Guidebook for Studying and Learning in STEM

STEM = Science, Technology, Engineering, and Math

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1. Test Preparation

When it comes time to prepare for an exam the first thing a student should know is what material will be covered. This may be as simple as the instructor specifying a number of chapters in a textbook or it may cover a host of other items such as techniques learned in a lab, class discussions, or other outside readings. The important thing to know is what is on the test so that you can be well prepared. Make sure that this is clearly communicated by the instructor as this will save time by not having to concentrate on areas that will not be included.

A study guide for each test is essential. Your instructor is not responsible for giving this to you, so you may have to come up with your own. How can you make up your own study guide? A really good place to start is the detailed Table of Contents of your textbook. For each chapter you were responsible for, write out all the headings from the Table of Contents that you have worked on as a class (your teacher may have skipped some sections of some chapters). Now take each heading and figure out what was really in that section using your chapter and notes. Write out any subtopics within that section. If you keep going in this manner, you will have made yourself your own detailed study guide.

One of the best sources of information for reviewing the course material is often your own class notes. Not only is it written in your own language but it often stresses concepts and terminology that the instructor wanted to emphasize. Reading through your own notes and highlighting the important points can be an effective means of reviewing the material. Once you have refreshed your memory you can then go back and review the textbook. Often doing it in this order reinforces the material that you reviewed in your notes. If there are practice questions at the end of the chapters now is a good time to try and answer these.

Aside from studying the notes and textbooks many students find study groups to be helpful when preparing for an exam. A small group of four or less is ideal for this purpose. It can be fun to quiz each other on the test material and can also be satisfying when you can help another individual to understand something they may find difficult. When you are able to explain a concept to someone else in the group it helps to reinforce that learning in your own mind. Study groups can be conducted throughout the course or may be useful right up to the day before the test.

Active Learning Tips
- *Join a study group*
- *Explain concepts to others*
- *Quiz your peers*
- *Use flash cards*
- *Practice writing essays*
- *Test yourself*

When there is a large amount of material that must be committed to memory such as formulas, definitions, symbols, etc., a set of homemade flash cards may be helpful. Write the word, symbol, or name of the formula on the front of the card with the corresponding definition or formula on the back. A quick review of this material can be done quite effectively by scanning through the cards any time you have a few free moments. Since they are small and portable this exercise can be done almost anywhere. Cards can be separated into two

groups as you go along- those that you know the answers immediately and those that require some more thought. This will allow you to focus on the set of cards that requires a bit more concentration. However, always remember that **memorization is not necessarily learning.** Memorization must remain secondary to truly understanding the terminology and concepts presented in your course material.

Practice tests are a great way to check how prepared you are and have the added advantage that they can be taken in a more relaxed setting. You can make your own test from class notes or use the one found in your book. Practice tests can usually be found at the end of a textbook chapter with the answers usually given on a separate page. However, a better gauge of what the test will be like is to obtain a copy of an earlier exam given by your instructor. If they have not made these available you may be able to ask for them before the test. These are usually a good indicator of the type of questions that will be asked as well as the degree of difficulty you are likely to encounter. If you can obtain a copy of an older test do not take it until you have done a fair amount of preparation otherwise you will not be able to accurately determine how ready you are. Remember to practice essay questions as well. Essays are frequently an indication of your true understanding of course material.

If the exam is "open book" or if you are allowed to bring in outside reference materials, it is often helpful to organize your materials ahead of time. This saves time by not having to consult the index or a table of contents during the test. It can be as simple as a set of tabs placed in a textbook highlighting the critical sections or the important tables that you'll need for doing calculations. When you organize the information this way it also helps you to commit it to memory.

Planning for any test accommodations should also be part of your preparation for exams. Everyone is different and if you need to take tests orally, on a computer, or using any kind of special equipment plan ahead, talk to your professor, and make arrangements so that you are organized and worry-free on the day of the exam.

Using the techniques described above will increase your chances of doing well on the test. It is not advised to wait until the night before the test to begin reviewing the material or to "cram". This usually makes you more tired and raises your level of stress prior to the test.

The Study Cycle

The study cycle is a 5-step approach to learning designed to help students become more efficient learners. It works the way your brain learns best. It reinforces new content and builds confidence. The study cycle can be easily adapted to any coursework. The five steps of the study cycle are:

- **Step 1 - Preview**

  Preview your text and other study materials before class to develop a big picture of what you'll be covering. Skim through the chapter, noting all headings, subheadings, bold words, graphs, pictures and summaries. Once you've developed a big picture, it will be much easier to remember and learn the detail.

- **Step 2 - Attend**

  Attending class should be an obvious step, but some students don't take it seriously enough. Missing even a few classes can be detrimental to your studies and the learning process, especially in subjects such as math. Combined with previewing, attending class will allow you to get more from lectures and take better, more concise notes.

- **Step 3 - Review**

  Preferrably right after class, but at least sometime during the day, take about 10 minutes to review your class notes. This process of review transfers the information you learned during class from your short-term to your long-term memory. It also reinforces new concepts and increases confidence.

- **Step 4 - Study**

  To reinforce the new material you learned during class, and to make sure you thoroughly understand the subject matter being taught, take about 30-50 minutes to review your notes, read your text book, work problems, make concept maps, or form a study group. As you study, ask yourself 'how', 'why' and 'what if' questions. Dont't forget, repetition is the key.

- **Step 5 - Assess**

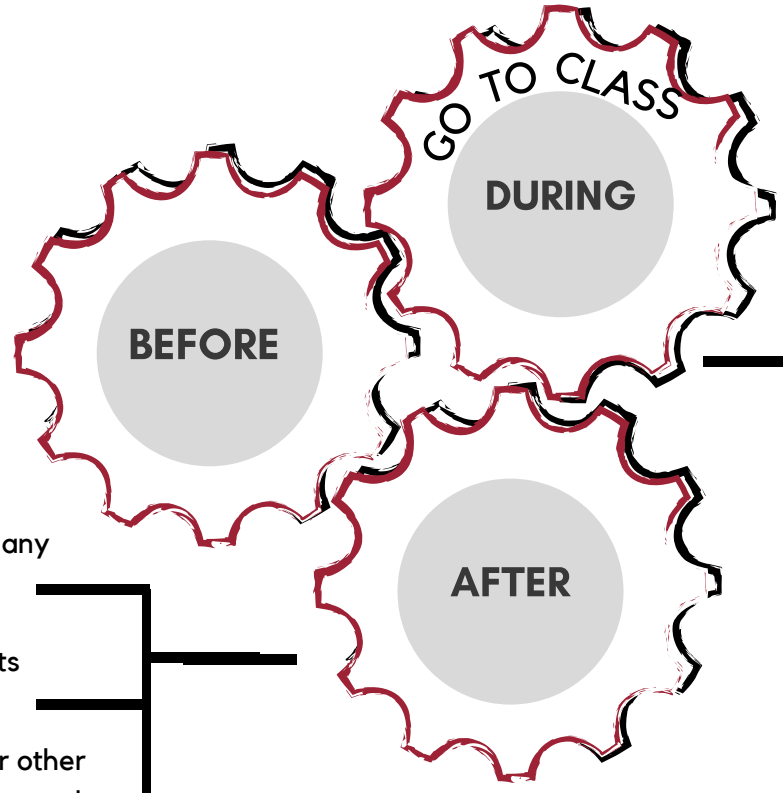
Reflect and evaluate your mastery and understanding of the material you learned and studied. Ask yourself, "Is the information I'm studying making sense?", "Am I confident with the new material?", "Do I understand the material well enough that I can teach it to someone else?" Assessing your studying from time to time is an essential aspect of learning.

Source: https://www.educationcorner.com/the-study-cycle.html

UNIVERSITY OF ARKANSAS
College of Engineering

Success in Class

HOW TO ENHANCE ACADEMIC SUCCESS FOR ENGINEERING STUDENTS



Preview syllabus and skim upcoming material

Note main ideas and write down questions

Be an active listener- gently bring yourself back to the present if you get distracted

Look for the relationship between concepts

Take efficient notes and leave room to fill in details later

Ask clarifying questions

Review class notes and note any knowledge gaps

Start homework/ problem sets the same day

Use focused study sessions or other learning strategies and keep a study schedule to avoid cramming

FOCUSED STUDY SESSION

SET GOAL
1-2 minutes

SET TIMER & STUDY
30-45 minutes

BREAK
5-10 minutes

REVIEW
5 minutes

Then you can choose to switch tasks or launch into another focused session!

Adapted from the "Study Cycle," Louisiana State University, Center for Academic Success and the PLRS System by Frank L. Christ