CS363 -- Computability Theory

Course Syllabus -- Spring 2016

COURSE INFORMATION:

Time: 12:55pm--3:40pm, Tuesday

Location: Dong Zhong Yuan 3-103（东中院 3-103）

February 2016

week	S	M	T	W	T	F	S
		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
(1)	21	22	23	24	25	26	27
(2)	28	29					

March 2016

week	S	M	T	W	T	F	S
(2)			1	2	3	4	5
(3)	6	7	8	9	10	11	12
(4)	13	14	15	16	17	18	19
(5)	20	21	22	23	24	25	26
(6)	27	28	29	30	31		

April 2016

week	S	M	T	W	T	F	S
(6)						1	2
(7)	3	4	5	6	7	8	9
(8)	10	11	12	13	14	15	16
(9)	17	18	19	20	21	22	23
(10)	24	25	26	27	28	29	30

May 2016

week	S	M	T	W	T	F	S
(11)	1	2	3	4	5	6	7
(12)	8	9	10	11	12	13	14
(13)	15	16	17	18	19	20	21
(14)	22	23	24	25	26	27	28
(15)	29	30	31				

June 2016

week	S	M	T	W	T	F	S
(15)				1	2	3	4
(16)	5	6	7	8	9	10	11
(17)	12	13	14	15	16	17	18
(18)	19	20	21	22	23	24	25
	26	27	28	29	30		

Total: 18 weeks, 16 classes

- Class Day
- Holiday
- Final Exam Week

INSTRUCTOR INFORMATION:

Name: Xiaofeng Gao（高晓汎）

Office: Telecom Building 3-543

Phone: 021-34207407

Email: gao-xf@cs.sjtu.edu.cn (best way to contact with me)

Office Hour: By appointment (Please mention your class ID and purpose in email beforehand)

Teaching Assistant: Xudong Zhu（朱旭东）, Email: nongeek.zv@gmail.com

COURSE PREREQUISITES:
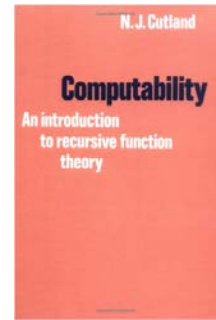
Discrete Mathematics

TEXTBOOK:

Title: Computability: An Introduction to Recursive Function Theory
Author: Nigel L., Cutland
Publisher: Cambridge University Press, 1980
ISBN-10: 0521294657   **ISBN-13:** 978-0521294652

EVENTS AND GRADING:

The final grade will be derived from your performance on the tests, and assignments. The class participation is shown as follows:

Events:		Grading Policy:	
Midterm Exam	30%	90-100%	**A**
Final Exam	30%	80-89%	**B**
Assignments	30%	70-79%	**C**
Class Participation	10%	60-69%	**D**
Total	100%	59% and below	**F**

WEBPAGE AND MATERIALS:

- All the class materials (slides, references), homework assignments, announcements, and other information can be seen from http://cs.sjtu.edu.cn/~gao-xf/computability/
- Please check the webpage often to get the up-to-date information.

INSTRUCTOR/COURSE POLICIES

Common Sense Notices

- Please attend every class and do not be late. **15-minute** late attendance is considered absent.
- Please turn off all cell phones, buzzers, and other noisy electronic devices during class time.
- Please show common courtesy to your fellow classmates and professor.

Homework

- **English only**. Each takes around 2%, Bonus for optional questions.
- **Late assignments**. Every effort should be made to hand assignments by the due date and time. NO late submission is accepted. Missed work will result in a grade of ZERO.
- **Academic dishonesty**. Your work must be your own. Cheating will result in a grade of 0 for the applicable assignment; further disciplinary action, including assigning a failing grade for the entire course and reporting your name to the department may also be taken.

Email Netiquette

- My response will be irregular on the weekend or when I am away from campus.
- When you email me you should consider the email as official correspondence. As such, the email should not appear as a text message but should have proper grammar and punctuation. The email title should include: **Class ID/Your Purpose.** An example is below.

(Email Title: Want a material for midterm—CS363)

Dear Dr. Gao,

    My name is John Smith. I'm from your class CS363-Computability Theory. I will not attend tomorrow's class due to sickness. Can you send me a copy of the midterm review so I may use it as a study tool? Thanks a lot.

Sincerely Yours,

John Smith

TENTATIVE SCHEDULE: (These dates could be changed depending upon the pace of the course)

Week	Date	Lecture Topic	HW	Exam
1	Tue.23	**Syllabus, Preliminary, Proof** Schedule, Grading Policy, Set, Functions, Symbols, Notations.	Lab-01	
2	Mar.01	**Chapter 1: Computable Functions** Decidable, Computable, URM, Algorithms, etc.	Lab-02	
3	Mar.08	**Chapter 2: Generating Computable Functions** Basic Functions, Substitution, Recursion, Minimalisation, etc.	Lab-03	
4	Mar.15	**Chapter 3: Church's Thesis** Godel-Kleene, Turing-Computability, Church's Thesis, etc.	Lab-04	
5	Mar.22	**Chapter 4: Numbering Computable Functions** Numbering programs, Diagonal Method, s-m-n Theorem, etc.	Lab-05	
6	Mar.29	**Chapter 5: Universal Programs** Universal functions and programs, Applications, Effective Operations etc.	Lab-06	
7	Apr.05	**Chapter 6: Decidability, Undecidability, and Partial Decidability** Undecidable programs, Diophantine, Sturm's algorithm, etc.	Lab-07	
8	Apr.12	**Review from Chapter 1 to Chapter 6** Tutorials, Exercises	No Lab	
9	Apr.19	Application. Exercises. Midterm.		**Midterm**
10	Apr.26	**Chapter 7: Recursive and Recursively Enumerable Sets** Recursive Sets, Recursively Enumerable Sets	Lab-07	
11	May 03	**Chapter 7: Recursive and Recursively Enumerable Sets** Productive Sets, Creative Sets, Simple Sets, etc.	Lab-08	
12	May 10	**Chapter 7: Recursive and Recursively Enumerable Sets** Comparisons, Exercises.	Lab-10	
13	May 17	**Chapter 9: Reducibility and Degrees** Many-One Reducibility, Degrees, etc.	Lab-11	
14	May 24	**Chapter 9: Reducibility and Degrees** Turing Reducibility, Turing Degrees, etc.	Lab-12	
15	May 31	**Chapter 8: Godel's Incompleteness Theorem (TBD)** Formal Arithmetic, Incompleteness, Godel's Theorem, etc.	Lab-13	
16	Jun.07	**Review from Chapter 7 to Chapter 9** Tutorials, Exercises	No Lab	
17-18	TBD	**Review. Exercises. Tutoring. Final Exam**		**Final**