CSE303 Introduction to the Theory of Computation
Spring 2026
Professor Anita Wasilewska
Course webpage

http://3www.cs.stonybrook.edu/~ cse303/

Course Prerequisites: CSE 214 and 215

Time: Tuesday, Thursday 3:30 pm - 4:50 pm

Place: Engineering 143

Professor Anita Wasilewska

e-mail anita@cs.stonybrook.edu

Office phone (631) 632 8458

Office location New Computer Science Department, office 208

Professor Office Hours Wednesday 1:00 pm - 3:00 pm, and by Appointment. I also read emails DAILY and respond within a day to students e-mails

Teaching Assistants Office Hours are posted and updated on Bright space

TA Office location: Room 2126 Old CS Building

COURSE TEXBOOK

Elements of the Theory of Computation

Harry R. Lewis and Christos H. Papadimitriou

Prentice Hall, Second Edition,1998

ADDITIONAL TEXTBOOK

Turing's Vision - The Birth of Computer Science

Chris Bernhard

The MIT Press, Cambridge, Massachusettts, London England (2016)

COURSE YOUTUBE CHANEL

We also have a special YOUTUBE CHANEL created for the course:

Theory of Computation https://www.youtube.com/channel/UCLZp06JC9yit6M_YW3XuvIw

The Chanel contains a set of Videos filmed at the Stony Brook TV Studio covering the material included in Chapter 1 to Chapter 4 of the course Textbook. Please use them for review and extra study during the semester.

COURSE WEBPAGE contains two types of Lectures.

L1. Class Lectures that are very detailed, not too long, containing many examples, exercises, and homework problems solutions. Usually there are 3-5 of them for one Chapter of the book.

L2. Video Lectures that are less detailed and were created especially for the Book Chapters Videos. Students can watch the Youtube Videos chapter by chapter, with exactly the same slides in hand as those used in them.

Both types of Lectures closely follow the book.

Course Objectives

Introduce abstract models of computation such as finite and push-down automata, and analyze their relative expressive power. Explore the connection between abstract machine models and formal languages, as specified by grammars. Enhance students awareness of both the power and inherent limitations of algorithmic computation via the study of Turing machines and/or other abstract computational models.

Course Description

The course is an introduction to the abstract notions encountered in machine computation. Topics include finite automata, regular expressions, and formal languages, with emphasis on regular and context-free grammars. Questions relating to what can and cannot be done by machines are covered by considering various models of computation, including Turing machines, recursive functions, and universal machines.

TESTING

All tests are will given in CLASS. The PRELIMINARY schedule is posted below and on the course webpage. Changes will be posted on the course webpage and on Brighspace .

PRELIMINARY TESTS SCHEDULE

This is a preliminary schedule. The changes and updates, if any, will be advertised in the GENERAL NEWS section the course webpage and on BRIGHTSPACE

EQ1 Thursday, **February 19**
MIDTERM 1 Tuesday, **March 10**
Spring Break March 16 - 21
Q2 - Thursday, **April 9**
MIDTERM 2 Tuesday, **April 21**
Last Day of classes May 8
FINAL May 12, 5:30pm - 8:30pm

MAKE-UP EXAMS POLICY The Course Policy on make-up exams, is consistent with university policy on Student Participation in University Sponsored Events, the policy on Final Exams and the New York State Education Law regarding Equivalent Opportunity and Religious Absences as defined in the UNDERGRADUATE BULLETIN https://www.stonybrook.edu/sb/bulletin/current/

Additionally, we would provide make-up tests in a case of legally documented health problems

Make-up exams will be given only in extenuating circumstances For example doctor's note stating that student is ill and unfit to take the exam. Specific arrangements will be made on a case-by-case basis

Grading and Course General Information

There will be THREE tests: **Midterm 1, Midterm 2**, and **Final**.

GRADING PRINCIPLES

TESTS are "closed book" - no cell phones, no computers, desks must be empty - no extra papers, no any form of communication with other students.

Professor supervises all tests together with course **TAs**. Anybody **violating** these rules would have to immediately submit the test to the **Professor** and **leave** the class.
Student will get **0pts** for the TEST and will be reported, if needed, to the University **Academic Judiciary**, as stated and explained the Syllabus' **Academic Integrity Statement**.

The consistency of your efforts and work is the most important for this course.

Homework assignments

There are two kinds of Homework assignments; Lecture and Book Homeworks.

None of the assignments will be **collected** or **graded**.

Students are responsible for solving the problems and checking their solutions included in Lectures and posted solutions of previous tests.

Students will be **tested** of their homework work by respective questions on **Quizzes** and **Tests**.

Lectures Homework Assignments

Study weekly yes/no questions and examples included in Lectures covered during each week of classes and study relevant posted solutions of previous quizzes and tests that cover material in that week Lectures.

Book Homework Assignments

Homework 1 Covers book pages 1-52.

Problems: Pages 8-9: 1.1.1, 1.1.2, 1.1.4 Page 13: 1.2.1, 1.2.2, Page 18; 1.3.5, 1.3.6- 1.3.8, 1.3.11 Page 23: 1.4.1, 1.4.3 Page 29: 1.5.4, 1.5.8, 1.5.11 Page 40: 1.6.1, 1.6.2, 1.6.4, Page 46: 1.7.2, 1.7.4, 1.7.5, 1.7. 6 Page 51: 1.8.2, 1.8.3, 1.8.5, 1.8.6.

Homework 2 Covers book pages 55 - 83.

Problems: Pages 60-63: 2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1. 7. Pages 73-75: 2.2.1, 2.2.2, 2.2.3, 2.2.9, 2.2. 10. Pages 83-85: 2.3.3, 2.3.4, 2.3.6, 2.3.7 a.

Homework 3 Covers book pages 86 - 120.

Problems: Pages 90-91: 2.4.5, 2.4,8. Pages 120-122: 2.5.1, 2.5.2, 2.5.3, 3.1.3, 3.1.7, 3.1.9, 3.1.10a, c d.

Homework 4 Page 135: 3.3.1, 3.3.2, Page 148: 3.5.1, 3.5.2 a,b .

Turing Machines Pages 191-193: 4.1.1 4.1.3, 4.1.4, 4.1.6, 4.1.7, Page 200: 4.2.2

Solutions to almost all of assigned **homework problems** are included in **posted solutions** of past Quizzes and Tests and in the Class Lectures.

Tests cover Class Lectures and Homework assignments **only** for the portion of material that was **covered** before the dates of tests.

Records of students points are kept on the Bright-space

You have to contact TAs when you have questions about grading and your grade

Previous TESTS

A collection of past Quizzes and Tests with solutions is posted the course Webpage. They are designed to help you to learn what you have learned and what you still don't understand from the material covered by the test. You can take them for your own practice (don't need to submit it)

Grading Components

There will be **2 Midterms** (100pts each) and a **Final** (100pts) examination The consistency of your efforts and work is the most important for this course.

EXTRA CREDIT You can earn up to **25 extra credits** points for the course. There will be 2 Extra Credit Quizzes, 5 points each, total 10pts. Each TEST will include one extra credit PROBLEM (5pts).

Final Grade Computation

None of the grades will be curved.

You can earn up to **300** points during the semester. The % grade will be determined in the following way: # of earned points divided by 3 = % grade.

The % grade is **translated** into a **letter grade** in a standard way i.e.

$100 - 95$ % is A, $94 - 90$ is $A-$,

$89 - 86$ % is$B+$, $85 - 83$ % is B, $82 - 80$ % is $B-$,

$79 - 76$ % is $C+$, $75 - 73$ % is C, $72 - 70$ % is $C-$,

$69 - 60$ % is D range and F is below 60%

Course Content and Schedule

The course will follow the book very closely and in particular we will cover some or all material from the following chapters and subjects.

Chapter 1 Sets, Relations, Languages. (pp. 1 - 53)

Some of it a review material, languages part is new. You can use any other book for the review. Our book is very condensed.

I posted special Lectures Notes (Lecture1 and 2)

Chapter 2 (Part 1) Deterministic and Non-Deterministic Finite Automata and their equivalence. (pp.55- 75)

Chapter 2 (Part 2) Finite automata and regular languages. (pp 75 - 102)

Chapter 3 (Part 1) Context-free grammars and Pushdown automata. (pp. 113 - 140)

Chapter 3 (Part 2) Languages that are and are not context-free. (pp. 141-150)

Chapter 4 Turing Machines (pp 179 -194)

Chapter 5, 6 Church- Turing Thesis, Computability. Computational Complexity - Reading from Additional Text-bookTextbook

SYLLABUS STATEMENTS

Basic Needs

If you are concerned about resources related to your basic needs, including access to nutritious food and stable housing, please contact the Student Support Team. please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or via e-mail at: sasc@stonybrook.edu.They will be able to listen to your story, connect you with possible resources, and provide stigma-free support.

Academic Dishonesty

The following statement about academic dishonesty, is required to be included in syllabi for all undergraduate courses:

"Each student must pursue his or her 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 the academic judiciary website."

Be advised that any evidence of academic dishonesty will be treated with utmost seriousness. Those involved will be prosecuted to the fullest extent permitted by the University and College policies.

Student Accessibility Support Center 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 via e-mail 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 his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at
`http://www.stonybrook.edu/uaa/academicjudiciary/`

Stony Brook University Syllabus Statement If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or
`http://http://studentaffairs.stonybrook.edu/dss`
They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:
`http://www.sunysb.edu/ehs/fire/disabilities.shtml`

Critical Incident Management

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.

SASC Student Accessibility Support Center

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