SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

CSE320/EEE361 :: Data Communications

"Tell me and I forget. Teach me and I remember. Involve me and I learn."
[Benjamin Franklin]

Summer 2019
[Sec 6: UB81301]
[Sec-6: 9:30 am, every Mon/Wed]

Instructor:	Sadia Hamid Kazi [UB80604, skazi@bracu.ac.bd]
Office Hours:	Sun 9:30am-12:30pm, Tues 11:30pm-3:30pm + by appointment
	Virtual Office Hours: Sun/Thurs 10am -3pm

I. Rationale:

Information and communication are two of the most important strategic issues for the success of any organization. An effective usage of information technology, computer networks are necessary. So this course provides an introduction to fundamental concepts in the design and implementation of computer communication networks, their protocols, and applications.

II. Course Aims and Outcomes:

CO 1	**Describe** the elements data communication and different network topology and the functionality of each protocol layer of two network models: OSI and TCP/IP.
CO 2	**Understand** the basics of signal, bit and performance measurements and different signal conversion techniques based on advantage and disadvantages.
CO 3	**Decide** which bandwidth utilization technique to use in a practical scenario: Multiplexing approaches.
CO 4	**Analyze** the major components of telephone and cable networks and different transmission medium based on their physical properties in data transmission.
CO 5	**Breakdown** the working principle and calculations of various error detection and correction processes like block coding, CRC, Checksum.
CO 6	**Illustrate** the concepts of framing, flow and error control like: Sliding window, window size, different ARQ protocols and HDLC frames.
CO 7	**Demonstrate** the concept of circuit switching, packet switching.

III. Format and Procedures:

For best results, students should read the textbook prior to coming to class, participate actively in the lecture, and revise the topics once they go back from class. A list of topics to be covered, along with an expected timeline, will be provided in class in order to facilitate this. Details about the textbook will be discussed in class. Students will also be encouraged to read current networking trends and innovation and each class will start with a small discussion on that. After completion of each chapter, assignments will be done in class to fine tune any misconceptions.

IV. Course Assessment Methods

Homework

Homework/ assignment shall be designed to ensure that the students have the required knowledge to analyze and design control systems. Specifically, they will support the students' progress in the project and term paper.

Quizzes

Quizzes will be designed to test the students' understanding in the course and to assess various course outcomes.

There will be Six (6) quizzes in total but only the best Four (4) (without exception) will be considered in calculating your final grade. **There will be no retake of quizzes**.

Examinations

The exam shall contain problems designed to test knowledge and comprehension, to analyze control systems and/or to apply the engineering problem solving method.

Project and Term paper

The project and term paper shall evaluate the overall understanding of the course given that it must cover 2-3 COs depending on the instructor's preference.

Assessment Methods vs. Course Outcomes:

Assessment Methods	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	CO 7
Homework		X			X	X	
Quizzes	X		X		X	X	
Examinations	X	X	X	X	X	X	X
Project and Term Paper							

   i.   Interactive discussion encouraged.
  ii.   Oral questions asked to stimulate students.
 iii.   Problem solving assignments.

V. Course Readings:

(a) Required Texts:
    i.   Data communication and networking, Behrouz A. Forouzen, 5th edition, Tata McGraw Hill.

      ii.   Computer Networking: A Top-Down Approach Featuring the Internet by Jim Kurose and Keith Ross, Addison Wesley, 6th Edition

      iii.   Data and Computer Communications by William Stallings, 10th Edition, ISBN-13: 978-0133506488, ISBN-10: 0133506487, Pearson, 2017.

(b) Course Materials
      i.   \\tsr\Summer-2019\CSE\SKZ[Sadia Hamid Kazi]\CSE320_EEE361

VI. Grading Procedures:

For CSE320/EEE361:
a) Final – 45%
b) Midterm – 25%
c) Quiz – 15%
d) Assignments -05%
e) Project – 05%
f) Participation – 05%

Participation marks will be decided based on number of lectures attended, punctuality of arrival.

VII. Academic Integrity

Each student in this course is expected to abide by the BRAC University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work.

You are encouraged to study together and to discuss information and concepts covered in lecture with other students. You can help out or receive help from other students in the form of consultation and guidance. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, or any form electronic or hard copy.

If copying occurs, both the student who copied work and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, and you may not compare answers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

VIII. Accommodations for students with disabilities

I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made.

IX. Tentative Course Schedule:

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CSE 320/EEE361::Data Communications :: Summer 2019 Tentative Course Schedule**

Sl. No.	Topic details	Time allocation
1	Introduction to elements of data communication, Network topology, Protocols and standards, Network models: OSI and TCP/IP model, Physical and logical addressing.	**Week 1,2**
2	Basics concepts of signal: Analog and digital signal and their properties, Transmission impairment, Data rate limit calculation, Digital to Digital conversion- Line coding, Block coding and Scrambling Analog to Digital conversion- PCM, DM.	**Week 3,4**
3	Bandwidth utilization: Multiplexing and spreading, FDM, WDM, Synchronous Time-Division Multiplexing, FHSS and Direct sequence spread spectrum.	**Week 5,6**
4	Major components of telephone network, Dial-Up modems and modem standards, Brief idea of DSL, Cable TV network for data transfer- Downstream and Upstream data band, Downstream and Upstream sharing, , Guided and Unguided Medium- Twisted-Pair, Coaxial and fiber optic cable, radio and micro waves, wireless media.	**Week 7**
5	Different types of errors, Detection vs. Correction, Block coding- Error detection and correction, Hamming distance, CRC, Checksum.	**Week 8,9**
6	Framing, Flow and error control protocols- Stop and Wait, Go-back-N ARQ, Selective Repeat ARQ, HDLC.	**Week 10, 11**
7	Circuit switched network, Datagram networks, Virtual circuit network, Structure of circuit and packet switches.	**Week 12**
8	Project presentation and course review.	**Week 13**