Welcome!
I and the entire teaching staff for CSE141 want to welcome you to this class. We are looking forward to the opportunity to get to know you, interact with you, and work with you to explore and develop your understanding of computer architecture.

What does this course offer to me?
No matter whether you plan to design processors, code for embedded devices (like cell phones), develop the next great search engine, or manage an international team developing cutting edge biological simulations – any career in computer science will have you interacting with and utilizing computers to solve problems. In this class, our goal is to help you understand the critical issues behind the design and implementation of modern computer processors in a way that you can most effectively utilize computers as resources.

Everyone wants their computer (and program) to run faster. Sometimes it’s critical – do you want your cure for cancer tomorrow, 10 years, or 100 years from now? One major component to a program’s efficiency is due to its algorithmic design. As a simple example, you know from CSE100 that different data structures can influence data access times. However, another key component to understanding and designing program efficiency lies in developing a deeper, more detailed understanding of how the computer actually executes the algorithmic instructions that you give to it via a program written in a programming language.

The development of this deeper understanding and the ability to apply it is what we offer to you in this class. Our goal is to work with you to help you develop a more realistic, complex mental model of how the computer executes programs – in order that you will be able to write better programs and to advise others on the design and development of efficient and effective programs to solve whatever problems you are engaged in solving.

How, exactly, am I going to accomplish this?
The class has two components – “lecture” and lab. They are designed to fit together.

In CSE141 we’ll:
- Be following a somewhat historical approach to exploring processor design.
- Build simple designs, identify difficulties and inefficiencies in those designs, and develop more complex designs to address these problems
- Before class: Read the book, like it’s a mystery novel. Understand the current design, but be wary – be thinking critically about what is ineffective, or inefficient.
- In class: I’ll expect you to be familiar with the basics – but I’ll realize that you are not an experienced Sherlock Holmes when it comes to the mysteries of processor design. So I’ll set up questions, conundrums, and experiments for you to engage in during class to discover and explore the details of various problems with a processor design.
• I’ll expect you to be active in the process. It’s not the specific designs we want you to have memorized, it’s the process of evaluating a design for strengths and weaknesses that we want. This is what will be useful for you later in your career. It’s a more specialized, detailed understanding of the computer’s functionality and how it impacts efficiency of program execution that we want. You may be stuck with hardware, and need to design a program most efficiently on it, or you may be stuck with software and want to design the most efficient hardware.

In CSE141L we’ll:
• Give you the chance to break the mold and design a specialized (not general purpose) processor.
• Ask you to be creative, evaluate options, create new ideas – every team’s design will be different.
• Guide you through the (somewhat painstaking) design EXPERIENCE. You may not do it every day of your life, but having done it ONCE will give you invaluable, first hand understanding of the complexities.
• Engage you in a team-design and implementation experience.

How will I (and the professor) know if I am making progress in my learning?
In CSE141 you will be engaged, daily, in formative assessment opportunities – that is, ungraded, problem-based activities that will be designed to help you test your knowledge and understanding of the material. This will give you the opportunity to practice techniques that will be useful to you later in your career and at the same time to help you prepare for graded, summative assessments.

We’ll have weekly summative assessments (aka, graded quizzes) which will give you the opportunity to gauge your own mastery of the material regularly and allow you to prepare for the midterm and final exam. Additionally, weekly homeworks will give you the chance to engage in analysis and preparation for quizzes and exams outside the classroom. We will not be able to grade all the homework necessary to fully prepare you for quizzes and exams, but we will make additional recommendations of homework questions which you can do to help yourself prepare. We will be prepared to discuss those questions with you and we strongly recommend that you work jointly with others on non-homework problems and engage in discussion of them.

In CSE141L you will be engaged in team-based design and development of a processor. There will be 3 assigned labs based around the design and implementation of an application-targeted processor. You will be introduced to each lab component and will work with your partner to engage in the practical application of skills learned in class in the creative process of a processor design. Each lab will culminate in the creation of a lab document (based around a set of questions we expect you to have answered in the process of completing that lab) and a short (approximately) 10 minute team presentation of the work accomplished during that lab. This combination of assessment techniques is designed to give you experience with common industry practices where you will be expected to explain and describe the rationale behind your work on a project.