The Sac State Senior Design course might be your first introduction to the organized method called System Design. Much of what we view as System Design at least partially came out of large scale military and federal (U.S. government) procurement. [1] Large, complex and costly projects require that clear goals and system requirements be defined and adhered to in the development and implementation of the desired system, process or procedure. While Senior Design may feel like a large, complex and costly project, in industrial terms this is not the case. But Senior Design is an ideal platform for the introduction of the methods that can be used in any project, large or small, that seek to maximize success in the face of the normal shortages of time, knowledge and money.

As a senior design student, you should take the time to read about system design so that you minimize unproductive time, particularly in the early part of the course. As an example, Rapid Application Development (RAD) as discussed by Walter Maner details many best practices. The following figure shows a typical software rapid development cycle.

![Rapid Application Development using Iterative Prototyping](image)

**Figure 1. Maner – RAD Development Cycle**
See the referenced link for a software related RAD discussion. [2] The author has a very good list of pros and cons near the end of this short discussion. Well worth reading.

The full description of the System Design is beyond the scope of this short reading assignment. But a crucial feature of System Design is that it is applicable to projects at all scales and for projects from any discipline or combination of disciplines. Tammy Noergaard in [3] lists four essential phases for embedded system design. Quoting from her text:

Phase 1. *Creating the architecture*, which is the process of planning the design of the embedded system.

Phase 2. *Implementing the Architecture*, which is the process of developing the embedded system.

Phase 3. *Testing the System*, which is the process of testing the embedded system for problems and then solving those problems. (my emphasis added)

Phase 4. *Maintaining the System*, which is the process of deploying the embedded system into the field, and providing technical support for users of that device for the duration of the device’s lifetime.

Noergaard has much more to say about these four phases in her text. But note the flow: clear definition of system requirements, survey of tools and skill sets, selection of prototype implementation, testing of the prototype, revision of the prototype and deployment of the system. You will find each of these phases in your senior design. Skip any of these steps and the risks of the project needlessly grow. From day one of your senior design experience, strive as a team to work smart (employ system design). You will discover that working hard comes with the territory.
References

Available at: http://www.its.bldrdoc.gov/fs-1037/fs-1037c.htm

Available at: http://csweb.cs.bgsu.edu/maner/domains/RAD.htm#12