

Study Skills in Mathematics and Statistics

The main points are that you need to be organized, you should attend all classes and submit all work, you need to identify material that you do not understand, and then ask about this material. Everybody who does maths gets things wrong, but it is how they react to these events that determine whether or not they will succeed. Most of all do not give up and be patient with yourself.

Lectures and Lecture Notes:

- It is essential to attend all your lectures.
- You need to take accurate notes.
- Try to listen, understand and ask questions.
- Keep the notes from each module together in one place.

Key advice: Many people rewrite their notes soon after the lecture, or at the very least they read them again. This helps identify material that you understand, and just as important, it identifies material that you do not understand.

Studying Mathematics:

- Studying maths is not just about doing examples.
- You should read notes soon after the lecture and make sure you understand them.
- Make a list of items you are unsure of, and ask questions at this stage of lecturers\tutors\MSC\friends.
- Use the textbook to find other explanations of material that the lecturer covered in class.
- Remember not to just focus on examples, read the introductions, definitions, explanations; these will help your understanding more.
- Use the table of contents and the index in the book to help locate material.
- Use the internet to find different explanations, there are some excellent resources out there, e.g. www.mathcentre.ac.uk, www.patrickjmt.com, www.khanacademy.org, but be active rather than passive, i.e. ask yourself questions, use the videos to clear up material that you do not understand.
- Important when you note something you do not understand to ask yourself WHY you do not understand it. Is it a definition you can not follow, notation you do not understand, etc.

Key advice: Many people adopt a policy of keeping a separate notebook where they accurately list specific items from their course that they do not understand. This list will never stop growing, so it is a good idea to add to it as you are working, do not sit down to compose an entire list in one day. Then, each time you go to ask for help, you can try to get one thing on

the list sorted out. When you do understand it, mark it off the list. It may seem like a slow process but it allows you to organize the things you do not know into a specific place, and everything you mark off the list is increasing your understanding and giving you a better chance of succeeding.

Working on Assignments:

- Start your assignment as early as you can, even if it is just to identify what the questions are asking and to locate where this material was covered in the notes.
- Work on your own before looking for help, it is very important to identify what you do not know.
- Use the notes and the book at this stage but be careful not to just try adapting examples, try to understand the examples and then work on your own problem separately. Remember to use definitions and explanations in the notes, not just the examples. Relevant definitions and explanations can be used as part of your solution to help you remember the process involved.
- Once you have identified what you do not know, then you should avail of help through the MSC, your friends, online etc.
- Glossary of definitions.

Key advice: Remember, maths is not an instant subject, sometimes it can take time for things to click or make sense, and this is a natural step in the process of understanding. When you first encounter a question, the hardest thing to do can often be taking the first step. Often the best first step is to write down what you know of the terms used in the question, e.g. if it asked you for the domain of a function, write down that the domain is the set of all allowable inputs (x), and this should start you on the road of thinking about what inputs are allowable etc.

Working in Groups:

- There are advantages and disadvantages to working in groups.
- The biggest advantage is that you see that other people have similar problems, that you are not the only one with these issues with Maths, and that you can work through these problems with classmates. It can be really useful to bounce ideas off other people. You often find that you will be able to discuss certain questions with others, and when you are explaining what you know, that's when you truly know if you understand it or not.
- The biggest disadvantage is that you can accept the explanations from friends, even though you don't understand them. Remember that in the end, you need to be able to work things out for yourself. Also, some students are reluctant to admit in front of others that they do not understand material.

Key advice: Working in groups can be extremely useful and enjoyable, as long as you realize that it is helping you to better understand your material. When you are outside a group, you need to make sure that you can do this material on your own, as you will be on your own in the exam.

Exposition:

- The way that you write maths is very important, not just for your teacher but for you yourself. You need to understand what you have written down, it needs to make sense. When you look back on work that you have done, you should understand what you are saying, and somebody else should be able to read it and understand it too.

Let's look at some examples of expositions to see what we should do...

Key advice: Write maths in a way that you understand, and you are sure that someone else reading it will understand. Be tidy and have a sensible structured layout.

Final Advice:

Do not be afraid of being wrong, everyone who does maths spends their time wondering what is going on and getting things wrong. However, the difference between people who succeed and those who do not, is that the people who succeed generally ask why they've gone wrong, they find the mistake or the point they do not quite understand, they ask (repeatedly) for help, and when they finally understand, they learn.

Use your corrected homeworks as one way to identify problems, ask yourself why you got this mark, try to identify where you went wrong and seek advice on how to fix those mistakes.

It is natural to be stuck, to be unsure what to do, if you look at a problem and can't see what to do, don't give up, try an experiment, try something...

Listen to your lecturers' and tutors' advice; they have many years of experience of dealing with students who were in a similar position to you.

Finally, you need to view getting thing wrong in maths as a positive, it is an opportunity to identify where you are making errors, and subsequently following up and clarifying these issues is the best way to succeed. It can seem like a tough route to take, but you will see progress if you stick at it.

This advice sheet and the advice sessions were constructed by Dr. Ciarán Mac an Bhaird and Dr. Ann O'Shea from the Department of Mathematics and Statistics, but are largely based on comments from students. Students, from a wide range of mathematical backgrounds, were asked how they dealt successfully with mathematics in NUIM, and this reflects what they told us. If you want to see their actual responses, the document 'Advice from former First Year Students' is available on all four first year module Moodle sites.