Guidelines for the use of the online bridging programme by Chemistry students

As explained in the main introduction to the bridging website, there are five separate courses available to you: Maths Bridging Programme, Chemistry Bridging Programme, Physics Bridging Programme, Computing and Study Skills and Laboratory Work. The Laboratory Work and Study Skills programmes are relevant for students of all subjects but the parts of the other three programmes that are relevant to you depend on your degree. So, before you start please read the advice below.

Maths Bridging Programme

Students in Chemistry do not need to take all of the programme. Many of the topics are primarily for the benefit of Physicists and Engineers. The Chemistry degree assumes only knowledge equivalent to the A-level C1-C4 syllabuses. Any topics covered only in A-level 'Further Maths' will be taught during the first year. This is illustrated by the table below, where you are advised to focus at this stage on the core maths topics required by Chemists.

Topic	**Essential knowledge**	**Helpful if students know this**	**Not needed before students start**
1. Basic geometry, trigonometry and misc. functions			
1.1 Basic geometry	Circle/parabola	The others	
1.2 Binomial expansion, Taylor/Maclaurin series, use in finding limits	Binomial and (1+x)^n		Everything else
1.3 Sums of geometric and arithmetic progressions	✓		
1.4 Sine, cosine, tangent	✓		
1.5 Important functions	Exponentials, logs		Hyperbolics
Extension material: Proof by induction			✓
2. Vectors and matrices			
2.1 Vectors and scalars	✓		
2.2 Resolving vectors			✓
2.3 Scalar and vector products			✓
2.4 Matrices – adding and multiplying of matrices by scalar			✓

2.5 Matrices – multiplying matrices			✓
2.6 Definition of the determinant and finding the inverse of a 2x2 matrix			✓
Extension material: Inverse of 3x3 matrix and solving simultaneous equations			✓
Introduction to linear algebra			✓
3. Differentiation			
3.1 Derivative defined via slope of curve		✓	
3.2 Differentiation of basic functions		✓	
3.3 Products and quotients	✓		
3.4 The chain rule	✓		
3.5 Use of differentiation to find stationary points + curve sketching	✓ (only basic sketching required – powers, exponential, log, circles)		
Extension material: Implicit differentiation	✓		
4. Integration			
4.1 Integration in general	✓		
4.2 Techniques for solving integration: a) inspection	✓		
4.3 Techniques for solving integration: b) substitution	✓		
4.4 Techniques for solving integration: c) partial fractions	✓		
4.5 Techniques for solving integration: d) parts	✓		
Extension material: Applications of integration			✓

5. Differential equations			
5.1 1st order equations: separable		✓	
5.2 1st order equations: integrating factors			✓
5.3 2nd order equations: homogeneous			✓
5.4 2nd order equations: inhomogeneous			✓
5.5 Linear vs non-linear differential equations			✓
Extension material: Solving complicated linear differential equations			✓
6. Complex numbers			
6.1 Complex numbers in general			✓
6.2 Complex arithmetic			✓
6.3 Argand diagram			✓
6.4 rexp(i□) form			✓
6.5 De Moivre's theorem			✓
Extension material: Applications of complex numbers			✓
7. Statistics			
7.1 Standard definitions and different probability distributions			✓
7.2 Fitting straight line data with the method of least squares			✓

Chemistry Bridging Programme

All topics are relevant so you should complete all sections.

Physics Bridging Programme

None of the Physics bridging programme is essential for Chemists before you start.

Topic	Essential knowledge before you start	Helpful if students know this	Not needed before students start
1. Mechanics			
1.1 Simple dynamics		✓	
1.2 Newton's laws and resolving vectors		✓	
1.3 Beyond SUVAT			✓
1.4 1D collisions			✓
1.5 Gravity and orbits			✓
1.6 Simple harmonic motion			✓
2. Data handling and Statistics			
2.1 Data handling and statistics		✓	
2.2 Sampling from populations		✓	
2.3 Experimental errors		✓	
2.4 Propagating errors			✓
2.5 Linear regression			✓
3. Circuits			
3.1 The basics			✓
3.2 Important laws			✓
3.3 Circuits and resistors			✓
3.4 Circuits with capacitors			✓
3.5 Circuits with inductors			✓
3.6 Real components			✓

Computing and Study Skills

All science degrees at Oxford will use computers for one or more of the above tasks, perhaps involving writing specific pieces of code, or by carrying out experiments with computers acquiring the data.

The computer packages used during your degree and suggested online courses to study before you arrive in Oxford are detailed below.

Subject	Computer package(s) used during degree	Suggested online courses to study before arrival in Oxford
Chemistry	Matlab, Python, Mathematica, Excel	Excel

The study skills information is relevant to all students.