

Learning and study guide

*KNOWLEDGE exists as neural networks in the brain. LEARNING is a biophysical process and occurs when new connections are formed between neurons, expanding the neural network. These connections are not permanent. Repeated use, in varied forms, is **critical** to strengthening the connections and expanding them to other networks. Without repetition and continued use, connections degenerate.*

1. Read the text before class.

Don't expect to understand it all, just read it. Reading the textbook before class acquaints you with the information so that the classroom is where you see the material for the second time. You *will* find yourself saying, "Oh, so *that's* what the textbook means!"

2. When studying, don't just read, write and talk!

Writing and talking are forms of active learning.

Taking notes, rewriting your notes, and completing assignments uses motor skills to further strengthen and expand the neural networks. Rewriting your notes (weekly and again at the end of term) forces you to critically review the information, follow the 'train-of-thought' of the instructor, and repeat it in your own words. Importantly, you end up with a smaller but complete set of notes from which to study! When studying, work through exercises in a simulated examination environment (i.e., without consulting the solution's manual). Cue cards or a 'super-summary' of your notes are a great study tool. These contain only the major concepts and key points; read a key point and then fill in the details in your mind.

Talking forces you to dynamically formulate your knowledge into coherent statements, again using and expanding the neural networks. Working in peer groups (two to six people) is an excellent way to pool and share knowledge. Students often explain concepts in a way that peers can relate to and teaching is an excellent way to learn.

3. Don't pull 'all nighters'.

Your ability to learn when fatigued is very low. Furthermore, your minds' ability to recall information and dynamically formulate answers is faster if you get a good nights' sleep, not live off caffeine, etc.

4. Don't study right up to the exam.

Take at least a four-hour break before the exam. Get active: go for a walk, to the gym, etc. Your mind can better consolidate what you have learned if you aren't cramming more in. Your mind will be refreshed for the exam and you will be able to recall information faster.

Exam-taking suggestions

1. Read the exam start to finish.

This should take no more than a few minutes but will give you an overview of the entire exam. Your mind will begin processing all the questions. Some instructors even give hints/answers to questions in other questions.

How many times have you been stumped on a question during the exam and, while walking away, had a revelation on how to answer it. You weren't thinking about it, were you? Now consider if your mind had been unconsciously processing that question for a while longer (like from the start of the exam).

2. Go through the exam and answer questions you know 'by heart'.

Your train-of-thought should be, "One: I know how to do this ... <answer>. Two: not a clue. Three: hmmm, not really sure. Four: oh yeah, that's how four is done ...<answer>. Five: like this ... <answer>. Six: ..."

Rereading the questions will keep your mind working on them. When the revelation strikes: "Oh yeah, that's how question three is done!", go back and complete three while it is still fresh in your mind. If you are stuck on a question, move on to the next one.

3. Go through the exam and *write something* for questions you haven't tried yet.

As you take higher-level courses, questions become more complex and there may be more than one path to the correct answer. Writing may spark an idea. Try rewriting the question in your own words and jotting down ideas. Don't be afraid to write something that may be wrong. If nothing else, putting something on paper gives the instructor something to mark! **J**

4. Reread each question and your answer.

If you begin to second-guess yourself, leave the first answer! Studies have shown that the first answer is more often correct. *Only* change an answer if there is an obvious mistake, like you misinterpreted the question. For mathematical questions, consider:

Is the answer of *reasonable* magnitude? Is it dimensionally correct (unit analysis)?

Redo the calculations to ensure you haven't made a simple mathematical error.