Scientists are finding themselves in situations where familiarity with data communications and networks is required; the survey of our Computer Science alumni and advanced students carried out last year produced several comments requesting a course in data communications. We might also mention that data communications and networks are among the most popular topics in short-term seminars or courses for practicing engineers and computer scientists. The topics of data communications and networks are not covered to any significant extent in existing courses at Glassboro, except that some operating system implications of networks are covered in the operating systems course; consequently, in the proposed course the coverage of networks will emphasize the data communications aspects.

3. Essence of the Course:
   a. Objectives: This is an advanced course which will build on the foundations of Computer Architecture and Digital Design and Lab. Students will learn the theoretical basis of data communications and will study network systems and techniques that are currently in use or being researched. Students will get hands-on experience with networks on campus, both at the microcomputer level (IBM, AppleTalk) and at the minicomputer level (DECnet). In addition, they will use a network simulation package which provides measures of hardware utilization, software execution and conflicts (under various workloads) in a computer network, communication or signal processing system. As a term project, students will design a network with specified characteristics.
   b. Topical outline:
      1. Introduction
      2. Data transmission
         2.1 Analog and digital data transmission
         2.2 Transmission media
      3. Data encoding
         3.1 Digital encoding of digital data
         3.2 Analog encoding of digital data
         3.3 Digital encoding of analog data
         3.4 Analog encoding of analog data
      4. Digital data communication techniques
         4.1 Asynchronous and synchronous transmission
         4.2 Error detection techniques
         4.3 Interfacing
      5. Data link control
         5.1 Line configurations
         5.2 Flow control
         5.3 Error control
         5.4 Bit-oriented link control
      6. Multiplexing
         6.1 Frequency-division multiplexing
         6.2 Time-division multiplexing
      7. Communicating networking techniques
         7.1 Circuit switching
         7.2 Message switching
         7.3 Packet switching
      8. Local networks
         8.1 Bus/tree topology
         8.2 Ring topology
         8.3 Medium access control protocols
         8.4 Protocol performance
      9. Protocols and architecture
         9.1 The layered approach: the OSI model
         9.2 The hierarchical approach: the DOD model
         9.3 Example architectures
      10. Network access protocols
         10.1 The network interface

10.2 Circuit-switched network access
10.3 Packet-switched network access
10.4 Broadcast network access
11. Internetworking
12. Transport protocols
13. Process/application protocols

c. Evaluation and grading procedure: the student's grade will be based on examinations and programming projects.
d. Course evaluation: we plan to evaluate the course by means of student evaluations.

4. Consultations:
   a. People consulted:
      Robert Loscher, Director of Information Management, Computer Services
      Michael Guerard, Department of Technology

5. Additional information:
   Possible textbooks:
   William Stallings, Data and Computer Communications, Macmillan, 1985.
   Andrew S. Tanenbaum, Computer Networks, Prentice-Hall, 1981.

6. Catalog Description:

0704.410 [suggested number]

Data Communications and Networks

(Prerequisites: 0704.370, 0704.380 and either 1702.360 or 1703.260)

This is an advanced course in which students will learn the theoretical basis of data communications and will study network systems and techniques. Topics will include data encoding and transmission, digital data communication techniques, data link control, multiplexing, network architectures and protocols, and internetworking. Students will complete a network term project.