

ESSENTIAL MATHEMATICS

PREPARING FOR THE EXAM

During the academic year, there will be seven examinations: in October, November, December, January, March, May and August. Check this website for the precise timetable of the next exam.

1. Before the first exam

To begin, download the web-book with the exercises. No need to print it, yet. Look through, to get a feel of what EM is all about. You will see that at the end of each section there are starred exercises, grouped together; these are very similar to exam questions.

Attempt one starred exercise for every group, chosen at random. If you get them all (well, almost all) correct at the first attempt, then you are EM-fit: read sections 2 and 6. If instead you have got several starred exercises wrong (or — worse still — found them positively difficult), during the few days preceding the first EM exam, ignore starred questions altogether, and concentrate on the *easiest* exercises leading to the questions you have failed. This effort may not suffice, but it will not be wasted. If you need help, see your advisor.

2. During the exam

Five answers are given for each question: four mathematical expressions, and a ‘not in the list’ (of the previous four). All answers, except one, result from common mistakes. So, if the result of your calculation matches one of the answers, it does not mean it is correct, and conversely, if it does not appear in the list, it does not mean it is wrong.

Ignore the given answers: they are designed to CONFUSE YOU, not to help you!

Perform your calculation, then check it carefully. When you are confident of your result, compare it with the given answers, remembering that your answer may be correct, but not simplified as requested, or simply taking a different form (i.e., $\sqrt{8}$ instead of $2\sqrt{2}$). Then mark your answer on the exam paper. During the last ten minutes or so of the exam, fill the answer form by ticking the appropriate boxes. We advise you against filling the form straight away, since this increases the likelihood of making mistakes.

If you do make a mistake, tick the ‘cancel’ box of the answer you wish to correct, and write the correct answer in the area below, remembering to fill in the corresponding question number.

Common mistakes:

- Attempting to guess the result by looking at the given answers.
- Failing to check the calculations.
- Filling the answer form too soon.

3. If you fail the first exam

You are not alone: most students fail the first exam. Follow the programme conscientiously, keeping in mind that a little daily effort is more effective than working one afternoon a week. The difficulty is to keep going beyond the first few days. If you are prone to procrastination, *time yourself*, and keep track of all your EM activities week by week.

We offer weekly *lectures*, and *tests*, and you can see your *advisor* during office hours.

The lecturer will cover all the material in the web book, will review formulae, tricks of the trade, and methods to check the correctness of a calculation. You'll also do exercises on the material that has been explained, and you'll have the opportunity of getting individual attention. Do not be afraid of asking elementary questions, say, on some primary school topic; for us no question is too elementary.

After each lecture, attempt the exercises in the relevant section of the web-book. Begin from the simplest exercises, and proceed to more complicated ones only when you consistently get the right answer. *Do not skip exercises*. If you get stuck or get it wrong, make a second attempt; if that fails too, make a note of the exercise(s) that you find difficult.

The weekly test is an opportunity of testing your skills under examination conditions. It is shorter than an exam, and it will feature questions on a limited number of topics —those covered during the last lecture(s).

Quite aside from their intrinsic value, lectures and tests are very useful to keep you going. So *attend regularly*, even if this may not seem important.

4. If you fail the second exam

A student with poor EM skills may need some 70–80 hours of work to become fit for the exam. So, if you have worked at EM regularly until now, there is probably nothing wrong with your approach; just keep going. I suggest however, that you discuss your situation with your academic advisor, who has been informed of your lack of success.

By now you have two examination answer forms, which give you precise information on your strengths and weaknesses. If there are topics where you do not have problems, you may ignore them for a while, and concentrate on the rest. Much of the material is sequential, in the sense that one's ability to perform a task depends on having mastered a previous task. For instance, computing with fractions requires being able to simplify them, which requires computing the greatest common divisor, which requires prime factorization, which requires long division.

Identifying the nature of your difficulties may not be obvious, and for this you may need help: talk to your lecturer, or advisor. *Are you seeking enough help?*

5. If you keep failing

On average, the EM programme should allow a student to pass the exam with no more than three months of regular work. If this has not happened, you must understand why. Discount the argument 'this stuff is too hard for me'. Several things may have gone wrong, ranging from inadequate effort, to a part-time job taking

up too much of your time. The easiest way to deal with this problem is to discuss it with your advisor, who can greatly assist you in this matter. *Make use of the help that is offered to you.*

6. Mock exams

On this web-site, there are sample examination papers, with answers.

- Download and print one exam paper and answer form.
- Read the rubric, carefully.
- Start the exam. Time yourself.
- Record your answers on the answer form.
- Download the solutions and mark your exam.

If you have no more than 3 errors, you have passed the mock exam. In any case, record the errors you have made, and perform some targeted remedial exercises from the web-book. Only then attempt another mock exam.