

Syllabus

1. Course Staff and Office Hours

Instructor: Sangjin Hong
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Light Engineering Building 201

Office Hours: Tuesday and Thursday, 10:00am to 12:00pm
Other hours by appointment

Instruction Location: M0113 Staller Center

Instruction Delivery: Synchronous. All lectures will be delivered via Zoom Meeting during the class time. The lectures will be recorded and posted on Blackboard immediately following the lectures.

TAs: To be announced

Office hours and locations may change. Please check Blackboard for most up-to-date information.

2. Course Description

Introduction to topics in computational mathematics, such as number systems, Boolean algebra, mathematical induction, combinatorial probability, recursion and graph theory. Algorithm aspects of the topics discussed will be emphasized. **Fall.**

Co-requisites: ESE 123

Credits: 3

3. Textbook

“Discrete Mathematics with Applications,” by Susanna S. Epp, Fifth Edition, 2018.
Brooks/Cole Cengage Learning. ISBN: 978-1-337-69419-3

4. Course Learning Objectives

Upon completion of the course, students will have

- ability to apply knowledge of mathematics, science and engineering;
- an ability to identify, formulate, and solve engineering problems;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

5. Student Learning Outcomes

Student Outcomes		% contribution
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	40%
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	40%
3	an ability to communicate effectively with a range of audiences.	
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	10%
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.	10%
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

6. Topics Covered

Week 1	Language of Sets Language of Relations and Functions Logical Form and Logical Equivalence Conditional Statements, Valid and Invalid Arguments
Week 2	De Morgan's Theorem, Boolean Expression Digital Circuits and Number Systems
Week 3	Predicates and Quantified Statements Statements and Quantifiers Arguments and Quantifiers
Week 4	Direct Proof and Counter Example Rational Number and Divisibility
Week 5	Quotient-Remainder Theorem Indirect Proof and Contradiction Indirect Argument
Week 6	Sequence and Mathematical Induction Recurrence and Recursion

Week 7	Functions of Sets Composition of Functions Cardinality and Computability
Week 8	Relations on Sets Equivalence Relations Modular Arithmetic and Applications
Week 9	Sample Space Counting
Week 10	Pigeonhole Principle Pascal's Formula and Binomial Theorem Probability and Expected Value
Week 11	Conditional Probability Bayes' Formula and Applications
Week 12	Graph, Paths, and Connectivity Traveling-Salesman Problem Directed Graphs
Week 13	Binary Trees Priority Queues, Heaps
Week 14	Spanning Trees and Shortest-Paths Tree Analysis

7. Assignments

7.1. Homework Assignments

Homework Assignments will be issued roughly weekly. A full schedule is available on Blackboard. (This schedule will be updated as needed.) All assignments will be due at the *beginning* of class on the assigned day. Please see the Late Homework Policy, below.

All homework assignments must be turned in on paper. Writing or typing your solutions electronically is great, but you must print them out and submit the paper copy.

7.2. Late Homework Policy

Each student is given two "late days" for homework assignments. Each late day can be used to turn in one homework assignment one day late. You may not use both late days on one assignment. **Late days may not be used on labs.**

7.3. Collaboration Policy

Homework assignments are to be completed individually. You may *discuss* them with your classmates. (In fact, you are encouraged to do so.) However, you must write up your own solution individually without any help from any other person.

For example, it is fine if you and a friend discuss a problem together, and then separately work out the details and write your own separate solutions. On the other hand, it is not acceptable to share written solutions with another person or to create the written solutions together. In other words, the work you turn in must entirely be your own personal effort.

If you discuss homework problems with another person in the class, you must write “I discussed this assignment with...” and include the name(s) at the top of the assignment.

8. Grading

Your grade will be based on labs, homework assignments, two midterm examinations, and one final examination.

Homework Assignments	20%
Midterm #1	15%
Midterm #2	15%
Midterm #3	15%
Final Exam	35%

9. Academic Honesty

Any academic dishonesty on a written homework will result in a zero grade for the assignment for all parties involved.

All exam work must be entirely your own with no collaboration or outside materials/information. Any academic dishonesty on the midterm exams or the final exam will result in failing the course. The case will be submitted to the College of Engineering’s Committee on Academic Standing and Appeals.

10. Electronic Communication Statement

Email and especially email sent via Blackboard (<http://blackboard.stonybrook.edu>) is one of the ways the faculty officially communicates with you for this course. It is your responsibility to make sure that you read your email in your official University email account. For most students that is Google Apps for Education (<http://www.stonybrook.edu/mycloud>), but you may verify your official Electronic Post Office (EPO) address at <http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>.

If you choose to forward your official University email to another off-campus account, faculty are not responsible for any undeliverable messages to your alternative personal accounts. You can set up Google Mail forwarding using these DoIT-provided instructions found at <http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail>.

If you need technical assistance, please contact Client Support at (631) 632-9800 or supportteam@stonybrook.edu.

11. 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.

12. 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

13. 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.