Course Project Information
Elec 422, VLSI Design I

The project is not predefined and individual groups will be allowed to design any reasonable project that they define with the instructor. The general theme for many of the previous projects has been a CPU. Due to time and area limitations, however, implementation of a full CPU is out of the question. Therefore, some of the possible paths are:

- ALU/Calculator: If you chose this path, you will implement an 8-bit ALU/Calculator, with typical set of capabilities, i.e. add, subtract, multiply, boolean and shift operators, etc. Particulars of the specifications are left to you (project definition).
- Mini-CPU: If you chose this path, you will implement a mini-CPU, with minimal 4-bit ALU and memory handling functionality. You will likely not implement a multiply. In this case, you will have to worry about reading and decoding opcodes, and handling the data and address buses. Particulars of the specifications are left to you (project definition).
- Any other implementation of some application or method; say, a circuit performing some communication or signal processing algorithm.

Notes:

1. It is natural to want to know what is expected of you in the course project, but it is equally important to realize that this project is not like a homework. Homeworks are usually made up of well-defined questions to which a single correct answer exists, and the goal is to find that answer. In the course project, even the question is not entirely known to you. This is not a coincidence, or an unhappy accident; you are put in this position for a purpose. In the real engineering world, this situation is the norm, and not the exception. Often there exist many degrees of freedom to the design, where the variables governing these degrees of freedom are partially or completely unknown (e.g. introduction of a product by competition, money problems at other parts/levels of the corporation, stock market, sudden introduction of a new technology, or even much simpler: a new product whose complexity/feature tradeoffs are not known yet). Project definition in the presence of uncertainty is something that you will have to deal with many times in your engineering career. The case of this course project, of course, is much simpler: you will start project definitions on your own, but will refine them in consultation with me.
2. On a more practical note: be warned that historically, students have consistently underestimated the amount of work needed to finish their projects. *It is of paramount importance that your project be finished;* you must have a working layout at the end of the semester. The systems definition of your project may sound simple at the beginning of the semester, but most of the challenge in this course is neither at the algorithmic nor logical level. Most of the work lies in the hierarchical design, layout and verification phases of the project. If you set your goals realistically, you can eliminate the need for cutting back later in the semester, which is a very inefficient process.