

STUDYING MATH, SCIENCE AND TECHNICAL SUBJECTS

BEFORE CLASS:

- ✓ Preview the text material that will be covered in class – find out what you already know and don't know to help you focus during the lecture or workshop.
- ✓ Review the notes from the previous lecture – get ready to add to it or apply it.
- ✓ Make note of any new terms or formulas you encountered in your reading and make sure you listen for them in the lecture or workshop.
- ✓ Formulate questions you have about the previous homework or class work. Be specific and concise; no teacher is willing to re-teach the entire lesson.

DURING CLASS:

- ✓ **TAKE NOTES!** Make sure you include both the examples and the theory behind the examples. Most students miss the conceptual framework in problem-based and technical subjects if they just write down the examples the teacher uses. Look for the basics – formulas, steps, exceptions to the rule, any explanatory remarks the professor makes, etc.
- ✓ Ask questions as the professor proceeds through the problem-solving process or procedure. If a professor does not allow questions – write down as much as you can verbatim, especially key words.

AFTER CLASS:

- ✓ As soon after class as possible, reread your notes. Check for errors, questions, and omissions. Fill in any information you can from a peer's notes or the textbook.
- ✓ Review your notes daily. Reread them before attempting to do the homework. Look for information you might want to use to create a "cheat sheet." Pull out important formulas, steps, and one good example for each concept. Create study aids to use later.
- ✓ Complete the homework, even if it is not collected. This is critical in problem-based and applied courses. You **MUST PRACTICE** the application of the procedures and concepts.

Analyze difficult problems by:

1. Drawing a diagram or picture of the problem.
2. Outlining the steps in a procedure (including hidden or assumed steps)
3. Working through problems step by step until you can determine where your understanding falls apart.
4. Seeking help from tutors, classmates, assistance labs, or your professor. The sooner the better!
5. Practicing, practicing, practicing! *First*, do problems with the aid of your text and notes. *Then*, attempt problems with minimal study aids -- like a "cheat sheet" or 3 X 5 cards only. *Next*, attempt similar problems without any references and under timed conditions. *Finally*, do several different types of problems randomly to guard against test-anxiety.

10 QUESTIONS TO ASK YOURSELF WHEN YOU RUN INTO TROUBLE:

- Can you determine what is given and what is not given in the practice problem?
- Can you come up with at least one strategy for solving the problem?
- If there are multiple possible approaches to the problem, can you determine the conditions under which each approach should be used?
- Can you think of a formula, theorem, or definition that might be relevant to the problem?
- Can you “work backwards” and determine what you need to know in order to complete the problem?
- Can you find a similar example in your textbook or notes and use it as a model for solving the problem?
- Can you break the problem into smaller parts and relate each section of the problem to the larger whole?
- Can you guess or estimate an answer and then try to see if it’s correct or close. (The method you come up with to check may be close to the procedure you need to use.)
- Should you take a break and return to the problem later?
- Can you find someone to help you?

AFTER THE EXAM:

Analyze returned quizzes and exams to help you prepare for the next exam. Ask yourself the following questions:

- *Did the majority of the questions come from textbook, lecture notes, or other source?*
- *How were the problems different from those I expected?*
- *What type of errors did I make? (Careless computations, rushing through problems, labeling errors, lack of understanding, not enough practice, uncertainty about approaches to use, lack of prerequisite knowledge or skill, test anxiety, lack of preparation or practice, did not seek additional assistance, procrastination and/or cramming?)*
- *How should I change my approaches for the next exam?*

For further information go to:

<http://www.rit.edu/lponline> (RIT Study Skills Web Site)

<http://www.utexas.edu/student/utlc/lrnres/handouts> (U. of Texas Learning Center)