

OAKLAND UNIVERSITY
Department of Mathematics and Statistics
Student Information Sheet and Syllabus

COURSE: **APM 3430, Theory of Computation**, 4 credits
(Equivalent of **CSI 3430, CRN 14460**)

SEMESTER: **Winter 2018**

Faculty	Office	CRN	Class Time	Room	Phone
László Lipták	368 MSC	13829	Tu Th 3:30–5:17 PM	281 EC	370-4054

E-MAIL: liptak@oakland.edu

WEB: <https://files.oakland.edu/users/liptak/web/apm3430.html>

You should attend every class.

OFFICE HOURS: Wed 1:30–2:30 PM, or by appointment. During office hours I let everyone who showed up into my office and discuss questions in a round-robin manner. If you need to meet me at a different time, ask me for an appointment. Before you ask for help I expect you to give a serious attempt to solve the problem, i.e., know the relevant definitions and theorems and spend at least 15 minutes thinking about possible solutions.

PREREQUISITES: A 2.0 or better in APM 3610 or CSI 3610 for APM 3430. If you do not meet the prerequisites, please come and see me in my office.

TEXT: *Introduction to Languages and the Theory of Computation*, by John C. Martin (fourth edition, McGraw-Hill, 2011). Previous editions are also acceptable, though references about the textbook will usually correspond to the fourth edition.

COURSE OBJECTIVES: This course gives an introduction to the theory of computation, languages, and complexity.

HOMEWORK: There will be three or four Homework Assignments worth 10% of the final grade overall. Your solutions should be nicely presented. Write as clearly and cleanly as you can, **use sentences**, and explain the steps of the solution. I encourage you to work in groups and discuss the problems and their solutions with each other. However, the actual solutions you submit should be your own work (see ACADEMIC HONESTY for more info). You may form a team with another student and submit solutions together. If you do, clearly indicate both names on the submissions. You will have a chance to resubmit each assignment once with no penalty. Scores will be available on Moodle. Solutions for homework assignment problems will rarely be discussed in class. If you have questions about the homework, ask me during office hours.

MIDTERM EXAM: There will be a midterm exam worth 40% of the final grade on Tuesday, March 6. This will be a closed-book exam; notes and textbooks will not be allowed. Scores will be available on Moodle.

FINAL EXAM: **The Final Examination is comprehensive.** It will be given on **TBD** and will be worth 50% of the final grade. Calculators or notes will not be allowed.

GRADING POLICY: Your course grade will be based upon your homework assignments, midterm and final exams. The percentage score you get will be converted to a final grade. The exact conversion scheme will be determined at the end of the term, and will follow the conversion: 50% → 1.0, 95% → 4.0, linearly in between. I reserve the right to make adjustments if I deem it necessary.

ACADEMIC HONESTY: Cheating is a serious academic crime. Oakland University policy requires that all suspected instances of cheating be reported to the Academic Conduct Committee for adjudication. Anyone found responsible of academic misconduct in this course may receive a course grade of 0.0 at my discretion in addition to any penalty assigned by the Academic Conduct Committee. Working with others on an assignment does not constitute cheating (unless explicitly forbidden); handing in an assignment that has essentially been copied from someone else or from an online resource does.

STUDY HABITS: I can only guide and help you by providing the framework for the course: **you are responsible to learn the material.** Most of this learning must take place *outside* the classroom. This will usually take two to three hours outside of class for each hour in class, but may take longer in some cases. Our aim is to be able to apply the material to new situations, hence the focus is on understanding rather than merely memorizing. How can you achieve that?

- *Read the textbook:* This must be done carefully and slowly. You may need to re-read and analyze sentences, since the text is very dense, unlike a novel. You should have pencil and paper ready to work with while reading to draw pictures and fill in omitted steps. Understand and **learn** the definitions and the proofs of important theorems. Whenever possible, read the relevant sections *before* we discuss them.
- *Ask questions:* In class, during office hours or an appointment. If you have difficulties or get stuck on a problem, get it clarified as soon as possible. If you make a mistake, rework the problem with the idea that you will avoid similar mistakes later.
- *Review the material regularly:* It will take time and practice to digest and really understand the new concepts and theorems.
- *Study with others:* If you can, discuss solutions to problems with your classmates.

EMERGENCY CLOSING: If the university should close due to inclement weather or other emergency at the time of the final exam, the missed exams will be made up in sequence on the first day or days after the end of the originally scheduled final examination period in the same room and at the same time as originally scheduled (i.e. if only one examination day is missed, it will be made up on Thursday, April 26th).

INTENDED SYLLABUS: Time permitting we will cover the following chapters:

- Chapters 1.4–1.6: Languages, Recursive Definitions, Structural Induction
- Chapters 2–3: Regular Expressions and Finite Automata
- Chapters 4–6: Context-Free Grammars and Pushdown Automata
- Chapters 7–8: Turing Machines and Enumerable Languages
- Chapter 9: Unsolvable Problems
- Chapter 11: Complexity Theory, P and NP

IMPORTANT DATES:

January 15	Martin Luther King, Jr. Day (no classes)
January 17	Last day for “no-grade” drop and adding a class
February 18–25	Winter recess (no classes)
March 14	Last day official withdrawal and drops
April 17	Winter classes end 10:00 PM
TBD	Final exam