Introduction

The Mathematics Entrance Assessment for NatMatSci contains 25 multiple choice questions. The questions are designed to understand the breadth of an applicants' mathematical acumen, as well as the depth of their understanding. A good understanding of the topics listed in this syllabus will enable candidates to perform well in this test, but routine knowledge alone is not likely to be enough: some experience with mathematical problem solving and a certain level of mathematical maturity will be required to access some of the questions. Therefore, it is recommended that candidates don't focus only on drilling exercises designed to develop fluency, but also are exposed to more unique problems which require a bit more creativity, systematic thinking, persistence, and wisdom. (The UKMT Intermediate Maths Challenge papers are a very good source for these types of problem.)

Syllabus

- Manipulating surds and laws of indices
- Substituting and rearranging expressions
- Rates and proportion (but *not* calculus)
- Simultaneous equations
- Area formulas (triangle, trapezium, circle)
- Factorising, including quadratics and difference of two squares
- Averages (mean, median, mode)
- Counting (including $\binom{n}{r}$ and the multiplication principle)
- Parabolas (including knowledge of roots, vertex and y-intercept)
- Probability (including tree diagrams)
- Basic trigonometry (Pythagoras' theorem and *sohcahtoa*)
- Gauss' formula for $1 + 2 + \cdots + n$
- Angle chasing (complementary angles, supplementary angles, etc)
- Linear equations (including perpendicular gradients)
- Percentages (including compound interest and calculating percentage change)

In addition to the above, some *basic* facts from physics, biology and chemistry will need to be recalled in order to answer a small number of questions. We won't specify these, but any student having studied sciences previously would reasonably be expected to know them.

Scoring

The assessment is scored on a scale of -25 to 100. Each correct answer is worth 4 marks, and an incorrect answer is worth -1, the expected value for randomly chosen answers is therefore 0. There is no specific range of scores which guarantees a place, rather the assessment will form a part of our overall holistic assessment which includes the English assessment, where required, and an interview.