Matemáticas Computacionales (TC2020)

Agosto–Diciembre, 2018

Instructor:	Xavier Sánchez Díaz	**Hora:**	LuJu 11:30 – 13:00
Email:	sax@itesm.mx	**Lugar:**	TBD

Páginas del curso:

1. https://saxarona.gitlab.io/teaching/tc2020

Horario de oficina: TBD.

Material recomendado: Ésta es una lista de recursos que pueden ser de utilidad durante el curso. No es mala idea que los consultes ocasionalmente.

- Libro 1
- Libro 2

Objetivos: Al final del curso, el alumno:

- será capaz de **abstraer modelos discretos relevantes y adecuados, a partir de situaciones que observa en el mundo real**, en términos de conceptos de estados, transiciones, autómatas, expresiones regulares y gramáticas;

- aplicará **transformaciones** a los modelos antes mencionados, tales como la simplificación o conversión a formas más convenientes que permitan llegar a la solución abstracta del problema a resolver;

- distinguirá entre aquellos problemas **resolubles** y aquellos que son **imposibles** dentro del campo, para evitar perder el tiempo tratando de resolver problemas que se sabe que no tienen solución;

- aplicará **soluciones abstractas en el mundo real** aportadas por los métodos de autómatas y lenguajes, considerando que los modelos abstractos son una *simplificación útil* y no una *verdad inmutable*.

Requisitos: Haber cursado Matemáticas Discretas (TC1003) y Estructura de Datos (TC1018).

Índice analítico del curso: El curso está dividido en tres módulos—Lenguajes regulares, lenguajes libres de contexto y lenguajes recursivamente numerables.

Lenguajes regulares

▌Conceptos preliminares
  ▌Conceptos matemáticos
  ▌Lenguajes formales
▌Teoría de los lenguajes
  ▌Máquinas de estados finitos
  ▌Autómatas finitos determinísticos
  ▌Autómatas finitos no determinísticos
▌Lenguajes regulares
  ▌Expresiones regulares
  ▌Gramáticas regulares
  ▌Análisis Léxico

Lenguajes libres de contexto

▌Lenguajes libres de contexto
  ▌Jerarquía de Chomsky
  ▌Gramáticas libres de contexto
  ▌Propiedades de las gramáticas
▌Análisis sintáctico
  ▌Análisis sintáctico descendente
  ▌Análisis sintáctico ascendente

Lenguajes recursivamente numerables

▌Tópicos avanzados
  ▌Máquinas de Turing
  ▌Decidibilidad
  ▌Computabilidad

Política de evluación: Tareas (30 %), Quizzes Examen de medio término (20 %), Examen Final (20 %).

Fechas importantes:

Midterm #1 ... Ābān 16, 1393 ≡ November 7, 2014
Midterm #2 ... Āzar 21, 1393 ≡ December 12, 2014

Políticas del curso:

- Please sign up for AeLP. I will confirm your enrollment for the course, then you will be able to see the course page.

- We have weekly homework and quiz. You will be given a quick quiz (based on the given homework) on the day that the homework is due. You are allowed to use your homework solutions to help you on the quiz, but not anything else.

- Late homework will never be accepted. Homework not submitted online before the deadline and/or not turned in with the quiz will be considered late.

- Homework solutions must be typeset (preferably using LaTeX), and all programming codes should be well documented.

- Nearly perfect solutions may be considered as an official solution of that homework and will be uploaded to the course web site, and the student gets a bonus mark.

- All homework solutions, programming codes, etc., must be submitted both electronically (through AeLP) and in class (along with the quiz). For electronic submission, create a folder (directory) on your computer, put your files all in there, zip the package, and submit it once you get them done. You can submit your files only once, and you are NOT allowed to edit the files after submission, so read/edit your files carefully before submission. If there is something that you would like me to know while grading your assignment, please write it in the comment box above the submit button or create a file called README in that directory and write your message there. So, please do not mail your homework solutions, codes, etc to me.

- You may discuss homework problems with other students, but you must write up your homework independently in your own words. You are not allowed to search the Web for solutions, as AeLP is equipped with a built-in plagiarism detector.

- Your lowest homework-quiz score will be dropped when calculating your final homework-quiz grade.

- The exams may or may not be take-home. If not, by default, all exams (midterms and final) are closed book, and you are not allowed to use any electronic devices such as mobiles and tablets.

Políticas de clase:

- Regular attendance is essential and expected. A student who incurs an excessive number of absences may be withdrawn from the class at the instructor's discretion.

- Be courteous when using mobile devices. Make sure your cell phone is turned fully off, or silent. No texting, reading emails, playing games, or whatever else it is that people do with those wretched gizmos.

- If you must use a laptop in class, then turn off the sound and do not type on laptop keyboards which is really distracting.

- Missing one class could easily lead to a disastrous domino effect. If you have to miss a lecture, then I strongly recommend you study the material you missed before you return to class. I require that you know all material covered in class. You are responsible for making up anything that was covered in lectures you missed. If you miss a lecture, I recommend doing the following:

- Photocopy, and read notes from someone who was in class,

- Reading the relevant sections from the lecture note, texts, Wikipedia, etc.

After you have done this, you may contact me if you need clarification on any materials.

Honestidad académica: Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

☞ I certainly impose a sanction on the student committed to any academic fraud. It varies depending upon the instructor's evaluation of the nature and gravity of the offense. Possible sanctions include but are not limited to, the following: (1) Require the student to redo the assignment; (2) Require the student to complete another assignment; (3) Assign a grade of **zero** to the assignment; (4) Assign a final grade of **zero** for the whole course.