

Course Syllabus
Switching and Finite Automata Theory

Professor: Dr. Frank L. Severance
Office: Room A-239, Parkview Campus
Office phone: 276-3161
Home phone: 372-2237
E-mail: *frank.severance@wmich.edu*

Office Hours: All office hours will be held in room A-239, Parkview campus
Monday: 2:00 to 3:00 pm
Tuesday: 2:00 to 3:00 pm
Wednesday: 2:00 to 3:00 pm
Thursday: 2:00 to 3:00 pm
Friday: 2:00 to 3:00 pm

Prerequisites:

ECE 2500, reasonable programming skills (Visual Basic is ideal, but don't worry if you are unfamiliar with this) and senior/graduate student status in Electrical Engineering, Computer Engineering, Computer Science, Mathematics or equivalent. Generally this means that you should have a healthy degree of mathematical maturity, an understanding of elementary digital logic (ECE 2500 or MTH 1450) and experience programming using a high-level computer language.

Text:

There is no required published text for this class. However, there is a set of notes, along with exercises, and a partially completed text written by the professor. Copies of these materials are available on the course web-site. There is no problem if you wish to print copies of these materials, but you are advised to use your own print resources since the computer center monitors printer usage and this will exceed your assigned limits! You should be able to successfully navigate the course by simply attending all lectures, taking good lecture notes and procuring these materials, which we will use extensively in each lecture. Therefore, you should be in the habit of bringing them to class regularly.

Grading:

There will be nine regular "paper and pencil" problem sets assigned uniformly throughout the course and three "computer" assignments that will require some elementary programming. There will also be three midterm tests and one comprehensive final examination. The relative weight of each will be as follows:

10 problem sets:	20%
3 computer assignments:	10%
3 tests (15% each):	45%
1 final examination:	25%

The final grading scale will be based on overall class performance. Your grades and class standing will be published regularly. If there are any questions or concerns, do not hesitate to discuss them with me.

All graded work, including the assignments, is expected to be your own. Failure to observe this rule will result in action by the office of *Student Judicial Affairs* and may result in a failing grade for the course.

Course Description:

ECE 5520 is an introduction to classical switching and finite automata theory. This course forms the basis upon which computer engineering is founded. Specific topics include...

- Mathematical foundations
- Switching algebras
- Minimization of switching functions
- Functional decomposition
- Gated and contact networks
- Symmetric functions
- Threshold logic
- Fault identification and detection
- Synchronous sequential circuits
- Iterative networks
- Finite state machines
- Asynchronous circuit design, including both fundamental and pulse modes
- Turing machines
- Mealy and Moore machines
- State-machine programming
- Structure of sequential machines
- Minimization of sequential machines
- Linear sequential machines
- State reduction and canonical forms of linear machines
- Regular expressions

If you are a student choosing to obtain an MS in Computer Engineering, this is a required course. Since you will encounter this material throughout your advanced studies, it is strongly recommended that this be taken in the first semester of your graduate program.

If you are expecting to apply for a teaching assistantship, note that it is expected that you will have had this course before the ECE department considers you fully qualified to teach a computer engineering lab in either ECE 2500 (Digital Logic) or ECE 3550 (Digital Design). Also, note that I will personally not support any candidate to teach any computer engineering course (including ECE 2510, 3500 and 4510) without first having taken this course.