

ESE 346 Syllabus
Fall 2020 - 7 29 2020

Prof. Thomas Robertazzi, Instructor

Office: 631-632-8412, Home (preferred): 631-281-9331, Cell 631-379-1449

Email: thomas.robertazzi@stonybrook.edu Office: room 219 Light Engineering.

Course Objective: To give students a broad background in computer networking technology and an introduction to performance evaluation and networking algorithms.

Texts: Note – Prof. Robertazzi has written a number of books with somewhat similar sounding titles, please get the two specified below.

(A) Networking and Computation: Technology, Modeling and Performance, 2nd ed. by Thomas Robertazzi and Li Shi, 2020. Publisher: Springer (www.springer.com).

(B) Introduction to Computer Networking, 2017, 1st ed by Thomas Robertazzi, 2017. Publisher: Springer (www.springer.com).

Mode of Instruction: An online synchronous course that meets at least two hours a week online. Asynchronous lectures are also available for the first month of the course.

Student Interaction: The instructor is available for thru synchronous lectures, emails anytime and his home and cell phone number is available for questions (see top of this page) – call before 8 PM any day.

Technology Requirements: Ability to work with Blackboard and Zoom.

Assessment and Academic Integrity: Students are allowed to consult with other students in order to learn the material but all submissions must be their own work and not copies from others or plagiarized from other sources.

Student Outcomes / Learning Objectives:

SO1: An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgement to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed using appropriate learning strategies.

All submissions due by midnight of due date):

Week 1 (Aug. 24): Probability Review and Transmission Media **Hwk 1 due Tuesday Sept. 1st.**

Week 2 (Aug. 31): Performance Evaluation **Hwk 2 due Sunday Sept. 6th.**

Week 3 (Sept. 7): Algorithms (Error Codes, Line Codes, Network Coding, Routing and Quantum Key Distribution). **Hwk 3 due Sunday Sept. 13th.**

Week 4 (Sept. 14): Algorithms (continued) **Hwk 4 due Sunday Sept. 20th.**

Week 5 (Sept. 21): Queueing Theory

Week 6 (Sept. 28): Queueing Theory (continued) **Self Exam I on homework problem topics due Sunday Sept. 27th.**

Week 7 (Oct. 5): Machine Learning for Networking. **Project 1 due Sunday Oct. 4th.**

Week 8 (Oct.12): Combined Networking and Computation (Divisible Load Theory)

Week 9 (Oct. 19): IEEE Local Area and Wireless Network Standards (Ethernet, Wifi 802.11, Bluetooth 802.15, cellular LTE). **Self-Exam II on queueing theory and divisible load theory due Sunday Oct. 18th.**

Week 10 (Oct. 26): Infiniband, MPLS and Fiber Optic Networking (including SONET and WDM). **Essay 1 due Sunday Oct. 25th.**

Week 11 (Nov. 2): Software Defined Networks. Networks on Chips. **Essay 2 due Sunday Nov. 1st.**

Week 12 (Nov. 9): Space Networks **Project 2 due Sunday Nov. 8th.**

Week 13 (Nov. 16): Grids, Clouds and Data Centers. **Essay 3 due Sunday Nov. 15th.**

Week 14 (Nov. 30): AES and Quantum Cryptography. **Essay 4 due Sunday Nov. 29th.**

Self-Final due Sunday Dec. 6th.

Grading:

Self-Exams (see below - two at 15 points each) 30%,

Homework (four assignments 4% each): 16%,

Projects (two at 10% each): 20%,

Essays (four at 4% each): 16%,

Self Final Exam (see below): 20%.

Total is 102 points. A is 90 or better. A- is 85-89. B-,B and B+ is 70 to 84.

Essays: For some chapters in the Introduction to Computer Networking text you will write 500 words on some aspect of the chapter coverage that you find interesting. Essays must be based on a related paper (***paper must published no earlier than 2019***). Relevant papers can be found on IEEE/IET and Science Direct databases on the library website. Look also on Google Scholar.

Self Exams: There are two self-exams in the course. Students create their own problems and solutions based on the homework problems for the first self-exam and based on queueing theory and divisible load theory for the second self-exam. Create 3 problems and solutions for each self-exam.

Self Final Exam: Students create their own exam based on the qualitative networking material of Introduction to Computer Networking. Create five questions and answers. Grading is based on choice of questions and reasonableness of answers. Questions should make one think a bit. For instance, a good question might be "What would be more appropriate to give connectivity to an airport lounge, WiFi or Bluetooth. Why?" A poor question would be "What is the second largest SONET data rate". The first question requires some thought, the second is a too simple look-up.

Old Exams

Several semester's worth of old exams and solutions will be on Blackboard under Course Documents. This is particularly relevant for the first self exam.

Videos

As an aid for the course, lecture videos and associated pdf files, for the first month of the course, are posted on Blackboard under Documents (not Course Documents). The video is in m4v format. Free viewers are available on the Internet. Be careful though, some sites ask if you want other software which you may not want. If you have Real Player or Quick Time on your computer it may convert the m4v files into other (probably viewable) formats such as mpeg.

Important Dates

All dates for homeworks, self-exams, projects and essays are in this syllabus on Blackboard under Course Documents.

Student Accessibility Support Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at sasc@Stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Academic Integrity Statement

Each student must pursue their academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management Statement

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.