



Rutgers University  
School of Arts and Science

**01.198.195**

Computer Science Honors Seminar

**Computable Numbers with an Application to the Entscheidungsproblem**

Classroom Section

(1/14/2017 Revision)

Spring 2018 – 1 Credit

Weekly Classroom Sessions

Office Hours: CAVE (Hill Annex, Rm 252, TBA)

Instructor: Lars Sorensen

Email: [biglars@cs.rutgers.edu](mailto:biglars@cs.rutgers.edu)

**Note: To reach me, you will be most successful using email.**

**MEETING DATES**

This course is a brick and mortar old school meet once a week class. We will incorporate SAKAI, online resources and we meet on Thursdays from 12:15pm to 1:10pm unless other plans are made. The class meetings will be in SERC 206. Attending class is mandatory, plan now.

**COURSE DESCRIPTION**

This Honors Seminar course will be reviewing the seminal Alan Turing 1936 work “On Computable Numbers, with an application to the Entscheidungsproblem.” This course will examine the life and works of Alan Turing with a concentration on dissecting his seminal paper. While unpacking this 36 page paper we will discuss the foundations of computer science, explore the limitations of computing and contextualize the work's place in history. While Turing will be the semester's story arc, we will have monthly "Monster of the Week" classes that examine topical issues in computer science like BitCoin, Stuxnet and Cryptography, Computer Science education and Computer Gaming. As an Honors seminar, we will also discuss topics related to computer science research. We will discuss using the library, literature reviews, methodologies, theoretical frameworks, and experimental design. Students will be expected to do their weekly readings, weekly SAKAI postings as well as choose a topic and produce a short paper and poster for a final project.

## COURSE OBJECTIVES

Upon completion of this course, candidates can expect to:

1. Gain experience and knowledge on specialized Computer Science topics.
2. Have the ability to understand the underpinnings and methodologies of computer science research.
3. Understand the anatomy of a research paper.
4. Understand the historical importance of Turing and his foundational 1936 paper.

## OVERVIEW OF COURSE ACTIVITIES

The course includes weekly readings, some additional web content, discussions in the discussion forums of SAKAI, a major project, and a poster session presentation.

## COURSE MATERIALS

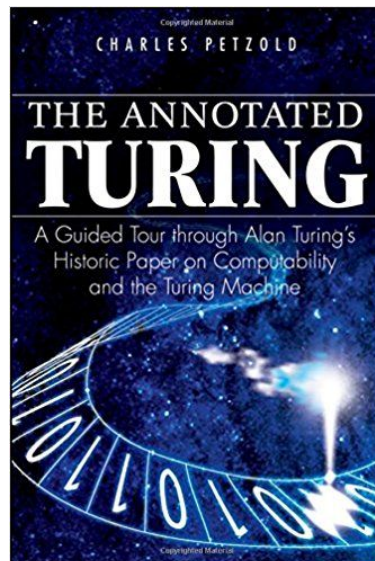
Petzold, Charles (2008). The Annotated Turing - A guided tour through Alan Turing's historic paper on computability and the Turing machine (1st Edition). Wiley Publishing Inc. (Referred to as Petz or AT in the slides).

**ISBN-10:** 0470229055

**ISBN-13:** 978-0470229057

Available on Amazon :

<https://www.amazon.com/Annotated-Turing-Through-Historic-Computability/dp/0470229055>



Other required readings will be made available online and as referenced

## MAJOR COURSE REQUIREMENTS

**Class Participation:** This class will try to follow a grad school model as closely as possible, therefore class participation will be crucial. Be prepared when you come to class and contribute to the discussion accordingly.

**Student discussion:** Students will participate in on-line discussions of the assigned readings and other special topics. You are encouraged to provide evidence for your statements with cited sources from your assigned readings. Basically, it will be a place to ask questions, make comments and, from time to time, display knowledge that lets me know you're learning.

**Course project:** As we go through the semester we will be learning about the components of research papers. Literature reviews, methodologies, reporting results, etc. The majority of your grade in this course will be based on a modest (I realize this is a 1 credit course) paper and a poster session. As an Honor's session course it's likely that students may go on to graduate school so this is meant to give students some exposure to these topics. Students who believe their futures may lean towards start-ups and business as opposed to graduate school may talk to me about doing a business plan instead of an academically formatted paper. We will discuss further in class. Requirements for this course will be released in the first few weeks of the course.

## COURSE TIPS

### Communication

- Discuss, evaluate, and summarize content and context of reading assignments;
- Share resources, ideas, and make suggestions; and
- Discuss and clarify class activities.

I am readily available through email most of the time. In addition, I am available during the office hours posted above for scheduled conferences, including weekends. I'm a nightowl. If you ping me at 2am you may very well get a prompt response. Early AMs, say 9am, not so much ;-)

### Guidelines for Email correspondence

- Use a descriptive subject heading
- Follow acceptable e-mail etiquette; and
- Be concise, write short sentences, and use bulleted lists.

### Code of Ethics

Students of the university must conduct themselves in accordance with the highest standards of academic honesty and integrity. Plagiarism or violations of copyright policies are a form of academic dishonesty and are treated as ethics violations. The University Code of Student Conduct covers student

rights and responsibilities, student complaint procedures, student misconduct, student disciplinary procedures, and other related information.

The Rutgers University Code of Student Conduct can be accessed at:

<http://studentconduct.rutgers.edu/university-code-of-student-conduct>

For information on the Rutgers University academic integrity policy, please go to:

<http://studentconduct.rutgers.edu/academic-integrity>

For any and all assignments and class activities, including quizzes, tests, papers, projects, PowerPoints, and any other class related work, **no copying of any kind is allowed**, unless copied text is placed within quotations and the author/source is appropriately cited. Excessive use of quoted material in essay assignments, quizzes, and tests is strongly discouraged, and this will tend to result in lower grades as candidates need to express themselves using their own language. Clear evidence of extensive plagiarism will result in a grade of F for the assignment AND the course.

## COLLABORATION

Students are encouraged to study and learn together. Another student is often the best resource for working out a complex computation or understanding a difficult concept. In order to allow students to work together, yet submit assignments that represent their own thought, the *Gilligan's Island* and the Freedom of Information rules are adopted.

**The *Gilligan's Island* Rule:** You are free to meet with fellow students and discuss an assignment with them. Writing on a board or shared piece of paper during the meeting is acceptable; however, you should not take any written (electronic or otherwise) record away from the meeting. Everything that you derive from the collaboration should be in your head. After the meeting, engage in at least a half-hour of mind-numbing activity (like watching an episode of *Gilligan's Island*\*), before starting to work on the assignment. This will assure that you are able to reconstruct what you learned from the meeting by yourself.

**The Freedom of Information Rule:** To assure that all collaboration is on the level, you must always write the name(s) of your collaborators on your assignment.

\* *Gilligan's Island* was a 1960s sitcom that set the standard for dim-witted TV. *Seinfeld* or anything more intelligent, e.g. some PBS programming, also works for this purpose.

## LATE ASSIGNMENTS POLICY

All assignments are expected on time. Late assignments will receive a reduced grade, generally the equivalent of 10% of the total possible project grade per day late (or part thereof) with no chance of late submission after the third day. Students with bona fide emergencies should contact the instructor as soon as possible to discuss special arrangements in order to avoid grade penalties. The instructor will work constructively and collaboratively with students who communicate early regarding special problems completing assignments on time but will not be supportive of last minute requests for extensions on project due dates. **No late submissions for the final project components will be accepted.**

## ACCOMMODATIONS FOR RELIGIOUS OBSERVANCE

I will of course accept a student's assertion of the need to be absent from class or unable to use a computer on a certain day for religious reasons, but students are required to notify me in advance that they will miss class or be unable to work in order to observe a religious holiday.

## ACCOMMODATIONS FOR DISABILITIES

Rutgers University welcomes students with disabilities into all of the University's educational programs. To receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentationguidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS website at:

<https://ods.rutgers.edu/students/registration-form>.

## COURSE GRADING PLAN

Classroom Participation: 40 points

Discussion Posts: 40 points

Course Project: 120 points

### Course Grades: (out of 200 possible points)

GRADE	PERCENT	POINTS
A	90.00 – 100.0 %	Point totals will be converted to percentages.  Any mid-course modification of course assignments that result in changes to possible point totals will be reflected accurately as percentage of total possible points earned.
B+	87.00 – 89.99 %	
B	80.00 – 86.99 %	
C+	77.00 – 79.99 %	
C	70.00 – 76.99 %	
D/F	Under 70 %/60%	

## SCHEDULE OF UNITS AND CONTENT COVERAGE

Class	Date	Topic	Due
1	1/18	Introductions - A quick overview of the course - A look at our text and an introduction to Alan Turing	
2	1/25	Turing - Foundations - Readings Assigned in SAKAI Research Paper Talk - Libraries	
3	2/1	Monster of the week class: Stuxnet, Crypto, DDOS, Hacking	
4	2/8	Prof Eric Allender - Professor Allender comes to class to discuss CS theory and his research	
5	2/15	Turing - Computable Numbers part 1 - Readings Assigned Research Paper Talk - Literature Reviews	
6	2/22	<b>SIGCSE WEEK - There will be no class this week</b>	
7	3/1	Monster of the week class: Bitcoin	
8	3/8	Turing - Computable Numbers part 2 - Readings Assigned Research Paper Talk - Methodologies	
9	3/22	Monster of the week class: CS Education	
10	3/29	Turing - Hilbert Problems and The Entscheidungsproblem Research Paper Talk -	
11	4/5	Monster of the week class: Gaming in Education	
12	4/12	Turing - WWII and Artificial Intelligence Research Paper Talk - putting it all together	
13	4/19	Prof Abhishek Battacharjee - Professor Battacharjee comes to discuss systems and his research	
14	4/26	Poster Session and Party	