

Study Suggestions

Learning New Concepts:

- Before a new chapter is discussed in class, you may find it useful to read ahead in the text book (without worrying about all of the details) to obtain a very general idea of the topic to be discussed.
- In the lectures I will try and make sure you know when we are studying fundamental concepts and the underlying theory and when we are doing applications of the theory (examples). It is very important that you understand the difference. When reading the textbook you should also be sure to distinguish between the basic theory and applications. Most chapters contain only a few basic concepts with many applications.
- You should try to follow the lectures very carefully and write detailed notes that you will understand later. Most of the *Power Point* slides used in class will be available on the course web page. You should download the slides before class so that you can add notes to the slides. As soon as possible after the lecture go over your notes to make sure you understand the material. You should, of course, read the text book too. If there is something in your notes that you do not understand check the textbook and make any necessary additions or revisions to your notes. If there is still something you do not understand then see me or your recitation instructor for help.
- Be sure that you understand the examples we cover in class. You must understand the concepts and theory *before* you can expect to successfully do applications (examples). Even a good understanding of the basic theory does not automatically guarantee that you will be immediately successful in doing.
- The only way to develop good problem solving ability and confidence is through practice which is the main purpose of the recitation classes.

Problem Solving Strategies:

- Read the problem very carefully making sure that you do not overlook a valuable piece of information.
- Draw a diagram and transfer all of the known quantities to the diagram. This step can save you a lot of time since once the information is organized in the figure you do not have to keep reading the problem over and over as you work through the problem. Determine exactly what you are trying to find.
- At this point you must think about the situation described in the problem and try and relate what is happening to the fundamental concepts that you have learned in the lectures. Do not rush this step! If you can think of more than one way of approaching the problem try and figure out the most efficient method.

- Now you should view the problem as a puzzle in which you know where to start (the given quantities) and the end (the answer you need.) The method of going from the start to the end of the puzzle involves applying the relevant theory based on the concepts that you have identified in the previous step.
- The final part of the problem solving process is to apply the correct theory with the relevant mathematical equations. Many problems will require the solution of a set of equations in order to obtain the final results.

Preparing for the Recitation Classes:

- Before you attempt the assigned problems you should have a good understanding of the basic theory as discussed above.
- Most students need to see how the new theory is applied to practical problems before they can solve problems on their own. You should review the examples done in the lecture class and some of the sample problems given in the text.
- It is *extremely important* that you try the assigned problems before the recitation class. Thinking about the problems, on your own, is essential to the learning process. Even if you are unable to do all of the problems you will learn much more in recitation if you have at least tried them ahead of time.
- Before the tests you must gain confidence that you can do typical problems on your own. Therefore if you work in a study group it is very important that you also *spend sufficient time working by yourself*. The most difficult step in problem solving is usually the first step in deciding what tools to use. This skill must be obtained by doing adequate individual work.
- Do not wait too long before coming for help.

Preparation for the Tests:

- Hopefully you have been following the advice above to try the problems assigned for your recitation session **before** you see your recitation instructor do them.
- Begin your studying well before the test and avoid last minute work - be sure to get a good rest the night before the test - no all-nighters!!
- Understand all of the theory and the content of the fundamental equations (on the equation sheet) before you do review problems. Just reading through the solutions for a lot of problems *has minimal value*. You should check your understanding by thinking about representative problems that were discussed in the lecture, assigned for the recitations sections and the sample problems from old tests. *You should only read the problem description without looking at the solution*. If you are sure you know how to do problems based on that particular theory move on until you find something you are not sure of. One of the primary goals is to identify area of weakness *before the test* and then try more of those types of problems to test your understanding. Only look at the solution if you get stuck. If you do get stuck be sure to figure how what it is that you do not understand.

- You may find working on problems with other students (or a tutor) is helpful. However, I believe that the most valuable time you spend is working on your own to discover your strengths and weaknesses. Therefore if you have been working with other students be sure to ***also spend time working on your own to develop the necessary level of self confidence.***
- Do not bother trying to memorize formulae developed for a particular problem since the formula you remember is probably not even applicable to the test problem. You should start the test problems from the fundamental level of the formulae on the equation sheet.